IN-SITU ANAEROBIC DECHLORINATION OF POLYCHLORINATED BIPHENYLS IN HUDSON RIVER SEDIMENTS

By

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ABSTRACT

Anaerobic dechlorination of PCBs in Hudson River sediments was studied using paired samples from co-located sediment cores. Cesium-137 dating provided the basis for pairing samples deposited at about the same time. The sediment cores were collected approximately eight years apart from the upper Hudson in the Thompson Island pool and from the lower Hudson near Kingston. These locations represent areas with high (1000 ppm) and moderate (10 ppm) levels of PCB contamination, respectively. Congener specific analysis was conducted to examine specific pathways of *in-situ* dechlorination. Comparisons between Aroclor 1242 and the extracts from sections of the earlier core and between the paired sections of the co-located cores, permit characterization of anaerobic dechlorination *in-situ* at two distinct time intervals.

Both upper Hudson cores showed substantial loss of tetra- and penta-chlorobiphenyls (penta-CBPs) and enhancement of di-, and mono-CBPs relative to standards of the original Aroclors (primarily1242 and 1016). During the *in-situ* incubation period, large reductions in the penta,- tetra-, and tri-CBPs were matched by increases in the mono-, di-, and tri-ortho substituted congeners (2-CBP, 2,2'/2,6-CBP, and 2,2',6-CBP) and several other di- and tri-CBPs (2,3'-CBP, 2,2',4-CBP, 2,3,6/2,3',6-CBP, and 2,3',5-CBP). During the second *in-situ* incubation period, decreases in tri- and di-CBPs were balanced by large increases in 2-CBP, 2,2'-CBP, and 2,6-CBP, which accounted for 30 to 40 percent of the PCBs in the more recent core.

The mono-ortho substituted congeners were initially dechlorinated from the para position, resulting in increased abundances of congeners with ortho-meta substitution and 2-CBP. Only after all or most of the chlorines in the para position were removed, did dechlorination from the meta position ensue. In a reverse fashion, the di-ortho substituted congeners were initially dechlorinated from the meta position resulting in accumulations of ortho-para substituted congeners, 2,2'-CBP, and 2,6-CBP. Chlorines in the para position were removed after significant accumulation of the ortho-para substituted congeners (2,2',4-CBP and 2,2',4,4'-CBP) occurred.

In samples from the tidal Hudson cores, congener patterns were much more similar to those of the original Aroclors. The lesser extent of dechlorination is attributed to the lower PCB concentrations at this site and less effective acclimation of PCB dechlorinating bacteria. Although less dechlorination had occurred, consistent alteration of congener patterns was observed. During a nine year *in-situ* incubation period, decreases in tetra- and penta-CBPs were accompanied by increases in tri- and di-CBPs. The levels of 2-CBP, 2,2'-CBP, 2,6-CBP and 2,2',6-CBP did not exceed three mole percent in the later core. The dechlorination patterns observed in the lower Hudson could reasonably be interpreted as the initial stages of the *in-situ* dechlorination process seen in upper Hudson sediments. Although dechlorination was apparent in both the upper and lower Hudson sediments, no reduction in PCB concentration over time was required to explain the observed congener patterns.

The PCB congeners in the sediments of the upper Hudson River are dechlorinated to four common terminal dechlorination products, 2-CBP, 2.2'-CBP, 2,6-CBP, and 2,2',6-CBP. Several recalcitrant congeners, which increase in concentration initially, (2,3,6-CBP, 2,3',6-CBP, and 2,2',4,4'-CBP), and appear quite stable, do show signs of reduction in the oldest sediments studied. Interestingly, neither the sediments with the longest *in-situ* incubation times, nor those with the highest PCB concentrations, had the most dechlorinated PCBs. For the shortest *in situ* incubation (about one year), dechlorination of PCBs in the upper Hudson sediments occurred with a rate constant that was within the range of those determined from laboratory incubation studies. After the more labile congeners were depleted, dechlorination proceeded with an apparent first-order rate constant that was one to two orders of magnitude smaller.

CHAPTER ONE
INTRODUCTION AND LITERATURE REIVEW

1.1 Introduction

Discharges of polychlorinated biphenyls (PCBs) from two capacitor manufacturing plants located in Fort Edward and Hudson Falls, New York occurred from ca. 1950 until 1976. As a result, the sediments along approximately 200 miles of the Hudson were contaminated with PCBs. In addition, removal of a dam at Fort Edward in 1973 and record high discharge events during 1974 and 1976 resulted in the re-suspension and downstream transport of a large quantity of significantly contaminated sediments.

Since the mid-1970s, the PCB concentrations in the sediments of the Hudson river have decreased dramatically, with half times on the order of ca. 3.5 years (Bopp and Simpson, 1989). More recently deposited sediments continue to show fairly constant levels of PCB contamination, primarily a result of continuing inputs from the Hudson Falls plant. Recent remedial efforts at the plant have resulted in non-detect levels of PCBs in the storm-water run-off and a large decline in the amount of pure phase PCBs leaking into the river from fissures in the underlying bedrock (Haggard, 1997).

In 1984 it was discovered that the congener composition of the PCBs in samples from the upper Hudson River was significantly different from the source Aroclors. Although the PCB discharges were dominated by Aroclor 1242, a systematic shift in the pattern of congeners was observed relative to the pattern exhibited by Aroclor 1242 (Brown et al., 1984). Specifically, higher proportions of mono- and di-chlorobiphenyls and selective depletion of tri-, tetra-, and penta-chlorobiphenyls were observed. The transformations were attributed to a microbially mediated process. Several years later, the anaerobic dechlorination of Aroclor 1242 was demonstrated in the laboratory using microorganisms eluted from Hudson River sediments (Quensen et al., 1988).

Since that time, many laboratory experiments have been conducted using both commercial Aroclor mixtures and individual congeners in an attempt to clarify dechlorination pathways, mechanisms, rates, and the responsible microorganisms.

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However, relatively little progress has been made in studying the actual progress of anaerobic dechlorination *in-situ.*

1.2 Objectives

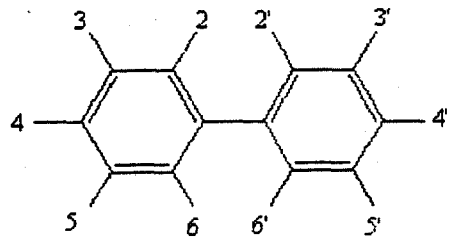
Congener-specific analysis of paired samples from co-located sediment cores collected approximately 8 years apart will be used to study *in-situ* anaerobic dechlorination in Hudson River sediments. Cesium-137 dating provides the basis for pairing samples deposited at about the same time. Two pairs of cores, from the upper Hudson River in the Thompson Island pool and the tidal Hudson River near Kingston, will be used. These locations represent areas that have experienced high (ca. 1000 ppm) and moderate (ca. 10 ppm) levels of PCB contamination, respectively.

The goal of this study is to provide quantitative information on the long term rates and pathways of *in-situ* anaerobic dechlorination. Comparisons will be made between the two locations and between the paired samples along each set of cores. This analysis will help to elucidate the dependence of dechlorination rates on PCB concentrations and allows for sensitive detection of the early stages of dechlorination. It is anticipated that the information provided herein will be applicable to other PCB contaminated systems and will serve to assist scientists currently studying anaerobic dechlorination with the ultimate goal of integrating it into a remediation technology.

1.3 Polychlorinated Biphenyls

A comprehensive review of polychlorinated biphenyls is provided by Erickson (1997). PCBs are class of non-polar, chlorinated hydrocarbons that are extremely stable. Their chemical and physical properties include: low vapor pressure, low aqueous solubility, non-flammability, low chemical reactivity, and high electrical resistance. Because of these properties, PCBs were widely used in transformers, capacitors, heat transfer and hydraulic systems, adhesives, plastics, solvents, flame retardants, paint, pesticides, and carbonless copy paper. Both their wide-spread use and subsequent fate as a persistent environmental contaminant are a direct consequence of their chemical and physical properties.

PCBs consist of a biphenyl nucleus with one to 10 chlorine atoms substituted for hydrogen atoms at various positions on the two rings. There a total of 209 possible congeners with the following general structure:



Chlorines occurring in positions 2, 2', 6, and 6' are oriented ortho, positions 3, 3', 5, and 5' are oriented meta, and positions 4 and 4' are oriented para relative to the biphenyl bridge, respectively. Congeners grouped according to the number of chorines present per biphenyl molecule are called homologs and the PCBs within each homolog group are called isomers.

Production of PCBs in the United States began in 1929 and continued until their use was banned in the late 1970s. Monsanto, the single largest producer of PCBs, synthesized approximately 1.25 billion pounds of PCBs and marketed them under the trade name of Aroclor. Aroclors are complex mixtures of PCBs identified by numerical designations indicating the approximate weight percent chlorine. For example, Aroclor 1242 has approximately "42" percent chlorine by weight. The only PCB mixture that did not follow these nomenclature rules was Aroclor 1016, which was introduced by Monsanto after significant concerns were raised about the toxicity and carcinogenity of PCBs. Aroclor 1016 is almost identical to 1242, also containing ca. 42 percent chlorine by weight. However, most of the hexa- and penta-chlorobiphenyls (minor components of 1242) were removed.

The extensive use of PCBs lead to their fate as a ubiquitous, global environmental contaminants. Discovery of PCBs in nearly all environmental media (e.g., air, water, soil, sediment, and biota) and studies suggesting that PCBs are toxic and carcinogenic resulted in the ban of the manufacture, processing, distribution in commerce, or use of PCBs after January 1, 1978 (15 USC 2601 et seq.; 40 CFR 761). Because PCBs are large, non-polar

molecules, they tend to accumulate in the fatty tissues of organisms that are exposed to them and subsequently magnify along the food chain. The more highly chlorinated congeners have a greater tendency to accumulate than the lesser chlorinated congeners which are more easily metabolized (Safe et al., 1982; Safe, 1992; Safe, 1994; Seegal, 1996).

1.4 History of PCB Use and Releases in the Hudson River Basin

The General Electric corporation used PCBs primarily in the manufacture of capacitors at its Fort Edward and Hudson Falls plants from the late 1940s until the middle 1970s. Capacitors were flood-filled with a reformulated PCB mixture (Pyranol™) and sealed in a vacuum chamber. The direct inputs of PCBs to the Hudson River primarily occurred as a result of washing the excess PCB mixtures from the outsides of the capacitors with water and detergent and discharging the wash water without treatment (Brown et al., 1984). It has been estimated that between 1966 and 1974, the two General Electric plants purchased ca. 3.5 X 10^{10} grams of PCBs from Monsanto, accounting for approximately 15 percent of Monsanto's domestic sales during that same time period (Horn et al., 1979). Various Aroclor mixtures were used throughout the operational history of the two plants (Bopp, 1979; Brown et al., 1984; Chillrud, 1996), as detailed below:

Table 1 -PCB Use - General Electric

	Aroclor Mixture			
Year(s)	**1254**	**1242**	**1221**	**1016**
1946-50	100%		--	--
1950-55	80%	20%	--	--
1955-64	5%	95%	--	--
1964-70	1%	99%	--	--
1971	--	76%	< 0.1%	24%
1972	--	--	< 0.1%	> 99%
1973	--	4%	< 0.1%	96%
1974-1975	--	--	< 0.1%	> 99%

The total PCB inputs to the Hudson River from the two plants has been estimated to be 6 X 10^8 grams; less than two percent of the total amount of PCBs purchased (Erickson, 1997). General Electric's first national pollutant discharge elimination system (NPDES) permit, approved in 1972, showed that the plants were averaging a discharge of 13.6 kilograms per day. In 1976, discharges were reduced to less than 250 grams per day and by 1977 discharges were reduced to less than one gram per day (Horn et al., 1979). As a result of a settlement between General Electric and the New York State Department of Environmental Conservation, purposeful discharges of PCBs ended on July 1, 1977.

Since that time, the extensive PCB contamination at the Hudson Falls plant has resulted in a continuous low-level PCB discharge of PCBs to the river as evidenced by the uninterrupted record of PCB contamination documented in the sediments. Sediment cores, collected along the length of the Hudson River and age dated using Cesium-137 chronologies, consistently indicate that: 1) the first appearance of PCBs occurred in the early 1950s; 2) maximum PCB levels consistently occur in ca. 1973 and appear to be related to the removal of the Fort Edward dam and subsequent high flow events; and 3) PCB levels have declined with half times of ca. 3.5 years to fairly constant levels in the more recently deposited sediments (Bopp, 1979; Bopp et al., 1981; Bopp et al., 1982; Bopp et al., 1985; Bopp and Simpson, 1989).

Recent, remedial efforts to contain the contamination at the Hudson Falls plant, include the construction of a large capacity waste water treatment facility to remove PCBs from stormwater run-off and contaminated groundwater. Since the waste water system has been operational, no PCBs have been detected in the water discharged to the river (Haggard, 1997). In addition, many recovery wells have been installed at the plant in an extensive effort recover the free phase PCBs from the underlying fractured bedrock. Efforts continue to totally eliminate discharges from the plant site to the Hudson River.

1.5 Transport and Fate of PCBs

The behavior of PCBs, once released to the Hudson River, is dictated by their large size and low polarity. In river water, the various PCB congeners tend to sorb to

particles in the water column, as predicted by their large suspended matter/water distribution coefficients (10^3 to 10^6; Schwarzenbach et al., 1993).

Large distribution coefficients, like those for PCBs, indicate a strong preference for suspended particles and sediments. The distribution coefficients of the individual PCB congeners coupled with suspended matter concentrations in the river water will determine the proportions of PCBs transported in the dissolved and adsorbed phases. Typical low flow suspended matter concentrations in the Hudson River are ca. 10 mg/l and typical high flow suspended matter concentrations are ca. 100 mg/l (Bopp, 1979; Bopp et al., 1985). For a mean distribution coefficient of 10^5 during low flow conditions, approximately half of the PCBs will be transported in the dissolved phase and half will be transported in the adsorbed phase. In contrast, under high flow conditions, nearly all of the PCBs are associated with the suspended matter.

Studies of PCB concentrations in filtered river water and on suspended matter under various conditions indicate that most of the PCBs are transported adsorbed to suspended matter during the high flow events that occur each spring (Bopp, et al., 1985). As PCBs are transported downstream preferential sediment-water and water-air partitioning of PCB components occurs and becomes more pronounced with distance from the source (Bopp, 1979; Bopp, et al., 1984). The smaller congeners will have the lowest distribution coefficients and will preferentially partition to the water from sediments and can escape from the water column to the atmosphere.

The fate of PCBs once deposited with the sediments on the river bottom is more complicated. Once deposited, PCBs can be degraded and dechlorinated by bacteria under aerobic and anaerobic conditions, respectively. Aerobic bacteria attack PCBs through the 2,3-dioxygenase pathway, effectively converting PCBs to chlorobenzoic acids, which are further degraded, producing carbon dioxide, water, chloride, and bacterial biomass (Abramowicz, 1990; Erickson, 1997). Most aerobic bacteria readily degrade only the lower chlorinated PCB congeners.

In depositional areas of the Hudson which preferentially sequester sediments and associated PCBs, the sediments become anaerobic within the upper centimeter and a

typical sedimentation rate is ca. 1.5 cm per year. It follows that anaerobic dechlorination is the dominant process governing the fate of PCBs within the sediments. In addition, anaerobic bacteria can dechlorinate even the most highly chlorinated congeners. Therefore, a bio-remediation technique that could optimize and couple the two processes has great promise.

1.6 Historical Review - Anaerobic Dechlorination

Anaerobic dechlorination is a microbially mediated process that removes chlorine atoms from PCB congeners leaving the biphenyl nucleus intact. Dechlorination usually occurs with methanogenesis at relatively low redox potentials; however, methanogenesis is not required for dechlorination to occur. It has been widely observed that the transformations resulting from dechlorination are congener specific and attributable to a consortium of microorganisms (Brown et al., 1984; Brown et al., 1987a; Brown et al., 1987b; Quensen et al., 1988; Brown and Wagner, 1990; Quensen et al., 1990; Alder et al., 1993; Rhee et al., 1993a; Rhee et al., 1993c; David et al., 1994; Fish and Principe, 1994; Sokol et al., 1994; Bedard and May, 1996; Hartkamp-Commandeur et al., 1996).

As dechlorination progresses, chlorine atoms in the meta and para positions are selectively removed, yielding congeners that are primarily substituted in the ortho position. The chlorination pattern on the opposite phenyl ring and the surrounding chlorine configuration also appear to affect which chlorines can be removed from a particular congener (Brown et al., 1984; Rhee et al., 1993d). PCB congener patterns obtained from sediments historically contaminated with PCBs consistently show depletion of the more highly chlorinated congeners and enrichment of the lower chlorinated and ortho substituted congeners relative to the source PCB mixtures. Even the most highly chlorinated PCB mixtures (e.g., Aroclor 1260) are dechlorinated by indigenous microorganisms (Quensen et al., 1990; Bedard et al., 1996; Bedard and May, 1996).

A consortium of anaerobes, including sulfate reducers, methanogens, and sporeformers, are capable of PCB dechlorination (Morris et al. 1992; Ye et al., 1992; Bedard and Quensen, 1995; Ye et al., 1995; Kim and Rhee, 1997). It has been widely hypothesized that the dechlorinating anaerobes are able to use PCBs as terminal electron

acceptors (Brown et al., 1987b; Quensen et al., 1988; Brown and Wagner, 1990; Quensen et al., 1990). Because electron acceptors are limited in anaerobic environments, microorganisms able to use PCBs as terminal electron acceptors would have a selective advantage. It has also been suggested that the dechlorinators are part of a syntrophic community and may be dependent on such communities (Morris et al., 1992; Bedard and Quensen, 1995). Reductive dechlorination may be catalyzed by inducible enzymes like those responsible for the aryl dehalogenation of halobenzoates (Brown et al., 1984; Brown et al., 1987b; Brown and Wagner, 1987; Mohn and Tiedje, 1992).

Ortho dechlorination has only been observed in laboratory studies using sediments spiked with individual congeners. Organisms eluted from the freshwater sediments of Woods Pond and Silver Lake were able to dechlorinate several congeners from the ortho position (Van Dort and Bedard, 1991, Williams, 1994). However, the *in-situ* congener patterns from the same sediments show only meta and para dechlorination (Bedard and Quensen, 1995). In addition, the ortho dechlorinating activity seen in the laboratory was not sustainable and difficult to repeat. Ortho dechlorination of several congeners was also observed in a study that utilized organisms eluted from the estuarine sediments of Baltimore Harbor (Berkaw et al., 1996). Although the ortho dechlorinating activity in this experiment was sustainable and reproducible, it may be a result of a microbial population specific to estuarine or marine environments. Laboratory cultures of Hudson River microorganisms obtained under highly selective pressure for methanogens through several transfers were also capable of ortho dechlorination (Ye, 1994). Evidence of *in-situ* ortho dechlorination in the sediments of the Hudson River or other water bodies has not been reported in the literature.

The dechlorination of Aroclor mixtures has been studied extensively in the laboratory with alternative electron acceptors and organic substrates; under various environmental conditions; and at differing concentrations. Most of these studies were undertaken to identify and enrich the responsible anaerobe populations and study dechlorination rates (Quensen et al., 1988; Nies and Vogel, 1990; Morris et al., 1992; Ye et al., 1992; Abramowicz et al., 1993; Rhee et al. 1993a; Rhee et al., 1993b; Rhee et

al., 1993c; Fish and Principe, 1994; Ye et al., 1995; Fish, 1996; Liu et al., 1996; McCue et al., 1996; Wu et al., 1996; Williams, 1997).

Cultures of anaerobes eluted from PCB contaminated sediments have been enriched using additional carbon sources such as pyruvate, acetate, methanol, and glucose. However, it is possible that such cultures become dependent on the carbon source used in the enrichment (Bedard and Quensen, 1995). Differences in the dechlorination activities seen in laboratory studies and *in-situ* may be attributable the carbon additions or the amount of organic carbon present in the sediments, respectively.

Manipulation of reducing conditions by addition of bromoethane sulfonic acid (BES) to inhibit methanogens, molybdate to inhibit sulfidogens, sulfate, nitrate, and ferric oxyhydroxide also alters the dechlorinating ability of sediment cultures. Additions of reducing agents can also be used to select for a certain classes of anaerobes that exhibit a specific dechlorinating activity (e.g., meta dechlorination). For example, several laboratory studies have found that the presence of sulfate or addition of BES (which contains a prominent sulfonate group) reduces or completely inhibits dechlorination, especially dechlorination from the meta position (Morris et al., 1992; Alder et al., 1993; Rhee et al., 1993b). This suggests that sulfate reducers are among the anaerobes responsible for meta dechlorination (Morris et al., 1992). The partial inhibition of dechlorination could occur as a result of depletion of the alternate electron acceptors in total or within micro niches in the sediment (Bedard and Quensen, 1995).

Pasteurized cultures treated with ethanol (to favor anaerobic sporeformers) were also found to dechlorinate PCBs primarily from the meta position (Ye et al., 1992). The dechlorination ability of these cultures was also inhibited by additions of sulfate, BES, and molybdate, indicating that the anaerobic sporeformers are sulfidogens (Ye, 1994). Strictly methanogenic cultures were found to dechlorinate PCBs primarily from the para position (Ye, 1994; Ye et al., 1995). Electron acceptors such as nitrate and ferric oxyhydroxide also inhibit dechlorination (Morris et al., 1992; Rhee et al., 1993b).

In-situ evidence and the results of several laboratory studies suggest that anaerobic dechlorination is dependent on the total PCB concentration. Several studies have shown

that both the rate and extent of dechlorination increases as the total PCB concentration increases (Quensen et al., 1988; Abramowicz et al., 1993; Rhee et al, 1993a; Fish, 1996). *In-situ* evidence from the Hudson River also supports this contention. The sediments of the highly contaminated upper Hudson are extensively dechlorinated while the sediments of the moderately contaminated tidal Hudson show only the initial stages of dechlorination. This suggests that a critical concentration may need to be available before dechlorination can occur (Bopp et al., 1984).

Quensen et al. (1988), Rhee et al. (1993a), and Fish (1996) observed a first order relationship between the rate of dechlorination and PCB concentration. Similarly, Abramowicz et al. (1993) noted a first order relationship up to ca. 1480 ppm. However, at very high concentrations (above 1500 ppm), the dechlorination rate observed was independent of the total PCB concentration (characteristic of zero order kinetics). When considered together, the resulting relationship between the dechlorination rate and total PCB concentration approximates Michaelis-Menten kinetics. Rhee et al. (1993a) reported that dechlorination did not occur at concentrations of 1000 ppm or higher, which may suggest that very high PCB concentrations are inhibitory to anaerobes. Also, in this study anaerobes eluted from contaminated sediments were incubated and enriched in uncontaminated, autoclaved sediments. Fish (1996) reported dechlorination at concentrations as low as 10 ppm.

The relationship between concentration and the rate of dechlorination may related to the bioavailability of PCBs. This could explain why Abramowicz et al. (1993) observed a leveling off of dechlorination rates at very high concentrations. As the total PCB concentration in the sediment increases, microorganisms are exposed to higher and higher levels of PCBs in the porewaters. However, above a certain concentration, the pore waters are saturated with PCBs, and the microorganisms simply continue to dechlorinate at the same rate. Because PCBs tend to sorb to sediment particles, their ability to partition between the sediment particles and the pore waters is controlled by a number of factors including organic matter concentrations. Bedard and Quensen (1995) reviewed the various factors that control the bioavailability of PCBs in sediments.

It has been suggested that the desorption of molecules such as PCBs occurs in two phases, an initial labile phase and a secondary non-labile phase that much more resistant to desorption (Di Toro and Horzempa, 1982; Wu and Gschwend, 1986), and furthermore that the proportion of PCBs in the non-labile phase increases with increased contact time between the PCBs and sediments (Karickoff et al., 1985). An *in-situ* aerobic bio-remediation experiment in the Hudson River concluded that the limiting factor in the biodegradation was the desorption of the PCBs from the sediments (Harkness et al., 1993).

1.7 Historical Review - Dechlorination Pathways and Patterns

Numerous congener patterns have been observed in laboratory studies and *in-situ*. Brown et al. (1984) was the first to report that the congener distribution patterns found in the deeper sediments of the Hudson River were systematically depleted in the more highly chlorinated congeners and enriched in the mono- and di-chlorobiphenyls relative to the source Aroclor mixtures. Brown et al. (1984) also observed that the congener patterns exhibited by the near surface sediments in the upper Hudson were only slightly different than the source Aroclor patterns (Pattern/Process A). These alterations could be explained by selective partitioning of the lighter congeners to the water during sediment transport and/or by aerobic degradation. In contrast, the deeper sediments of the upper Hudson were observed to be depleted in the more highly chlorinated congeners and enriched in the mono- and di-chlorobiphenyls (Patterns/Processes B, B', C). Patterns B, B', and C are primarily distinguished by the presence of three (2,2'-/2,6-CBP; 2,3'-CBP; 2,4'-CBP), two (2,2'-/2,6-CBP; 2,4'-CBP), or one (2,2'-/2,6-CBP) prominent di-chlorobiphenyl peaks and reductions in almost all higher congener peaks (Brown et al, 1984; Brown et al., 1987a; Brown et al., 1987b).

After the first reports of dechlorination were published, several laboratory studies demonstrated the dechlorination of Aroclor mixtures by anaerobic bacteria eluted from Hudson River sediments (Quensen et al., 1988; Quensen et al., 1990). These studies clearly confirmed that dechlorination occurs from the meta and para positions. Large changes in the relative proportions of the mono-, di-, tri-, tetra-, penta-, and hexa-

chlorobiphenyls were observed over the length of the experiment (Quensen et al., 1988). The dramatic losses of the more highly chlorinated congeners were matched by increases in lesser chlorinated congeners. Although, large accumulations of the mono-, di-, and tri-ortho substituted congeners (2-CBP; 2,2'/2,6-CBP; and 2,2',6-CBP) were observed, decreases in the total molar concentration of PCBs did not occur. The congener patterns observed in these studies were basically consistent with Patterns B, B' and C, discussed above.

In subsequent laboratory experiments, it was shown that Pattern C dechlorination is actually the result of two separate processes that selectively remove meta and para chlorines, resulting in Patterns M and Q, respectively (Quensen et al., 1990; Ye et al., 1992; Bedard and Quensen, 1995). Process M dechlorination results in accumulation of the usual process C dechlorination products (2-CBP; 2,2'-/2,6-CBP; 2,2',6-CBP; 2,3',6-CBP) and the following para substituted products: 2,4'-CBP; 2,4,4'-CBP; 2,2',4-CBP; 2,4',6-CBP; and 2,2',4,4'-CBP (Quensen et al., 1990; Ye et al., 1992; Morris, et al., 1992; Bedard and Quensen, 1995). Process M removes flanked and unflanked meta chlorines from the following groups: 3; 2,3; 2,5; 3,4; 2,3,4; and 2,3,6. The reactivity of the following groups is unknown: 2,4,5; 2,3,4,5; 2,3,4,6; 2,3,5,6; and 2,3,4,5,6

Process Q dechlorination results in accumulation of the process C dechlorination products named above and meta substituted products such as 2,3'-CBP; 2,2',5-CBP; 2,3',5-CBP; 2,3',6; 2,2',5,5'-CBP (Quensen et al., 1990; Bedard and Quensen, 1995; Ye, et al., 1995). Process Q dechlorination removes flanked and unflanked chlorines from the para position and meta chlorines from rings substituted in the 2,3 and possibly 2,3,4 and 2,3,6 positions. The following groups are reactive for para dechlorination: 4; 2,4; 3,4; 2,4,5, and 2,3,4. Several studies have suggested that process Q dechlorination follows process M dechlorination as a result of microbial succession (Quensen et al., 1990; Ye et al., 1992) while other have shown that the two processes occur simultaneously (Alder et al., 1990).

Further process M and Q activity on either Pattern B or Pattern B' would result in pattern C dechlorination suggesting that patterns B and B' are simply earlier stages in

process C dechlorination (Bedard and Quensen, 1995). The primary difference between patterns B or B' and C is the accumulation of several di-substituted congeners (namely 2,3'-CBP and 2,4'-CBP); less extensive depletion of several tri substituted congeners (2,4',5-CBP and 2,4,4'-CBP); and a lower accumulation of the mono ortho substituted congeners (Brown et al., 1984).

Two additional and more limited dechlorination processes, H' and H, have also been observed. Process H' dechlorination products include: 2,3'-CBP; 2,4'-CBP; 2,2',4-CBP; 2,2',5-CBP; 2,4,4'-CBP; 2,4',5-CBP; 2,4',6-CBP; 2,3',4-CBP; 2,3',5-CBP; 2,3',6-CBP; 2,2',4,4'-CBP; 2,2',4,5'-CBP; 2,2',5,5'-CBP; 2,2',3,4',5-CBP; 2,2',3,5,5'-CBP; 2,2',3,4',6-CBP; and 2,2',3,5',6-CBP. Process H dechlorination is very similar to process H' dechlorinations, except that there is no activity against the 2,3-CBP group (Bedard and Quensen, 1995.) Common process H dechlorination products include: 2,3'-CBP; 2,3'4-CBP; 2,3'5-CBP; 2,3'6-CBP; 2,4,4'-CBP; 2,4',5-CBP; 2,2',4,4'-CBP; 2,2',4,5'-CBP; 2,2',5,5'-CBP; 2,2',3,4',5-CBP; 2,2',3,5,5'-CBP; 2,2',3,4'6-CBP; and 2,2',3,5',6-CBP.

Processes H and H' remove flanked and doubly flanked para chlorines as well as some meta chlorines. Neither process removes isolated chlorines. All process H dechlorination products are among the dechlorination products obtained from process H'. Therefore, it is possible that process H is actually a composite of process H'. The meta dechlorination observed with process H' would then be the result of a different dechlorinating population (Bedard and Quensen, 1995). Alternate explanations include: 1) process M and Q are responsible for the meta dechlorination of the 2,3 groups; or 2) process H and H' are actually composites of combined, but limited, process M and Q dechlorination.

Evidence of process H or H' dechlorination is a result of laboratory studies that either imposed reducing conditions on sediment slurries that may not have lasted throughout the time course of the experiment (Morris et al., 1990); used previously uncontaminated autoclaved sediments spiked with microorganisms eluted from contaminated sediments thereby causing increased acclimation periods; or, used a highly chlorinated Aroclor mixture (e.g., Aroclor 1260).

Several other dechlorination patterns were observed in sediments contaminated as a result of dechlorination of more highly chlorinated Aroclors. Process P dechlorination was observed in the sediments of Woods Pond and Silver Lake, both of which are contaminated with Aroclors 1260 and 1254 (Bedard and Quensen, 1995). Process P dechlorination products include: 2,2',3,5-CBP; 2,2',4,5'-CBP; 2,2',5,5'-CBP; 2,2',3,3',5-CBP; and 2,2',3,5,5'. Process P dechlorination is similar to process H or H' dechlorination, but is restricted to dechlorination from the para position. Flanked and doubly flanked para chlorines are removed and the most reactive groups include: 3,4; 2,3,4; 2,4,5; 2,3,4,5; and 2,3,4,6 (Bedard and Quensen, 1995).

Process N dechlorination was also observed in sediments from Woods Pond and Silver Lake (Quensen et al., 1990; Alder et al., 1993). Common dechlorination products include: 2,4,4'-CBP; 2,2',4,4'-CBP; 2,2',4,5'-CBP; 2,2',4,6'-CBP; 2,2',4,4',6-CBP; and 2,2',3,4',5,6-CBP. Flanked and doubly flanked meta chlorines are removed from the following groups: 3,4; 2,3,4; 2,3,6; 2,4,5; 2,3,4,5; 2,3,4,6; 2,3,4,5,6.

Like process M and Q dechlorination, process N and P dechlorination complement each other in that the remove meta and para chlorines, respectively. However, unlike process M and Q dechlorination, process N and process P dechlorination do not necessarily produce congeners that are substrates for one another.

Most process H and H' dechlorination products could be further dechlorinated by processes M and Q. Similarly, process P and N dechlorination products could also be further dechlorinated by process M and Q activity. The limited dechlorination observed in the experiments revealing these patterns may be a result of the source Aroclor composition. A more highly chlorinated Aroclor mixture would obviously yield a more highly chlorinated dechlorination pattern and show a preference for flanked and doubly flanked chlorines.

CHAPTER TWO
METHODS AND MATERIALS

Sediment cores collected from areas that accumulate fine-grained sediment can be age dated using Cesium-137 (^{137}Cs) chronologies and provide information on time scales of years to decades. Fine-grained sediments have an affinity for a wide range of particle reactive pollutants, including ^{137}Cs and PCBs. Paired sections from co-located sediment cores collected approximately 8 years apart provide a unique method of quantitatively studying the process of anaerobic dechlorination *in-situ*.

2.1 Collection and Analysis of Sediment Cores

Sample locations along the Hudson River are named in terms of the number of mile points (mp) upstream from the southern tip of Manhattan Island (mp 0) measured along the river channel. Archived cores from two locations were chosen to represent areas of high (ca. 1000 ppm) and moderate (ca. 100 ppm) PCB contamination, respectively. Co-located cores were collected from each location approximately 8 years apart as shown in Figure 1 and detailed in Table 2, below:

Table 2 - Sediment Core Statistics

Core (mp)	Date of Collection	Depth of Water (m)
188.5	July, 1983	0.6
188.6	May, 1991	0.5
91.8	July, 1977	8.0
88.6	July, 1986	9.0

Cores 188.5 and 188.6 were collected in the Thompson Island Pool near Fort Edward, ca. 10 miles downstream from the PCB inputs. Cores 91.8 and 88.6 were collected near Kingston in the tidal portion of the Hudson, ca. 110 miles downstream from the PCBs inputs. The Green Island Dam near Troy, New York (mp 154) marks the transition from the upper Hudson to the tidal Hudson.

11.0203

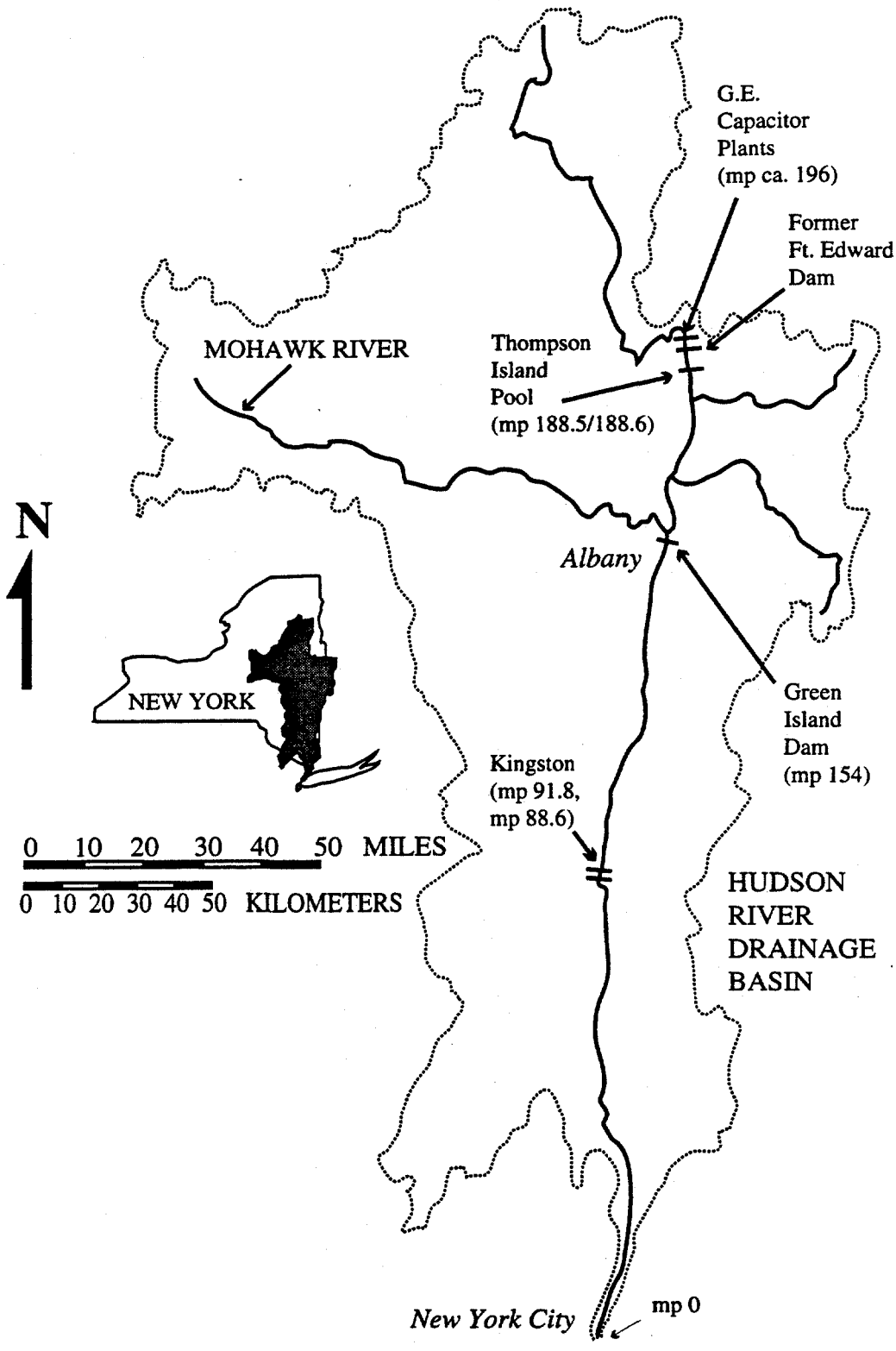


Figure 1. Sediment coring locations along the Hudson River. Locations are reported as milepoints north of the southern tip of Manhattan Island, measured along the river channel.

Sediment cores were collected with a gravity or hand corers equipped with polybutyrate liners. The cores were extruded from the core liners and sliced into two or four centimeter sections. The sections were either oven-dried (35°C) under a flow of air filtered through florisil to remove atmospheric contaminants. The dried sediment sections were ground to a fine powder with a mortar and pestle and sealed in air-tight aluminum cans. Before grinding, each section was homogenized by removing bits of wood. However, closer physical inspection of the archived sections of Cores 188.5 and 188.6, revealed small, centimeter sized pieces of paper (see Section 2.3.1).

Sections of sediment cores were analyzed for ^{137}Cs and the other gamma-emitting radionuclides (e.g., ^{7}Be, ^{40}K) by nondestructive gamma-ray spectroscopy using either an intrinsic germanium or a lithium-drifted germanium detector and multichannel analyzer. Sub-samples of the sediment sections were also analyzed for metals and PCBs. Metals were measured by atomic absorption spectrometry and inductively coupled plasma mass spectrometry. Polychlorinated biphenyls were measured by electron-capture gas chromatography as discussed in Section 3.2.

2.1.1 Cesium-137

Cesium-137 is an anthropogenic radionuclide with a half life of 30 years, that partitions readily to sediment and soil. It has been shown to be an excellent tracer of recent accumulations of fine-grained sediment and associated contaminants and can be used to date sediments on time scales of years to decades (Simpson, et al., 1976; Bopp, 1979; Bopp, et al., 1981; Bopp et al., 1982; Chillrud, 1996).

The dominant source of ^{137}Cs to the Hudson River and its drainage basin is fallout from atmospheric testing of nuclear weapons. The history of fallout in the metropolitan New York metropolitan area has been well documented since the early 1950s (Hardy and Alexander, 1962; Hardy et al., 1968). Measurable levels of ^{137}Cs first occurred in 1954 and peak levels occurred in 1963. Sediments that contain ^{137}Cs unquestionably have a post-1954 component, while sediments with no ^{137}Cs were deposited prior to 1954. A

large peak in the ^{137}Cs activity followed by a continuous exponential decrease is associated with the peak fallout that occurred in 1963.

Two other particle reactive radionuclides, ^{7}Be and ^{40}K, are useful indicators of the age and type of sediment, respectively. The presence of ^{7}Be, a naturally occurring radionuclide with a half life of 53 days, is indicative of sediment deposited within the last year. Relatively constant ^{40}K levels along the length of a core indicate a consistent sediment type. Clay minerals, to which ^{137}Cs readily sorbs, contain high levels of potassium and ^{40}K. Large changes in the ^{40}K activity, indicate changes in the type of sediment (e.g., from clayey to sandy) and the ability of the sediment to sorb ^{137}Cs and particle reactive contaminants.

Previous studies have shown the two coring locations chosen for this study to be near ideal in terms of their ^{137}Cs profiles (Bopp et al., 1982; Bopp and Simpson, 1989; Chillrud, 1996). The magnitudes of the ^{137}Cs activities found in the sediments of the Thompson Island Pool are similar to those found in lake sediments. This reveals the effectiveness of the Thompson Island dam in trapping the very fine grained sediments that have high ^{137}Cs activities (Chillrud, 1996). Activities of ^{137}Cs have also been found to be elevated near Kingston from mp 85 to mp 95. The highest activities are associated with the sediments of the main channel near the inside portions of meanders where currents are somewhat slower (Chillrud, 1996). When collecting core 88.6, attempts were initially made closer to mp 91.8. Repeated unsuccessful attempts led to the pairing of cores 91.8 and 88.6.

2.1.2 Determination of Sedimentation Rates and Sediment Ages

Cesium-137 derived ages provide the basis for pairing samples deposited at about the same time. Trace metal and PCB maxima are used as secondary indicators in the development of the time-stratigraphy. Tables 3 - 6 detail the radionuclide, total PCB, and metal concentrations in each of the cores. Figures 2 - 3 show the ^{137}Cs and PCB profiles with depth in each of the cores. Sedimentation rates were determined by assuming the following: 1) the deepest sediment layer containing ^{137}Cs corresponds to 1954; 2) the sediment layer with the maximum ^{137}Cs concentration corresponds to 1963; 3) the ^{7}Be

Table 3

Radionuclide, Total PCB and Metals Data
Core 188.5

									Metals (ppm)					
Section	Cs-137 (pCi/Kg)	± 1 σ	K-40 (pCi/g)	± 1 σ	Be-7 (pCi/Kg)	± 1 σ	Total PCBs (ppm)	error	Cd	Cr	Cu	Pb	Ni	Zn
0-2	945	40	18.2	5	440	190	75	4	21 (17.1)	317 (898)	38(47.2)	247 (278)	16	153 (199)
2-4	1560	62	18.5	0.5	-66	158	187	11	39	493	52	541	16	188
4-8	3740	140	13.5	0.5	-1825	719	615	34	80	1240	108	1600	22	456
8-12	6250	230	12.6	0.5	--		827	46	163	1640	157	2330	22	636
12-16	6210	230	14.6	0.7	--		974	55	148 (156)	1310 (1840)	135 (154)	1700 (1790)	29	549 (607)
16-20	6230	240	14.7	0.7	--		1212	67	110	1050	119	1120	28	552
20-24	10500	400	11.9	1	--		855	47	181	1590	152	1760	30	1050
24-28	18600	690	15.8	0.6	--		442	24	72 (81)	1300 (1170)	109 (109)	1360 (1310)	32	1050 (1040)
28-32	6100	230	16	0.6	--		397	22	30	1160	90	704	42	711
32-36	1020	55	18.9	1	--		--		3 (4)	549 (571)	43 (45)	215 (226)	24 (24)	288 (303)
36-40	32	6	17	0.3	--		--		0.2 (0.95)	11 (69.8)	6 (27.1)	11 (38)	5	34 (89)
40-44	7	5	19.8	0.4	--		--		--	--	--	--	--	--
44-47	24	5	20	0.4	--		--		--	--	--	--	--	--

Notes:

Total PCB and Metals Data from NYDOH analysis. Numbers in parentheses are from Chillrud, 1996.

Radionuclide activities were decay corrected to the date of collection.

All concentrations reported on a dry weight basis.

-- Not Analyzed

11.0207

Table 4

Radionuclide, Total PCB and Metals Data
Core 188.6

Section	Cs-137 (pCi/Kg)	± 1 σ	K-40 (pCi/g)	± 1 σ	Be-7 (pCi/Kg)	± 1 σ	Total PCBs (ppm)	error	Metals (ppm) Cd	Cr	Cu	Pb	Ni	Zn
0-2	938	229	--		1874	272	34	2	3	154	31	69	21	188
2-4	905	174	--		775	165	21	1	3	109	25	53	17	147
4-6	928	218	--		--		32	2	4	126	37	67	24	190
6-8	1561	270	--		--		30	2	7	197	49	104	27	245
8-12	1074	131	--		--		52	3	7	172	41	121	21	225
12-16	1473	150	--		--		88	5	20	438	81	342	27	366
16-20	1786	206	--		--		148	9	41	706	90	914	25	577
20-24	2647	264	--		--		202	12	--	--	--	--	--	--
24-28	4970	397	--		--		375	21	--	--	--	--	--	--
28-32	5153	418	--		--		464	28	193	1730	170	2450	29	675
32-36	4209	391	--		--		811	48	--	--	--	--	--	--
36-40	6943	492	--		--		624	39	--	--	--	--	--	--
40-44	11448	702	--		--		352	21	115	1440	121	1560	33	1100
44-48	4693	372	--		--		204	12	--	--	--	--	--	--
48-52	1381	167	--		--		--		--	--	--	--	--	--
52-56	74	72	--		--		--		--	--	--	--	--	--
56-60	167	87	--		--		--		--	--	--	--	--	--
60-64	-65	61	--		--		--		--	--	--	--	--	--
64-68	-80	59	--		--		--		--	--	--	--	--	--

Notes:
Total PCB and Metals Data from NYDOH analysis.
Radionuclide activities were decay corrected to the date of collection.
All concentrations reported on a dry weight basis.
-- Not analyzed.

11.0208

Table 5

Radionuclide, Total PCB, and Metals Data
Core 91.8

	Cs-137		Pu-239/240		K-40		Be-7		Total PCBs		Metals (ppm)					
Section	(pCi/Kg)	± 1 s	(pCi/Kg)	error	(pCi/g)	± 1 s	(pCi/Kg)	± 1 s	(ppm)	error	Cd	Cr	Cu	Pb	Ni	Zn
0-2	730	31	7.4	0.4	16.5	0.8	--		3.3		2.6	--	61	82	46.5	219
2-4	995	67	--		17	1.1	--		6.6 (10.3)	(0.8)	3.99	--	68	120	45.2	259
4-8	1800	90	16.2	0.5	18.4	0.6	--		16.4 (17.7)	(1.1)	6.94	--	94	171	51.8	319
8-12	1890	95	--		19.8	0.8	--		8.2		2.9	--	78	101	55.7	262
12-16	1620	81	19.3	0.6	18.8	0.6	--		6.7		2.53	--	74	95	54.5	263
16-20	1660	83	--		19.6	0.6	--		6.7		2.59	--	80	101	56.9	282
20-24	2050	102	27.4	1	19.1	0.6	--		6.6		2.49	--	83	101	54.5	300
24-28	2380	119	--		18	0.6	--		8.3 (11)	(0.8)	2.91	--	87	113	49	319
28-32	896	45	19.3	0.8	17.5	0.6	--		3.6		2.28	--	92	125	49.1	313
32-36	51	9	--		17.9	0.6	--		--	--	2.24	--	105	143	48.9	305
36-40	9	10	ND		18.5	0.6	--		--	--	1.98	--	80	118	50.2	244
40-44	--		--		--		--		--	--	1.48	--	77	95	47.7	229
44-48	--		--		--		--		--	--	1.53	--	82	107	47.6	244
48-52	--		--		--		--		--	--	0.63	--	42	58	40.3	144
52-54	--		--		--		--		--	--	0.35	--	20	16	32.7	89

Notes:
Total PCB concentrations from Chillrud, 1996; numbers in parentheses are from the DOH Analysis.
Metals data from Chillrud, 1996.
Radionuclide activities were decay corrected to the date of sample collection.
All concentrations reported on a dry weight basis.
ND - Not Detected
-- - Not Analyzed

11.0209

Table 6

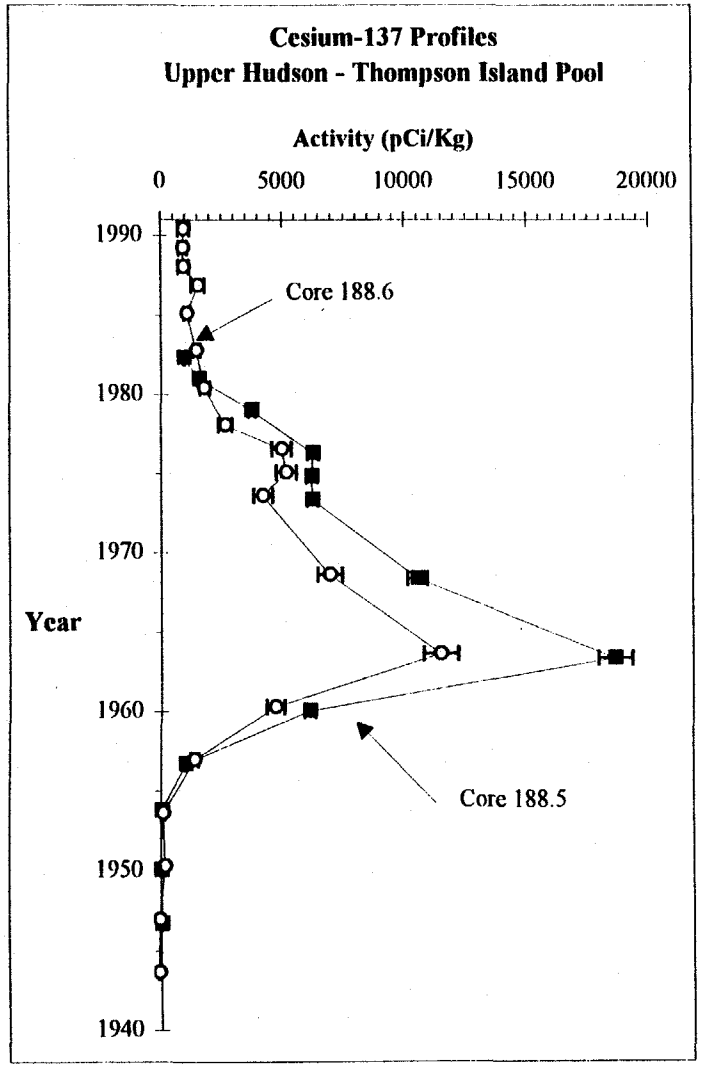
Radionuclide, Total PCB and Metals Data
Core 88.6

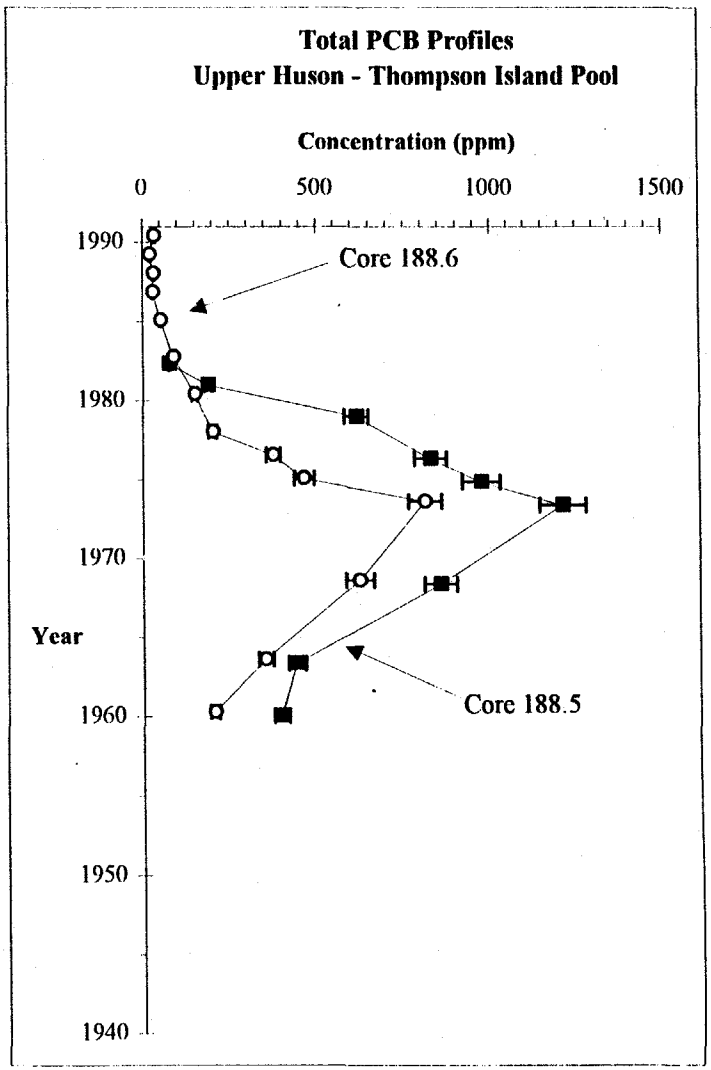
									Metals (ppm)					
Section	Cs-137 (pCi/Kg)	± 1 s	K-40 (pCi/g)	± 1 s	Be-7 (pCi/Kg)	± 1 s	Total PCBs (ppm)	error	Cd	Cr	Cu	Pb	Ni	Zn
0-2	293	22	14.5	0.8	310	137	0.79		1.12	74.2	31	53	30	145
2-4	336	24	14.9	0.8	-29	138	0.89		1.22	--	33	53	32	153
4-6	348	21	15.5	0.8	-7	112	1.4		1.66	95.5	31	46	27	143
6-8	419	25	16.7	0.9	--		2.1		2.45	--	40	60	30	182
8-12	387	21	15.6	0.8	--		2.6		3.29	--	36	53	27	177
12-16	427	24	16.1	0.8	--		5.9		3.03	--	38	68	29	192
16-20	618	33	15.6	0.8	--		8.2 (8.1)	(0.7)	6.34	109	48	104	30	233
20-24	1013	52	1538	0.8	--		15.4 (13.7)	(0.9)	5.9	--	68	118	40	283
24-28	1352	70	16.3	0.8	--		11.8		4.96	--	74	126	44	311
28-32	1731	89	16.4	0.9	--		5.7		3.26	--	63	111	42	272
32-36	2500	127	16.6	0.9	--		9.9 (14.7)	(1)	3.44	196	76	118	49	308
36-40	1603	82	17.2	0.9	--		--		2.81	--	73	97	45	281
40-44	1548	79	16.7	0.9	--		--		2.63	--	78	97	51	306
44-48	1576	81	16	0.8	--		--		2.73	--	75	111	46	313
48-52	740	39	15.8	0.8	--		--		2.02	--	68	97	43	281
52-56	188	13	16.6	0.9	--		--		1.7	--	75	118	46	311
56-59	44	10	12.3	0.9	--		--		1.59	204	70	104	45	286

Notes:
Total PCB Numbers from Chillrud, 1996. Numbers in parentheses are from the DOH Analysis.
Metals data from Chillrud, 1996.
Radionuclide activities were decay corrected to the date of sample collection.
All concentrations reported on a dry weight basis.
-- - Not Analyzed

11.0210

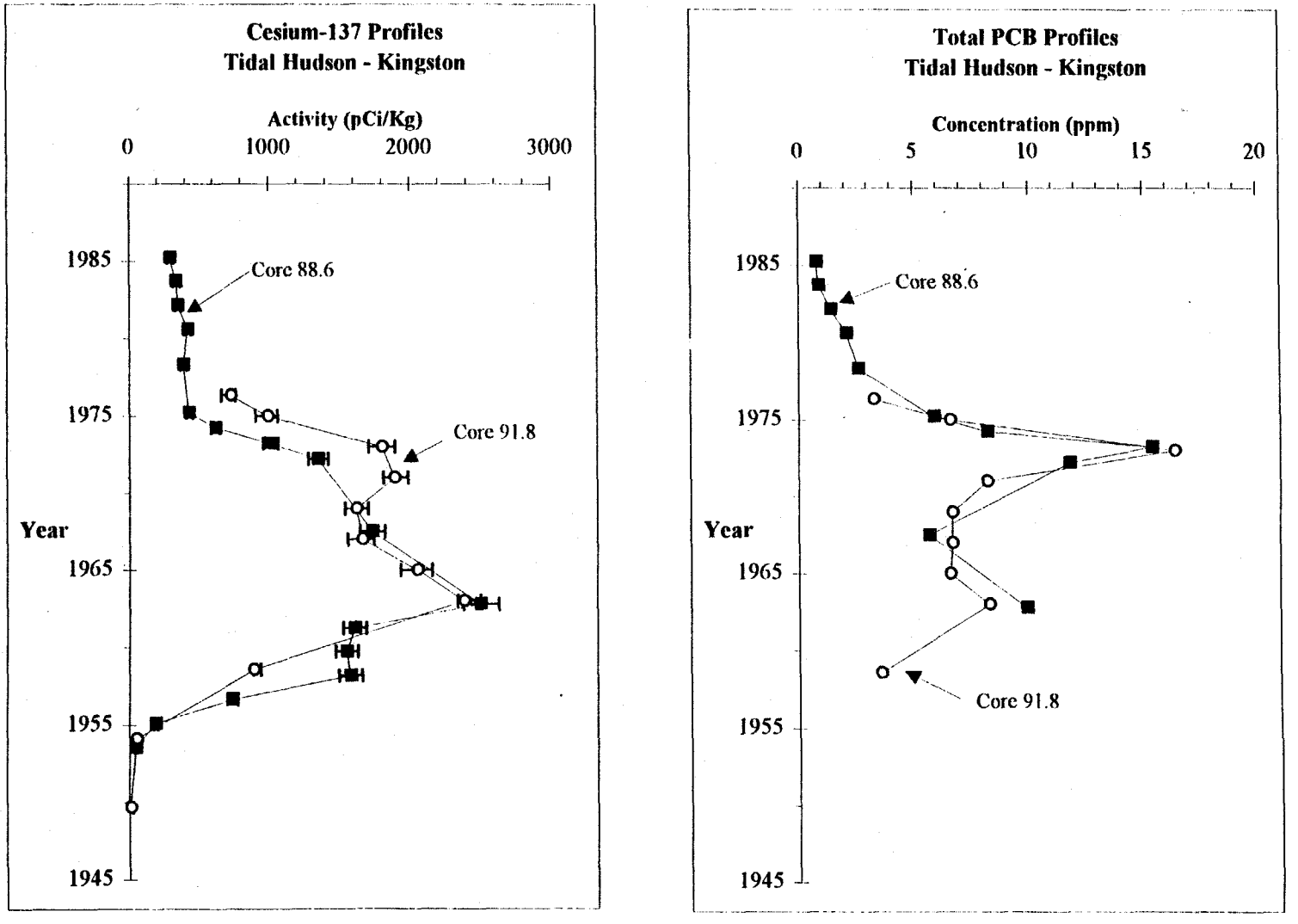
Figure 2 - Cesium-137 and Total PCB Profiles for Cores 188.5 and 188.6





11.0211

Figure 3 - Cesium-137 and Total PCB Profiles for Cores 91.8 and 88.6



11.0212

bearing sediment layers (or the 0-2 cm section, in the case of 91.8) correspond to the date of collection.

Maximum PCB concentrations were also used to refine the sedimentation rates. The numerous cores collected along the axis of the Hudson downstream from the PCB inputs consistently show that the maximum PCB concentration falls within one to three years of 1973 (Bopp et al., 1982; Bopp and Simpson, 1989; Chillrud, 1996). Mobilization of a large quantity of sediment by an event such as the 1973 removal of the Fort Edward Dam provides a good explanation for a sharp increase in PCB concentration occurring at the same time that ^{137}Cs activities are declining (Bopp, et al., 1982). An alternate explanation would be a large point source discharge of PCBs in ca. 1973.

The ^{137}Cs profiles for cores 188.5 and 188.6, show a plateau in ^{137}Cs activities nearer to the surface than the peak ^{137}Cs activity. Such a plateau is consistent with a large sediment transport event, such as the one caused by the removal of the Fort Edward dam and subsequent spring high flow events (Bopp et al., 1982; Bopp and Simpson, 1989; Chillrud, 1996). The sedimentation rates calculated for these cores place the timing of this large sediment transport event from ca. 1973 to ca. 1976.

Further evidence for assigning the peak PCB concentration to 1973, is the similarity between the depth profiles exhibited by several trace metals. In the Thompson Island Pool, cadmium, chromium, and lead are present at high concentrations and exhibit maxima in ca. 1973. Like PCBs, these metals originate from an up-stream source (mp 200) and are particle reactive, conservative tracers of fine grained sediments. Therefore, a large sediment transport event, like the removal of the Fort Edward Dam, would cause a similar perturbation in their depth profiles. In the tidal Hudson at Kingston, only cadmium varied directly with total PCB levels. The depth profiles of the other metals in the tidal Hudson clearly show the existence of prominent downstream sources of metals contamination (Chillrud, 1995).

The uncertainty associated with the time of deposition for any given sediment section is estimated to be approximately 2 years. This accounts for changes in sedimentation rates over short time scales and the possibility of gaps in the depositional

record. Appendix A details the calculated sedimentation rates and provides a listing of the paired samples for both coring locations. This appendix also shows the depth profiles of total PCBs and relevant trace metals.

2.2 PCB Congener Analysis

PCB congener analysis was conducted by the New York Department of Health Laboratory following NYSDEC Method 91-11 (modified 1/94). Dried sediment samples (ca. 2 grams) were Soxhlet extracted overnight into hexane with one change of solvent. Polar co-extractants were removed by column chromatography on alumina deactivated with 6% water (w/w). Elemental sulfur was removed by treating the extract with HCl-activated copper dust. PCBs were separated from the chlorinated pesticides by column chromatography on silica. All concentration steps were conducted in a Kundera-Danish apparatus and all solvents used were pesticide grade. The hexane extracts were analyzed on a fused silica capillary column gas chromatograph equipped with an electron capture detector. Individual congener standards were used for quantification purposes.

2.3 PCB Congener Data

The resulting PCB congener data is organized according to Ballschmitter and Zell (BZ) number and is presented in Appendix B. Ballschmitter and Zell (1980) arranged the 209 PCB congeners in ascending order according to the degree of chlorination and position of chlorine atoms and assigned each a number. These numbers, in addition to the associated chlorination patterns, will be used throughout this study. For example, BZ 47 is expressed 2,2',4,4'-chlorobiphenyl or 2,2',4,4'-CBP. The prime marks denote chlorine substitution on the opposite phenyl ring. Due to differences in nomenclature conventions there are several discrepancies between the BZ numbers and IUPAC numbers. This study will strictly adhere to BZ numbers.

2.3.1 Analysis of Archived Samples

The extractions discussed above utilized dried sediment archived in air-tight aluminum cans. These sediments were either oven-dried (35°C) under a flow of air filtered through florisil to remove atmospheric contaminants. Preservation of original

congener distributions was checked by comparing the analysis of two sub-samples from the same section (36-40 cm) of core 188.6. One aliquot was dried and preserved in an air-tight aluminum can and the other was stored frozen. The analysis was carried out in the laboratory of Dr. G-Yull Rhee of the NYDOH. Virtually no difference was observed between the sample extracted dry and the one extracted wet (Figure 4). This indicates that our dried, archived samples are suitable for this study. The scientists at General Electric, have also used dried sediment samples in some of their dechlorination studies (Brown et al., 1984; Brown et al., 1987).

As previously discussed in Section 2.1, inspection of the archived dried sediment sections of Cores 188.5 and 188.6, revealed centimeter sized pieces of paper. Extraction of a 3.8 mg piece of the paper revealed a total PCB concentration of ca. 6000 ppm (Bopp et al. 1985). Therefore, some variation in the total PCB concentrations is to be expected depending on how much paper is contained in the section and the degree of non-homogeneous sub-sampling for PCB congener analyses. Significantly, the paper exhibits a congener pattern typical of those found in anaerobically dechlorinated sediments.

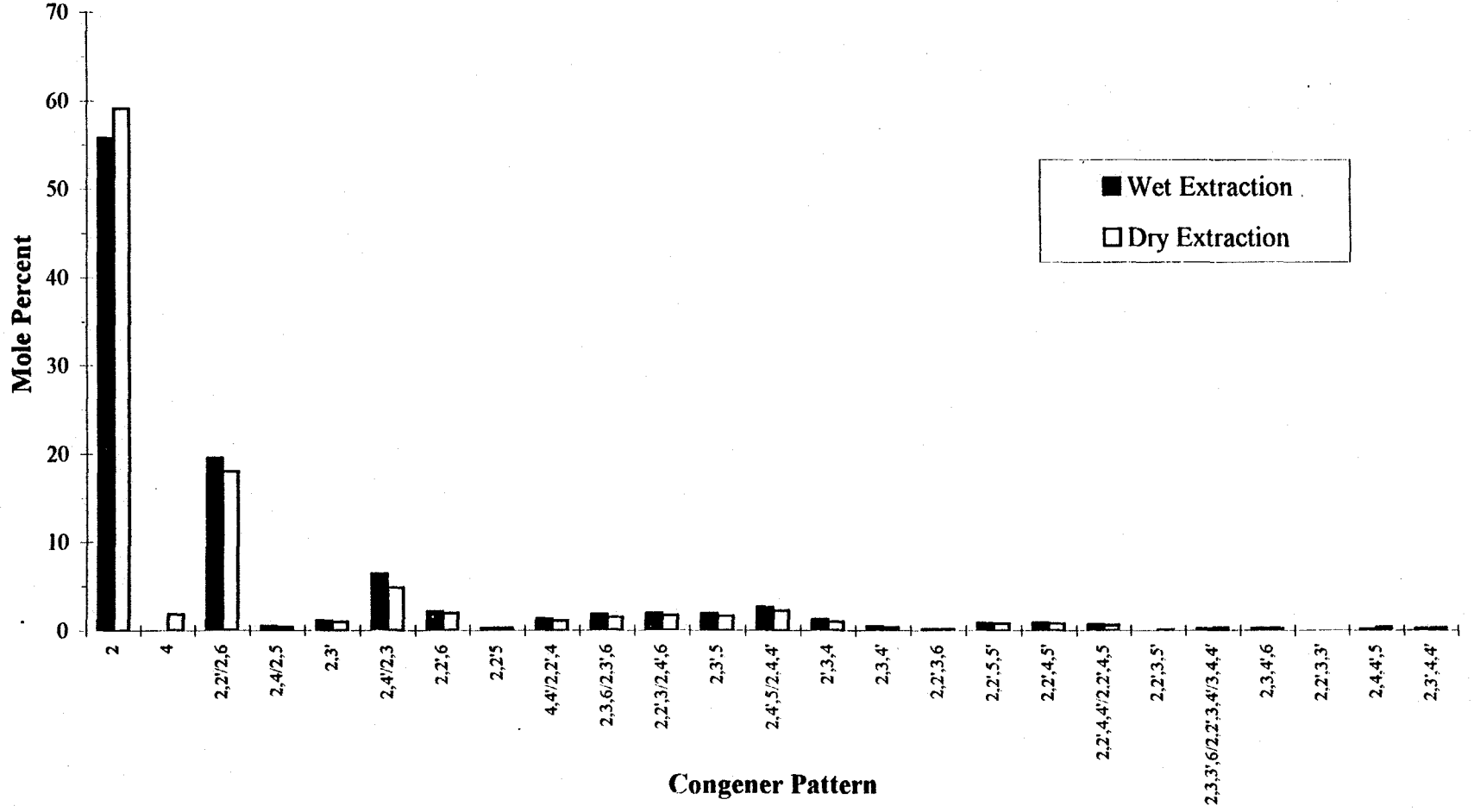
2.3.2 Data Summation

An error of 10 percent or 10 ng/g, whichever was greater, was assigned to the mono-chlorinated congeners and an error of 5 percent or 5 ng/g, whichever was greater, was assigned to all congeners with more than one chlorine. These errors were propagated throughout all of the calculations discussed below. Concentrations are presented in parts per billion (ppb) by weight (nanograms PCB per gram dry sediment)), parts per billion by mole (nanomoles PCB per gram dry sediment), and mole percent (% nmol/g). The mole percents were calculated using the molecular weights of the individual congeners. In cases of co-eluting congeners, the molecular weights for each of the congeners represented were averaged. Total PCB concentrations were computed by summing the concentrations of all congeners detected in a given sample.

The homolog group distribution, another indicator of the extent of dechlorination, was determined by tallying the mole percentages for all congeners in a given homolog group. The mole percentages for co-eluting congeners belonging to different homolog

Figure 4

Comparison of Wet and Dry Sediment Extractions
Core 188.6 (36-40 cm)



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groups were distributed using their relative weight percentages in Aroclor 1242 as reported by Schulz et al. (1989). This assumption does not account for changes to such proportions as a result of dechlorination. However, the error associated with this simplifying assumption is expected to be within the total error calculated for each homolog group.

The extent of dechlorination was investigated by studying the changes in 30 chromatographic peaks relative to the source Aroclor mixtures (discussed in Section 2.3.3, below) and between the paired sections of the co-located cores. The 30 peaks chosen, represent 45 congeners and comprise greater than 85 weight percent of the congeners in Aroclor 1242 (and greater than 95 percent of Aroclor 1016). Several of the peaks selected are not components of Aroclor mixtures, but are common dechlorination products. These 30 peaks, plus 12 others representing 14 congeners, also common to Aroclors 1242 and 1016, were used to compute compositional balances for the paired sections from the upper Hudson and more recently deposited sections from the tidal Hudson. An additional 10 peaks representing 11 congeners were used in computing the compositional balance for the older sediments of the tidal Hudson. These sediments are enriched in the later eluting congeners, commonly encountered in Aroclor 1254.

To compare the extent and rates of dechlorination, the average number of chlorines per biphenyl molecule was calculated for each sample. The average number of ortho, meta, and para chlorines per biphenyl was similarly calculated. Co-eluting congeners were assumed to be present in equal proportions and changes in those proportions due to dechlorination were assumed negligible. Quensen et al. (1990) used a similar method for this calculation and determined that these simplifying assumptions would, in the worst case, effect the calculations by only a few hundredths of a chlorine. This is primarily due to the fact that many of the co-eluting congeners have the same number of chlorines and ortho chlorines per biphenyl. The time course of dechlorination was also investigated by comparing the changes in concentration (mole percent) of congeners substituted in the ortho only; ortho and meta; ortho and para; and ortho, meta, and para positions, respectively. Dechlorination rates were calculated using the change in

the number of chlorines per biphenyl and are reported in terms of the micro-moles of chlorine released per kilogram of sediment per week.

2.3.3 Composition of Original Aroclor Releases

As shown in Table 1, the PCB mixtures used throughout the operational history of the two G.E. capacitor plants were almost exclusively Aroclors 1242 and 1016 (Bopp, 1979; Brown et al., 1984; Chillrud, 1996). Circa 1971, G.E.'s Aroclor usage changed from Aroclor 1242 to Aroclor 1016. The primary difference between the two mixtures is the proportion of penta- (ca. four percent in 1242 and ca. 0.4 percent in 1016) and tetra-chlorobiphenyls (ca. 37 percent in 1242 and ca. 27 percent in 1016). Accordingly, Aroclor 1016 contains equivalently more tri- and di-chlorobiphenyls than Aroclor 1242.

Several investigators have attempted to identify and quantify the weight percent contribution of the various congeners in the Aroclor mixtures. Schulz et al. (1989) used a capillary column and a multidimensional gas chromatographic technique that utilized two columns in series. The columns had differing polarities and were contained in separate temperature controlled ovens. Comparisons to original Aroclor releases will be made relative to Schulz et al. (1989) throughout this study (see Table 7). It should be noted, however, that some discrepancy exists in calculating the actual degree of chlorination and weight percentages of individual congeners in Aroclor mixtures. This occurs as a result of slight differences in production batches, making congener assignments without individual standards for all 209 congeners, and the complex nature of the mixtures which results in chromatographic overlap of individual congener peaks (Erickson, 1997).

In the highly dechlorinated sediments of the upper Hudson River, the change in Aroclor usage is not immediately evident due to the large changes in the congener distributions that occur as a result of anaerobic dechlorination. Sediment core sections from the upper Hudson that correspond to the early to middle 1970s are very similar to sections corresponding to the early 1960s. Very high levels of mono- and di-chlorobiphenyls, especially the mono and di-ortho substituted congeners, are distinctively elevated relative to any Aroclor mixture. In addition, the levels of all other homolog groups are markedly decreased relative to both Aroclor 1016 and 1242. Conversely, the

Table 7
Congener Distribution in Source Arolcor Mixtures

Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Arolcor 1254 (wt %)	Arolcor 1242 (wt %)	Aroclor 1016 (wt %)
1	2	0.00	0.00	0.00
7/9	2,4/2,5	0.00	1.14	1.55
6	2,3'	0.00	1.38	1.83
5/8	2,3/2,4'	0.00	7.71	10.93
26	2,3',5	0.00	1.33	1.92
25	2,3',4	0.00	0.79	1.19
31	2,4',5	0.22	4.59	6.40
28	2,4,4'	0.25	6.52	8.71
20/33	2,3,3'/2',3,4	0.14	5.08	7.25
22	2,3,4'	0.00	3.41	4.80
67	2,3',4,5	0.09	0.41	0.27
74	2,4,4',5	0.78	2.17	0.89
70	2,3',4',5	3.21	3.89	1.20
66	2,3',4,4'	0.59	1.66	1.60
56/60	2,3,3',4/2,3,4,4'	1.12	2.93	0.17
118	2,3',4,4'.5	6.39	1.62	0.00
Totals		**12.79**	**44.63**	**48.71**

Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Arolcor 1254 (wt %)	Arolcor 1242 (wt %)	Aroclor 1016 (wt %)
4/10	2,2'/2,6	0.00	3.21	4.26
18	2,2',5	0.41	6.28	9.03
17	2,2',4	0.19	2.88	3.84
24/27	2,3,6/2,3',6	0.00	0.50	0.77
16/32	2,2',3/2.4',6	0.00	2.89	4.20
52	2,2',5,5'	5.18	4.04	4.46
49	2,2',4,5'	1.64	3.60	4.31
47	2,2',4,4'	0.17	0.94	1.11
48	2,2',4,5	0.01	0.82	0.98
44	2,2',3,5'	2.03	3.20	3.50
40	2,2',3,3'	0.20	0.89	0.96
42/59	2.2',3,4'/2,3,3',6	0.23	1.17	0.84
41/64	2,2',3,4/2,3,4',6	1.09	3.50	4.04
82	2,2',3,3',4	0.95	0.44	0.00
99	2,2',4,4',5	3.60	0.86	0.00
90/101	2,2',3,4',5/2,2',4,5,5'	8.87	1.65	0.15
110	2,3,3',4',6	5.85	1.53	0.00
Totals		**30.42**	**38.40**	**42.45**

Table 7 (Continued)

Congeners Contributing to 2,2',6-trichlorobiphenyl

BZ #	Structure	Arolcor 1254 (wt %)	Arolcor 1242 (wt %)	Aroclor 1016 (wt %)
19	2,2',6	0.00	0.53	0.96
53	2,2',5,6'	0.09	0.64	0.55
95	2,2',3,5',6	6.02	2.87	0.55
45	2,2',3,6	0.00	1.16	1.66
46	2,2',3,6'	0.00	0.49	0.7
51	2,2',4,6	0.23	0.23	0.36
84	2,2',3,3',6	1.95	0.72	0.14
91	2,2',3,4',6	0.83	0.17	0.15
132	2,2',3,3',4,6'	1.98	0.30	0
149	2,2',3,4',5',6	2.21	0.63	0
Total		**13.31**	**7.74**	**5.07**
Sub-Total		**56.52**	**90.77**	**96.23**

Extra 8 Peaks for Mass Balances

BZ #	Structure	Arolcor 1254 (wt %)	Arolcor 1242 (wt %)	Aroclor 1016 (wt %)
92	2,2',3,5,5'	1.58	0.25	0.00
97	2,2',3',4,5	2.55	0.65	0.00
87/115	2,2',3,4,5'/2,3,4,4',6	4.08	0.77	0.00
153	2,2',4,4',5,5'	4.26	0.68	0.00
138	2,2',3,4,4',5	3.2	0.54	0.19
128	2,2',3,3',4,4'	2.07	0	0.00
180	2,2',3,4,4',5,5'	0.38	0.06	0.00
170/190	2,2',3,3',4,4',5/ 2,3,3',4,4',5,6	0.39	0.11	0.00
Total		**18.51**	**3.06**	**0.19**
Grand-Total		**75.03**	**93.83**	**96.42**

Source: Schulz et al., 1989

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sediment record of the tidal Hudson attests that the switch from Aroclor 1242 to Aroclor 1016 occurred in the early 1970s (Bopp et al., 1979; Bopp et al., 1981; Bopp et al., 1982; Bopp et al., 1984).

Aroclor 1242 was chosen to quantify the changes that have occurred as a result of anaerobic dechlorination in the upper Hudson. For the older sediments, this selection will provide an accurate representation of the changes that occurred. For the sediments deposited since the early 1970s, this selection still represents an accurate representation because Aroclors 1016 and 1242 are very similar; the recent contamination from fissures in the bedrock underlying the Hudson Falls capacitor plant has been continuously contributing Aroclor 1242; and, the downstream transport of Aroclor 1016 prior to deposition would result in a slightly "heavier" and more Aroclor 1242 like congener pattern. The congener distributions presented in Table 7 attest to the similarity be the two mixtures.

The situation in the tidal Hudson is significantly complicated, however, by the significant changes that occur due to preferential sediment-water and water-air partitioning of the certain PCB components during their transport over more than 100 miles. Losses of the lower chlorinated congeners result in congener patterns similar to a mixture of Aroclors 1242 and 1254. As the source Aroclor mixture changed from Aroclor 1242 to Aroclor 1016, the congener pattern exhibited by the sediments shifted so that less of an Aroclor 1254 signal and more of a 1242 signal was apparent, respectively. Quantitative evaluations will not be made between an Aroclor mixture and the sections of core 91.8 (the earlier core). Dechlorination in the sediments of the tidal Hudson River will only be discussed in terms of the change that occurred during the nine years that passed between collection of the cores.

CHAPTER THREE
RESULTS AND DISCUSSION

3.1 Upper Hudson River

Concentrations of PCBs in the sediments of the upper Hudson River have ranged from over 1000 ppm (sediment dry weight) in the early 1970s to levels of ca. 30 ppm in the early 1990s. Comparisons of the congener profiles from these sediments to those of the source Aroclor mixtures demonstrates that the PCBs have undergone extensive anaerobic dechlorination. Terminal dechlorination products and recalcitrant congeners comprise between 25 and 57 percent of the PCBs in the sediment.

Most anaerobic dechlorination studies are conducted by inoculating micro-organisms eluted from PCB contaminated sediments into sediment slurries containing PCBs, various nutrients, and carbon sources. While such studies are useful in the development of a ex-situ remediation technique, they may not provide a good representation of the process *in-situ*. This study presents the first *in-situ* incubation experiment.

Comparisons between Aroclor 1242 and the extracts from sections of Core 188.5 and between the paired sections of cores 188.5 and 188.6, permit characterization of anaerobic dechlorination *in-situ* at two distinct time intervals. The length of the first sampling interval or *in-situ* incubation period varies based on the amount of time elapsed between the deposition of each sediment section and the collection of core 188.5 (1983). Based on the ^{137}Cs ages for the sediments studied, the first sampling interval ranges in length from one to 23 years. The second sampling interval or *in-situ* incubation period encompasses eight years. The following discussion presents a quantitative study of the time course and extent of *in-situ* dechlorination using individual congeners.

3.1.1 Homolog Group Distributions

Changes in homolog group distributions are typically used as an initial tool to investigate the progressive nature and extent of anaerobic dechlorination. As shown in Table 8 and Figure 5, both upper Hudson cores show substantial losses of tetra- and

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Table 8
Homolog Group Distributions
Upper Hudson River - Thompson Island Pool

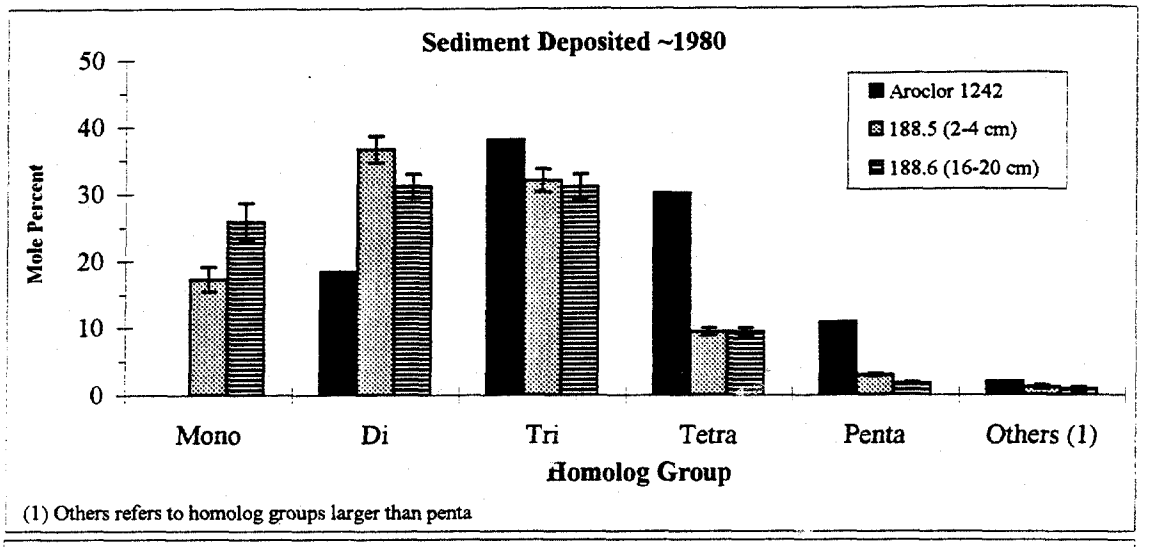
Homolog Group	Aroclor 1242	1960 Sediment 188.5 (28-32 cm)	error	188.6 (44-48 cm)	error	1963 Sediment 188.5 (24-28 cm)	error	188.6 (40-44 cm)	error	1968 Sediment 188.5 (20-24 cm)	error	188.6 (36-40 cm)	error
Mono	0.00	11.29	1.20	15.52	1.68	10.13	1.08	23.80	2.50	13.24	1.37	30.26	3.18
Di	18.36	37.78	2.01	36.34	1.98	32.64	1.72	29.11	1.63	37.24	1.97	29.51	1.71
Tri	38.10	34.82	1.83	33.71	1.83	35.93	1.87	29.67	1.64	31.14	1.65	24.41	1.42
Tetra	30.07	11.52	0.64	10.07	0.57	14.31	0.78	10.80	0.62	12.27	0.65	9.84	0.59
Penta	10.77	2.49	0.18	2.30	0.24	4.28	0.26	3.60	0.23	3.68	0.21	3.22	0.21
Others (1)	1.99	1.91	0.16	1.95	0.40	2.28	0.18	2.39	0.19	1.70	0.10	1.91	0.14

Homolog Group	Aroclor 1242	1973 Sediment 188.5 (16-20 cm)	error	188.6 (32-36 cm)	error	1975 Sediment 188.5 (12-16 cm)	error	188.6 (28-32 cm)	error	1976 Sediment 188.5 (8-12 cm)	error	188.6 (24-28 cm)	error
Mono	0.00	13.14	1.33	23.72	2.46	15.54	1.60	24.71	2.59	14.94	1.54	17.77	1.87
Di	18.36	39.65	2.09	32.01	1.77	38.31	2.03	29.30	1.63	37.81	2.00	31.94	1.76
Tri	38.10	31.43	1.66	28.98	1.62	30.34	1.62	29.56	1.66	30.66	1.63	32.53	1.78
Tetra	30.07	11.56	0.62	9.55	0.55	10.36	0.56	10.56	1.62	10.91	0.59	12.43	0.69
Penta	10.77	2.00	0.11	3.22	0.20	3.12	0.18	3.29	0.22	3.30	0.20	3.61	0.24
Others (1)	1.99	1.89	0.11	1.53	0.02	1.34	0.09	1.63	0.15	1.39	0.11	1.59	0.16

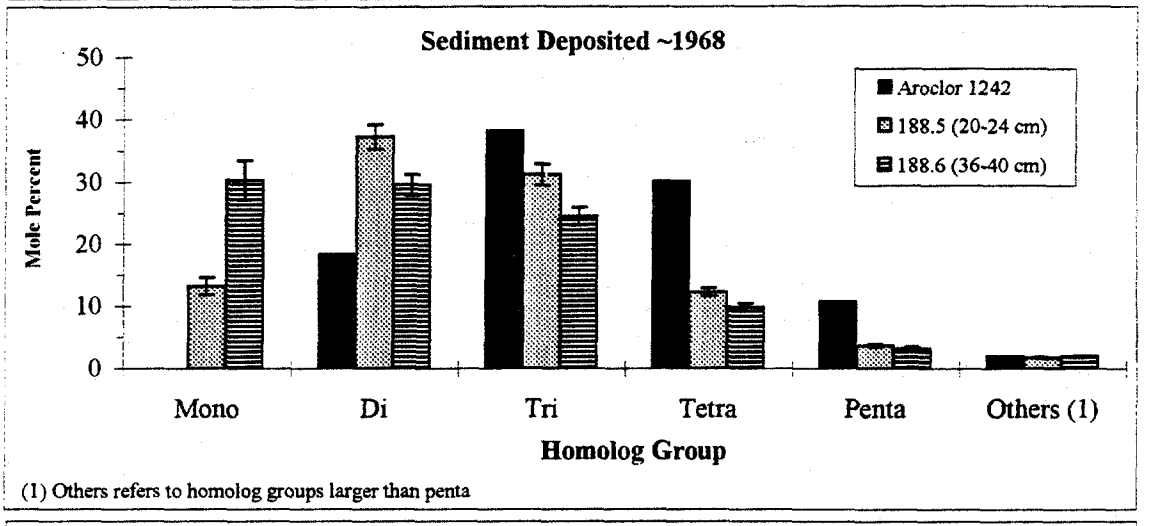
Homolog Group	Aroclor 1242	1979 Sediment 188.5 (4-8 cm)	error	188.6 (20-24 cm)	error	1980 Sediment 188.5 (2-4 cm)	error	188.6 (16-20 cm)	error	1982 Sediment 188.5 (0-2 cm)	error	188.6 (12-16 cm)	error
Mono	0.00	14.17	1.47	20.03	2.15	17.26	1.87	25.86	2.81	14.00	1.71	17.68	2.05
Di	18.36	35.95	1.91	31.70	1.76	36.64	2.01	31.15	1.82	37.20	2.10	29.98	1.72
Tri	38.10	32.15	1.71	31.04	1.76	32.01	1.71	31.09	1.85	34.84	1.95	36.34	2.14
Tetra	30.07	11.58	0.62	11.82	0.67	9.37	0.54	9.33	0.61	10.00	0.72	10.91	0.67
Penta	10.77	3.84	0.21	3.58	0.28	2.95	0.19	1.69	0.18	2.86	0.25	2.88	0.31
Others (1)	1.99	1.41	0.11	1.68	0.23	1.14	0.26	0.83	0.35	1.02	0.99	2.07	0.71

(1) Others refers to all homolog groups larger than penta

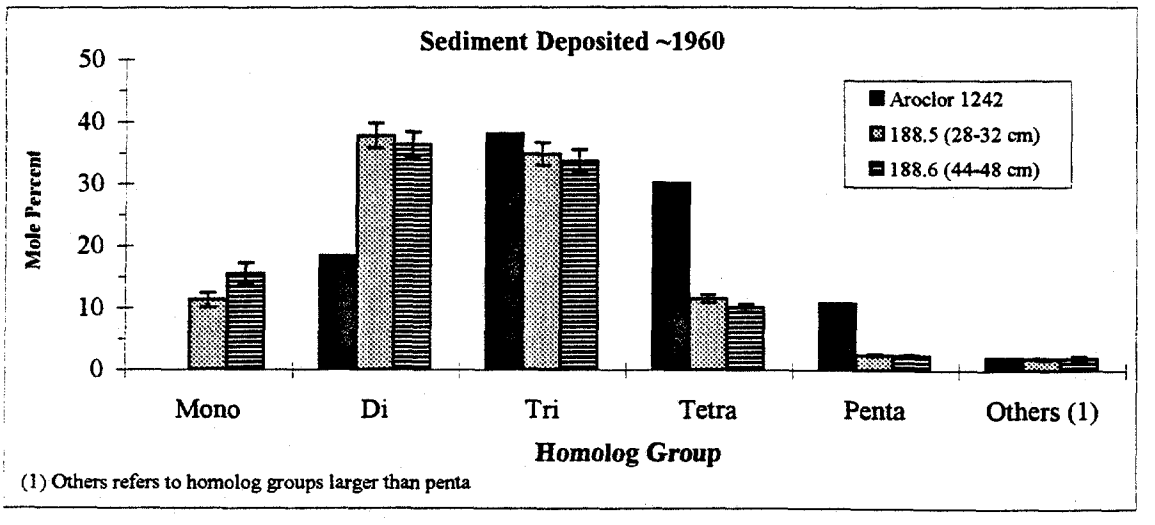
Figure 5
Relative Concentrations of Homolog Groups
Upper Hudson - Thompson Island Pool



(1) Others refers to homolog groups larger than penta



(1) Others refers to homolog groups larger than penta



(1) Others refers to homolog groups larger than penta

penta-chlorobiphenyls (penta-CBPs) and enhancement of di-, and mono-CBPs relative to standards of the original Aroclors. Less extensive losses of tri-CBPs are observed, suggesting that they commonly serve as intermediates in the dechlorination process. More than one tri-CBP can easily form as a result of dechlorinating the higher chlorinated congeners.

During the eight years between core collection, concentrations of the penta-CBPs remained relatively constant, while decreases in tetra-, tri-, and di-CBPs were balanced by large increases in 2-mono-CBP. None of the homolog groups disappear completely, suggesting the existence of other persistent congeners. The di- and tri-ortho substituted congeners, 2,2'-, 2,6- and 2,2',6-CBP, in addition to 2-CBP, have been shown to be terminal dechlorination products in most of the environmental and laboratory incubation studies of anaerobic dechlorination (Bedard and Quensen, 1995). Only a few laboratory incubation studies have shown that dechlorinating microorganisms are capable of removing chlorines in the ortho position (Var. Dort and Bedard, 1991; Berkaw, et al., 1996; Ye, 1994). There have been no reports of ortho dechlorination *in-situ*.

The change in the homolog distributions relative to Aroclor 1242 and between the two cores varies along the length of the cores. For example, the relative abundance (mole percent) of the mono-CBPs (primarily 2-CBP) steadily increases from the bottom to the top of core 188.5, possibly reflecting the acclimation (i.e., increased affinity of dechlorinating enzymes) or growth of the dechlorinating microbial population.

In addition, changes in the homolog distributions between the two cores are extensive in some cases and virtually absent in others. Figure 5 shows that the homolog group distributions in core 188.6 are indistinguishable for sediments initially deposited in 1968 and 1980. However, at the first sampling interval, the sediments deposited in 1968 was much less dechlorinated (i.e. had a significantly lower relative abundance of mono-CBPs) than those deposited in 1980. This is especially significant considering that the *in-situ* incubation time for the 1968 sediment (15 years) was five times longer than that of the 1980 sediment (3 years). This phenomenon may also reflect acclimation or growth of the microbial population. Several laboratory studies have shown that higher PCB

concentrations yield faster rates of dechlorination (Quensen et al., 1990; Abramowicz et al., 1991; Rhee et al., 1993a; Fish, 1996). However, the total PCB concentration in the 1980 sediment is somewhat lower than in the 1968 sediment.

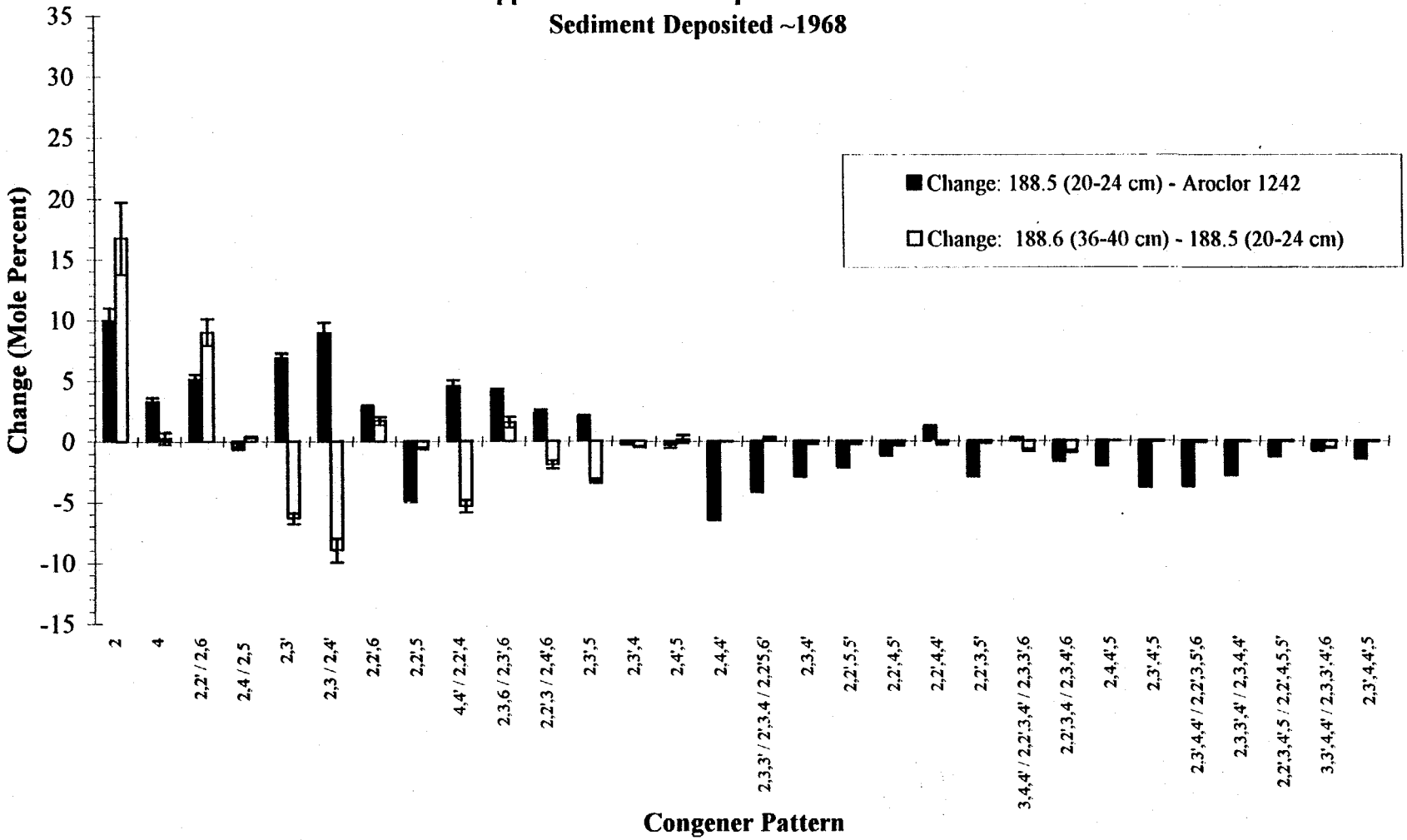
Table 8 shows that the sediments deposited in the early to middle 1970s are somewhat less dechlorinated. A similar observation was noted in another sediment core (18-6) collected in the Thompson Island Pool in 1977. The section with the highest PCB concentration (2,604 ppm) exhibited an anomalously low level of mono-CBPs and higher levels of tri-, tetra-, and penta-CBPs compared to the sections immediately above and below it (Brown et al., 1984). It is assumed that, like most of the other cores collected along the length of the Hudson, the maximum PCB concentration corresponds to ca. 1973. The lower degree of dechlorination in these sediments is peculiar in that it has been shown that higher PCB concentrations enhance dechlorination by allowing the growth or increasing the enzyme affinities of microbial populations (Quensen et al., 1988; Quensen et al., 1990; Abramowicz et al., 1993; Rhee et al., 1993a; Bedard and Quensen, 1995; Fish, 1996). However, Rhee et al. (1993) found no change in the congener compositions from the slurries inoculated with 1,000 and 1,500 ppm, even after seven months of incubation. This suggests that very high PCB concentrations may be inhibitory to the dechlorinating microorganisms.

Plots of the homolog distributions at both sampling intervals in all of the paired sections are presented in Appendix C-1. The actual changes in the individual congener concentrations that cause the shifts in the homolog group distributions are discussed below.

3.1.2 Changes in Congener Distributions

To investigate the extent and pathways of dechlorination, a more detailed analysis of the changes in the individual congener concentrations over time is necessary. Figure 6 shows the changes in 30 peaks typically found in Aroclor 1242 or dechlorinated sediments. Similar plots are located in Appendix C-1 for all of the paired sections. Enrichment of the mono-, di-, and tri-ortho substituted congeners (2-CBP; 2,2'/2,6-CBP; and 2,2',6-CBP) and several other di- and tri-CBPs (2,3'-CBP; 2,2',4-CBP; 2,3,6/2,3',6-

Figure 6
Change in PCB Congener Distributions During *In-Situ* Incubation
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1968



11.0227

CBP; and 2,3'5-CBP) is obvious in the earlier core. With the exception of 2,2',4,4'-CBP, there were corresponding decreases in all of the tetra- and penta-CBPs. In the eight years that passed between core collection, the levels of congeners substituted solely in the ortho positions continued to increase. Most of the di-CBPs and tri-CBPs that were initially enriched, decreased relative to their levels in the earlier core. The tetra- and higher chlorinated congeners show little change and two peaks, 2,3,6/2,3'6-CBP and 2,2',4,4'-CBP, appear to be recalcitrant. The similarity of the changes in composition, regardless of the age of the sediment is striking. The biggest difference between the paired sections are the levels to which certain congeners increase or decrease at each sampling interval.

The total PCB concentrations (expressed in parts per million) in the earlier core (188.5) are consistently higher than those in the later core (188.6). Some decrease in concentration between the two cores is expected due to losses of chlorine atoms and non-ortho substituted congeners during dechlorination. However, much of the concentration difference is likely due to the non-homogeneous distribution of bits of paper, containing ca. 6000 ppm of PCBs, that were found in both cores. In the earlier core (188.5), the paper and bits of wood were significantly more abundant. Both were left in the dried sediments that were archived. Therefore, the sub-sampling for PCB analysis certainly included some of this paper. In contrast, the sediments from core 188.6 were more rigorously homogenized after drying. Bits of paper were removed and archived separately. Paper was observed in most sections of both cores, but was much more concentrated in the sediments deposited in the middle 1970s.

It should be noted that some small portion of the changes noted at the first sampling interval are a result of selective partitioning of certain congeners from the sediment to the water column during transport and aerobic degradation prior to burial. Because of the short travel distance from the source and because the sediments of the Hudson become anaerobic within the first centimeter, the alterations were likely minimal.

3.1.3 Compositional Balance

To support the hypothesis that 2-CBP, 2,2'-CBP, 2,6-CBP, and 2,2',6 are terminal dechlorination products and that full dechlorination to biphenyl does not occur,

composition balances were conducted for each pair of samples. Correlation of losses of certain congeners to gains in others, through a parent-daughter analysis, was also completed for all of the pairs and is discussed in Section 3.1.4. To investigate differences in the reactivities of congeners with differing degrees of ortho substitution, forty-two peaks common to Aroclor 1242 and dechlorinated sediments were separated on that basis. Table 9 shows a compositional balance for the sediment deposited around 1968.

This pair of samples was chosen because the congener profile at the first sampling interval is one of the least dechlorinated and the congener profile at the second sampling interval is the most dechlorinated. These samples are also some of the most unambiguous in terms of comparison to a source Aroclor mixture. In 1968, General Electric's Aroclor usage was made up of 99 percent Aroclor 1242 and less than one percent Aroclor 1254 (Brown et al., 1984; Chillrud, 1996).

The balance shows that although significant alteration of the congener pattern occurs, increased mole percentages of each of the proposed terminal dechlorination products is balanced by decreases in "parent" congeners. A measure of how well the increases in certain congeners balance the decreases in others is shown by the percentages listed on Table 9. The net difference is shown as a percentage of the total mole percentage for each group of congeners. The compositional balances for the mono- and di-ortho substituted congeners balance to within 3 to 6 percent and the tri-ortho substituted congeners balance to within 20 percent of the total.

The balances for the mono- and di-ortho substituted congeners in all of the other paired sections are in good agreement with these results, balancing to within 1 to 10 percent. With the exception of two paired sections, the tri-ortho substituted congeners only balance to within 15 to 20 percent. Comparison of the pairs out of balance to those in balance (sediments deposited in 1976 and 1980) reveals that the overall levels of tri-ortho substituted congeners in the earlier core (188.5) are about one mole percent too low.

Table 9
Compositional Balance
188.5 (20-24 cm) and 188.6 (36-40 cm); Sediment Deposited ~ 1968

Congeners Contributing to 2-monochlorobiphenyl

			Core 188.5 (20-24 cm)		188.5 - Aroclor 1242		Core 188.6 (36-40 cm)		188.6 - 188.5	
BZ #	**Structure**	**Aroclor 1242**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
1	2	0.00	9.96	1.01	9.96	1.01	26.73	2.78	16.77	2.96
7/9	2,4/2,5	1.14	0.53	0.03	-0.61	0.03	0.88	0.05	0.36	0.06
6	2,3'	1.38	8.24	0.43	6.86	0.43	1.89	0.11	-6.35	0.45
5/8	2,3/2,4'	7.71	16.67	0.88	8.96	0.88	7.69	0.45	-8.97	0.98
26	2,3',5	1.33	3.31	0.17	1.98	0.17	0.04	0.002	-3.27	0.17
25	2,3',4	0.79	0.52	0.03	-0.27	0.03	0.03	0.002	-0.49	0.03
31	2,4',5	4.59	4.24	0.22	-0.35	0.22	4.40	0.25	0.16	0.34
28	2,4,4'	6.52	0.00	0.01	-6.52	0.01	0.00	0.01	0.00	0.015
20/33	2,3,3'/2',3,4	5.08	1.41	0.07	-3.67	0.07	1.58	0.09	0.17	0.12
22	2,3,4'	3.41	0.45	0.02	-2.96	0.02	0.22	0.01	-0.22	0.03
67	2,3',4,5	0.41	0.06	0.003	-0.35	0.003	0.07	0.004	0.01	0.01
74	2,4,4',5	2.17	0.09	0.005	-2.08	0.005	0.11	0.01	0.01	0.01
70	2,3',4',5	3.89	0.05	0.003	-3.84	0.003	0.04	0.002	-0.01	0.004
66	2,3',4,4'	1.66	0.29	0.02	-1.37	0.02	0.27	0.02	-0.02	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.03	0.002	-2.90	0.002	0.02	0.001	-0.01	0.002
118	2,3',4,4',5	1.62	0.13	0.01	-1.49	0.01	0.13	0.01	0.00	0.01
Sum		**44.63**	**45.99**	**2.91**	**1.36**	**2.91**	**44.10**	**3.80**	**-1.89**	**5.20**
					2.96%				**4.19%**	

11.0230

Table 9 (Continued)

Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

			Core 188.5 (20-24 cm)		188.5 - Aroclor 1242		Core 188.6 (36-40 cm)		188.6 - 188.5	
BZ #	Structure	Aroclor 1242	Mole Percent	error	Change (Mole Percent)	error	Mole Percent	error	Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	8.33	0.44	5.12	0.44	17.37	1.01	9.04	1.10
18	2,2',5	6.28	1.35	0.07	-4.93	0.07	0.82	0.05	-0.53	0.09
17	2,2',4	2.88	5.87	0.31	2.99	0.31	2.36	0.14	-3.52	0.34
24/27	2,3,6/2,3',6	0.50	4.61	0.24	4.11	0.24	6.18	0.36	1.57	0.43
16/32	2,2',3/2,4',6	2.89	5.21	0.27	2.32	0.27	3.27	0.19	-1.94	0.33
52	2,2',5,5'	4.04	1.92	0.10	-2.12	0.10	1.79	0.10	-0.13	0.14
49	2,2',4,5'	3.60	2.51	0.13	-1.09	0.13	2.31	0.13	-0.20	0.19
47	2,2',4,4'	0.94	2.08	0.11	1.14	0.11	1.91	0.11	-0.17	0.16
48	2,2',4,5	0.82	0.00	0.01	-0.82	0.01	0.00	0.01	0.00	0.01
44	2,2',3,5'	3.20	0.27	0.01	-2.93	0.01	0.09	0.01	-0.18	0.01
40	2,2',3,3'	0.89	0.07	0.004	-0.82	0.004	0.00	0.01	-0.07	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	1.34	0.07	0.17	0.07	0.73	0.04	-0.61	0.08
41/64	2,2',3,4/2,3,4',6	3.50	1.90	0.10	-1.60	0.10	1.05	0.06	-0.85	0.12
82	2,2',3,3',4	0.44	0.02	0.001	-0.42	0.001	0.01	0.001	-0.01	0.001
99	2,2',4,4',5	0.86	0.24	0.01	-0.62	0.01	0.27	0.02	0.03	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.35	0.02	-1.30	0.02	0.37	0.02	0.02	0.03
110	2,3,3',4',6	1.53	0.93	0.05	-0.60	0.05	0.51	0.03	-0.42	0.06
Sum		**38.40**	**37.01**	**1.95**	**-1.39**	**1.95**	**39.05**	**2.28**	**2.04**	**3.12**
					3.77%				**5.38%**	

11.0231

Table 9 (Continued)

Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (20-24 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (36-40 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
19	2,2',6	0.53	3.30	0.17	2.77	0.17	4.90	0.28	1.60	0.33
53	2,2',5,6'	0.64	0.18	0.01	-0.46	0.01	0.20	0.01	0.02	0.01
95	2,2',3,5',6	2.87	0.50	0.03	-2.37	0.03	0.47	0.03	-0.03	0.04
45	2,2',3,6	1.16	0.65	0.03	-0.51	0.03	0.61	0.04	-0.04	0.05
46	2,2',3,6'	0.49	0.13	0.01	-0.36	0.01	0.06	0.004	-0.07	0.01
51	2,2',4,6	0.23	0.78	0.04	0.55	0.04	0.59	0.03	-0.19	0.05
84	2,2',3,3',6	0.72	0.34	0.02	-0.38	0.02	0.29	0.02	-0.04	0.02
91	2,2',3,4',6	0.17	0.43	0.02	0.26	0.02	0.35	0.02	-0.08	0.03
132	2,2',3,3',4,6'	0.30	0.00	0.002	-0.30	0.002	0.00	0.002	0.00	0.003
149	2,2',3,4',5',6	0.63	0.26	0.01	-0.37	0.01	0.28	0.02	0.02	0.02
Sum		**7.74**	**6.58**	**0.35**	**-1.16**	**0.35**	**7.75**	**0.45**	**1.17**	**0.57**
					17.65%				**16.36%**	

Notes:
The sum of the changes in mole percent are expressed as a percentage of the total mole percentage for each catagory.

11.0232

Aroclor 1242 and the later core (188.6) consistently contain ca. 7.7 mole percent of the tri-ortho substituted congeners. However, most of the sections studied in Core 188.5 show levels around 6.5 mole percent. The lower percentages in these sections is likely a result of a lower than actual mole percentage for 2,2',6-CBP. This becomes more obvious upon closer inspection of the changes that occur during each sampling interval. The decreases are too large during the first incubation period and the increases too large during the second incubation period. If the concentration of 2,2',6-CBP was underestimated by about one mole percent in the earlier core, then the balance would agree within a few percent. The same is true for the other paired sections that show adverse balances for the tri-ortho substituted congeners.

3.1.4 Parent - Daughter Analysis and Time Course of Dechlorination

Correlation of losses of certain congeners to gains of others, through a parent-daughter analysis, was conducted to confirm the results of the compositional balances and to investigate the pathways of dechlorination. Table 10 presents the detailed parent-daughter analysis for the changes that occurred during each sampling interval for the sediment deposited in 1968. This analysis is also sub-divided by the changes that occurred to the mono-, di-, and tri-ortho substituted congeners. Table 10 is discussed in conjunction with Figures 7-12 which detail the likely dechlorination pathways, and Tables 11 - 13 which summarize the common dechlorinating characteristics observed at both sampling intervals for each pair of samples.

3.1.4.1 Mono Ortho Substituted Congeners

During both *in-situ* incubation periods, most of the mono-ortho substituted congeners are depleted relative to Aroclor 1242, as would be expected in extensively dechlorinated sediments. At the first sampling interval, the relative percentages of 2-CBP, 2,3'-CBP, 2,3/2,4'-CBP, and 2,3',5-CBP are significantly elevated compared to Aroclor 1242 and appear to be balanced by the decreases shown. As shown in Table 11, these

Table 10
Parent - Daughter Analysis
Core 188.5 (20-24 cm) - Aroclor 1242; Sediment Deposited ~ 1968

Peaks Contributing to 2-monochlorobiphenyl
Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	9.96	1.01	All decreasing peaks listed below
6	2,3'	6.86	0.43	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	8.96	0.88	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2.4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4', 2,3',4,4',5
26	2,3',5	1.98	0.17	2,3',4,5; 2,3',4',5; 2,3',4,4',5
Total		**27.76**	**2.49**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.61	0.03	2	--
25	2,3',4	-0.27	0.03	2,3'; 2	2,4
31	2,4',5	-0.35	0.22	2,4'; 2	2,5
28	2,4,4'	-6.52	0.01	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.67	0.07	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-2.96	0.02	2,3; 2,4'; 2	--
67	2,3',4,5	-0.35	0.003	2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-2.08	0.005	2,4'; 2	2,4,4'; 2,4',5; 2,4; 2,5
70	2,3',4',5	-3.84	0.003	2,3',5; 2,4'; 2,3'; 2	2,3',4; 2,4',5; 2,5
66	2,3',4,4'	-1.37	0.02	2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,3',4; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.90	0.002	2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,3',4; 2,4
118	2,3',4,4',5	-1.49	0.01	2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,4',5; 2,3',4; 2,5; 2,4'
Total		**-26.40**	**0.42**		

11.0234

Table 10 (Continued)

Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	5.12	0.44	All decreasing peaks listed below
17	2,2',4	2.99	0.31	2,2',4,5'; 2,2',4,5; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	4.11	0.24	2,3,4',6; 2,3,3',4',6; ?
16/32	2,2',3/2,4',6	2.32	0.27	2,2',3,5'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	1.14	0.11	2,2',4,4',5; ?
42/59	2,2',3,4'/2,3,3',6	0.17	0.07	2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
Total		**15.86**	**1.44**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-4.93	0.07	2,2'	--
52	2,2',5,5'	-2.12	0.10	2,2'	2,2',5
49	2,2',4,5'	-1.09	0.13	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.01	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.93	0.01	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.82	0.004	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-1.60	0.10	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.42	0.001	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,3'
99	2,2',4,4',5	-0.62	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.30	0.02	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-0.60	0.05	2,3,3',6; 2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6
Total		**-17.25**	**0.51**		

11.0235

Table 10 (Continued)

Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	2.77	0.17	All decreasing peaks listed below
51	2,2',4,6'	0.55	0.04	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.26	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**3.59**	**0.24**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.46	0.01	2,2',6	--
95	2,2',3,5',6	-2.37	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.51	0.03	2,2',6	--
46	2,2',3,6'	-0.36	0.01	2,2',6	--
84	2,2',3,3',6	-0.38	0.02	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.30	0.00	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.37	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-4.75**	**0.11**		

11.0236

Table 10 (Continued)

Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	16.77	2.96	All decreasing peaks listed below
7/9	2,4/2,5	0.36	0.06	2,3',5; 2,3',4
Total		**17.13**	**3.02**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-6.35	0.45	2	--
5/8	2,3/2,4'	-8.97	0.98	2	--
26	2,3',5	-3.27	0.17	2,5; 2	2,3'
25	2,3',4	-0.49	0.03	2,4; 2	2,3'
22	2,3,4'	-0.22	0.03	2	2,3; 2,4'
Total		**-19.31**	**1.66**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
31	2,4',5	0.16	0.34
28	2,4,4'	0.00	0.01
20/33	2,3,3'/2',3,4	0.17	0.12
67	2,3',4,5	0.01	0.01
74	2,4,4',5	0.01	0.01
70	2,3',4',5	-0.01	0.004
66	2,3',4,4'	-0.02	0.02
56/60	2,3,3',4/2,3,4,4'	-0.01	0.002
118	2,3',4,4',5	0.00	0.01

11.0237

Table 10 (Continued)

Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	9.04	1.10	All decreasing peaks listed below
24,27	2,3,6/2,3',6	1.57	0.43	2,3,3',6; 2,3,4,',6; 2,3,3',4',6
Total		**10.61**	**1.53**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-0.53	0.09	2,2'	--
17	2,2',4	-3.52	0.34	2,2'	--
16/32	2,2',3/2,4',6	-1.94	0.33	2,2'; 2,6	--
44	2,2',3,5'	-0.18	0.01	2,2'	2,2',5; 2,2',3
42/59	2,2',3,4'/2,3,3',6	-0.61	0.08	2,3,6; 2,3',6; 2,2'; 2,6	2,2',4; 2,2',3
41/64	2,2',3,4/2,3,4',6	-0.85	0.12	2,3,6; 2,2'; 2,6	2,2',3; 2,4',6; 2,2',4
110	2,3,3',4',6	-0.42	0.06	2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6; 2,4',6
Total		**-8.04**	**1.03**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
52	2,2',5,5'	-0.13	0.14
49	2,2',4,5'	-0.20	0.19
47	2,2',4,4'	-0.17	0.16
48	2,2',4,5	0.00	0.01
40	2,2',3,3'	-0.07	0.011
82	2,2',3,3',4	-0.01	0.00
99	2,2',4,4',5	0.03	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	0.02	0.03

11.0238

Table 10 (Continued)

Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	1.60	0.33	All decreasing peaks listed below
Total		**1.60**	**0.33**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
46	2,2',3,6'	-0.07	0.01	2,2',6	--
51	2,2',4,6'	-0.19	0.05	2,2',6	--
84	2,2',3,3',6	-0.04	0.02	2,2',6	2,2',3,6'; 2,2',3,6
91	2,2',3,4',6	-0.08	0.03	2,2',6	2,2',4,6'; 2,2',3,6
Total		**-0.39**	**0.12**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
53	2,2',5,6'	0.02	0.01
95	2,2',3,5',6	-0.03	0.04
45	2,2',3,6	-0.04	0.05
132	2,2',3,3',4,6'	0.00	0.003
149	2,2',3,4',5',6	0.02	0.02

11.0239

congeners are enriched at the first sampling interval in every sample studied. Other congeners that are occasionally elevated above Aroclor 1242 levels include: 2,3',4-CBP, 2,4',5-CBP, and, in one instance, 2,3',4,5-CBP. A common trait of these congeners, and the other tri- and di-CBPs named above, is that they are easily formed intermediates that result from meta and/or para dechlorination of many of the higher chlorinated congeners.

Table 11
Dechlorination Sequence - Mono Ortho Congeners
Summary of Changes in all Paired Sections
Cores 188.5 and 188.6

Change: Aroclor 1242 and Core 188.5				Change: 188.5 and 188.6			
Increasing Peaks		Decreasing Peaks		Increasing Peaks		Decreasing Peaks	
BZ#	Structure	BZ#	Structure	BZ#	Structure	BZ#	Structure
1	2	7/9	2,4/2,5	1	2	6	2,3'
6	2,3'	25	2,3',4	7/9	2,4/2,5	5/8	2,3/2,4'
5/8	2,3/2,4'	31	2,4',5	20/33	2,3,3'/2',3,4	26	2,3',5
26	2,3',5	28	2,4,4'			25	2,3',4
31	2,3',4	20/33	2,3,3'/2',3,4	Less Common		22	2,3,4'
		22	2,3,4'	26	2,3',5		
Less Common		67	2,3',4,5	31	2,3',4	Less Common	
67	2,3',4,5	74	2,4,4',5			20/33	2,3,3'/2',3,4
		70	2,3',4',5			28	2,4,4'
		66	2,3',4,4'			67	2,3',4,5
		56/60	2,3,3',4/2,3,4,4'			70	2,3',4',5
		118	2,3',4,4',5			66	2,3',4,4'
						56/60	2,3,3',4/2,3,4,4'

Notes:
Less common congeners were observed two or fewer times at a given sampling interval.
No change was observed in the concentrations of the congeners not listed.

One congener, 2,4,4'-CBP, is almost always entirely depleted after the first incubation period. Only the more most recently deposited sediments (e.g., 1982 sediment) and oldest sediments (e.g., 1960 sediment) show sequential decreases in the concentration of 2,4,4'-CBP after the first incubation. In the case of the more recently deposited sediments, it appears that the sampling interval was short enough (1 year) to observe intermediate levels. In the case of the older sediments, a slower rate of dechlorination, due to an acclimating population, is likely the cause.

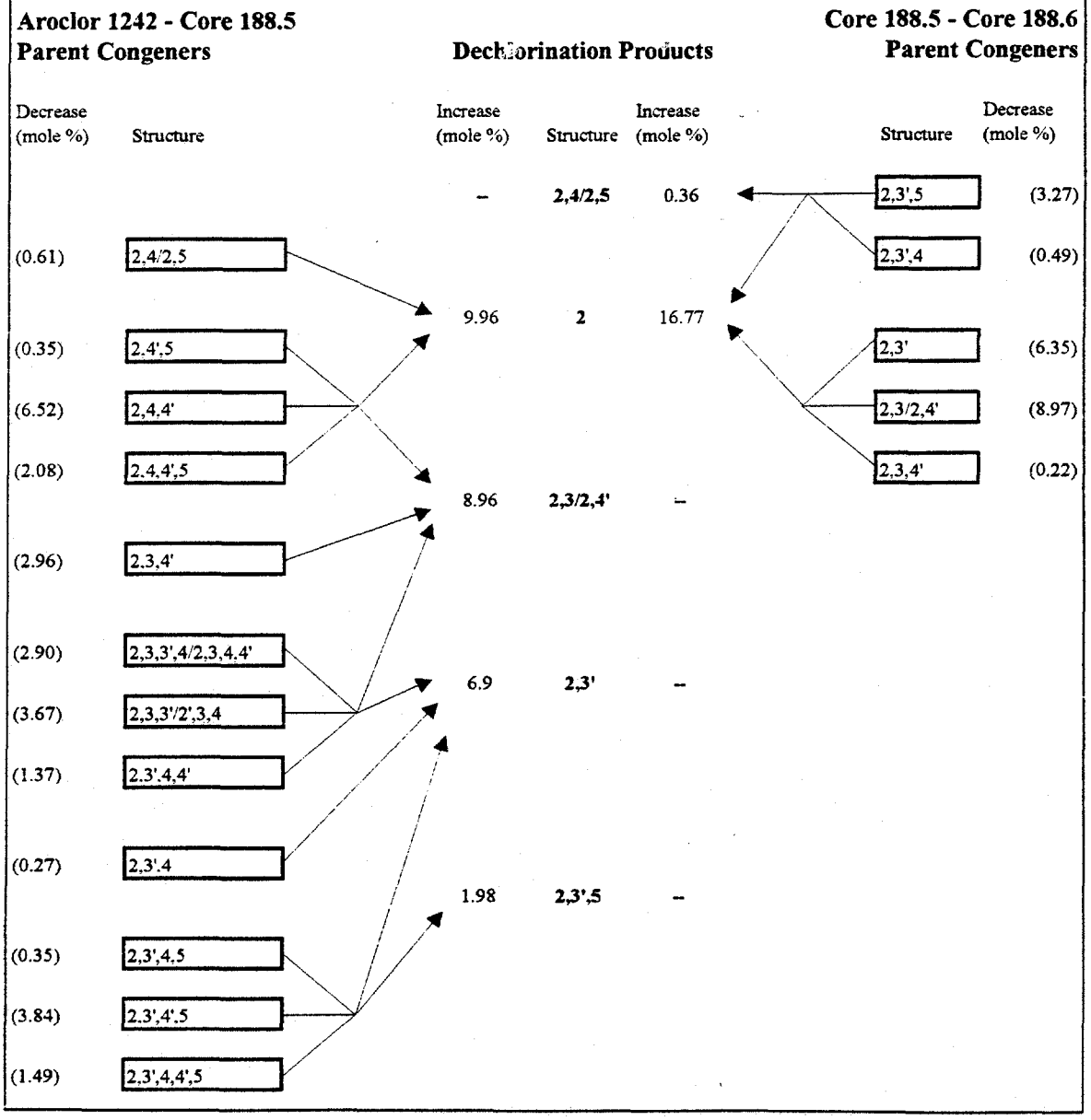
At the second sampling interval, only two congeners are depleted relative to the levels observed in Core 188.5. The levels of 2-CBP sharply increased in response to the large decrease in those congeners observed to be enriched at the first sampling interval. This occurrence is clearly depicted in Figure 6, shown above. A small increase in 2,4/2,5-

CBP was also observed. The congeners in this peak are common intermediates in the dechlorination of the peaks listed as decreasing and significant levels are not likely to accumulate. Table 11 shows that several other congeners, 2,3,3'/2',3,4-CBP, 2,3',5-CBP, and 2,3',4-CBP, also accumulate during the second sampling interval in some cases.

At both sampling intervals, the possible "daughter" congeners of the decreasing peaks, almost exactly match the increases observed on a mole percent basis. Figure 7 shows the proposed routes of dechlorination for the 1968 sediments. It appears that

Figure 7

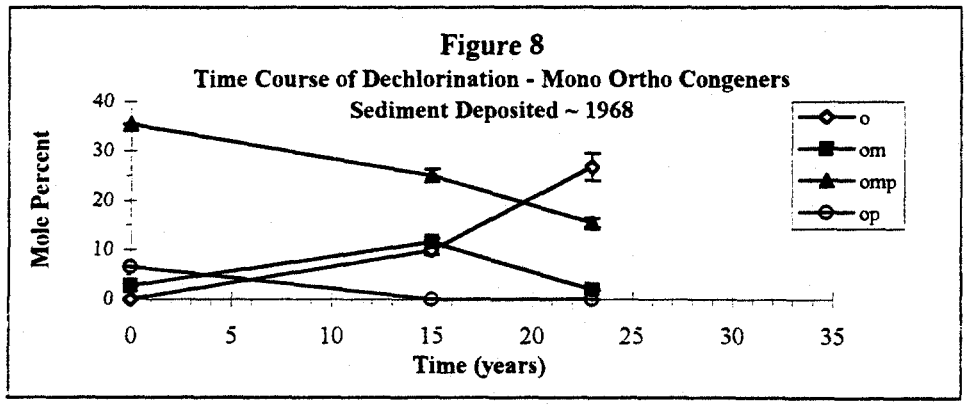
Match of Losses to Gains in Relative Percentages of Mono Ortho Congeners
Sediment Deposited ~ 1968



2,3,4,4',5-CBP, 2,3',4',5-CBP, and 2,3',4,5-CBP are dechlorinated from the para position forming 2,3',5-CBP and then 2,3'-CBP. Therefore, it is likely that 2,3',4-CBP and 2,4,4'-CBP are also dechlorinated from the para position to form 2-CBP. The remaining congeners are dechlorinated from the meta and/or para positions to form 2,3'-CBP, 2,3/2,4'-CBP or 2-CBP. During the second interval, the changes consist entirely of tri- and di-CBPs dechlorinating to 2-CBP.

To further investigate the time course of the dechlorination process, the mole percentages of congeners substituted in the ortho only (o), ortho-meta (om), ortho-para (op), and ortho-meta-para (omp) positions were plotted at each sampling intervals. The proportions of these congeners in Aroclor 1242 was used for time zero. As shown in Figure 8, chlorines in the para position are removed preferentially, during the initial sampling period, resulting in enrichments of 2-CBP and congeners substituted in the ortho-meta positions only (2,3'-CBP and 2,3',5-CBP). Levels of congeners substituted in all three positions consistently decrease. In contrast, meta chlorines appear to be preferentially removed during the second incubation period. None of the mono-ortho substituted congeners, except for 2-CBP, appears to be recalcitrant.

Figure 8



In one of the first demonstrations of anaerobic dechlorination in the laboratory, Quensen et al. (1988) found that many of the same mono ortho congeners, including 2,4/2,5-CBP, 2,3'-CBP, 2,3/2,4'-CBP, and 2,3',5-CBP, accumulated over just 16 weeks. Rhee et al. (1993a) also found that 2,3'-CBP, 2,3',5-CBP, and 2,3'4-CBP were the first peaks to appear after only 3 months of incubation. Similarly, losses of the earlier dechlorination products ensued in the later portions of the experiment. In contrast to our

study, however, increased abundances of 2,4,4'/2,4',5-CBP were observed. Several experiments performed to isolate the dechlorinating microbes, have shown that methanogenic bacteria are responsible for the removal of the para chlorine from 3,4-chlorophenyl groups on mono ortho congeners (Ye, 1994; Ye et al., 1995). Rhee et al. (1993b) also noted increased abundances of 2,3'-CBP and 2,3',5 in methanogenic cultures.

In another incubation study, Quensen et al. (1990) showed that Aroclor 1242 was extensively dechlorinated after only 8 weeks of incubation, showing significant increases in only two mono ortho congeners, 2-CBP and 2',3,5-CBP. No accumulations of 2',3,5-CBP were seen in the samples from either 188.5 or 188.6, but it could serve as intermediate in the dechlorination of several minor components of Aroclor 1242. In a similar study, Alder et al. (1993) found that anaerobes eluted from Hudson River sediments were able to dechlorinate all of the mono ortho congeners, yielding only 2-CBP, after 11 months.

3.1.4.2 Di Ortho Substituted Congeners

Losses of the more highly chlorinated di-ortho substituted congeners result in enrichment of 2,2'/2,6-CBP, 2,2',4-CBP, 2,3,6/2,3',6-CBP, 2,2',3/2,4',6-CBP, 2,2',4,4'-CBP, and 2,2',3,4'/2,3,3',6-CBP. In contrast to the mono-ortho substituted congeners, chlorines in the meta positions appear to be preferentially removed. Large decreases in the abundances of 2,2',5-CBP, 2,2',5,5'-CBP, 2,2',4,5'-CBP, 2,2',3,5'-CBP, 2,2',4,4',5-CBP and 2,2',3,4',5/2,2',4,5,5'-CBP are observed. Also unlike the situation with the mono-ortho congeners, the di-ortho congeners substituted in only the ortho and para positions (2,2',4-CBP and 2,2',4,4'-CBP) accumulate. As shown in Table 12, these alterations are consistent with those observed at the first sampling interval in all of the other sections studied.

In very dechlorinated sediments, like the 1968 sediment, only 2,2'/2,6-CBP and 2,3,6/2,3',6-CBP are enriched between the two sampling intervals. However, as shown in Table 12, several other congeners, including 2,2',5-CBP, 2,2',5,5'-CBP, 2,2',4,4'-CBP, and 2,2',4,5'-CBP tend to accumulate in some sections. Several of these congeners

appear to be quite recalcitrant. Levels of 2,3,6/2,3',6-CBP and 2,2',4,4'-CBP increase or remain the same during both incubations for almost every pair of samples. At the second sampling, 2,2',4,4'-CBP does show signs of reduction in abundance (less than one mole percent) in the older sediments (those with the longest *in-situ* incubation periods).

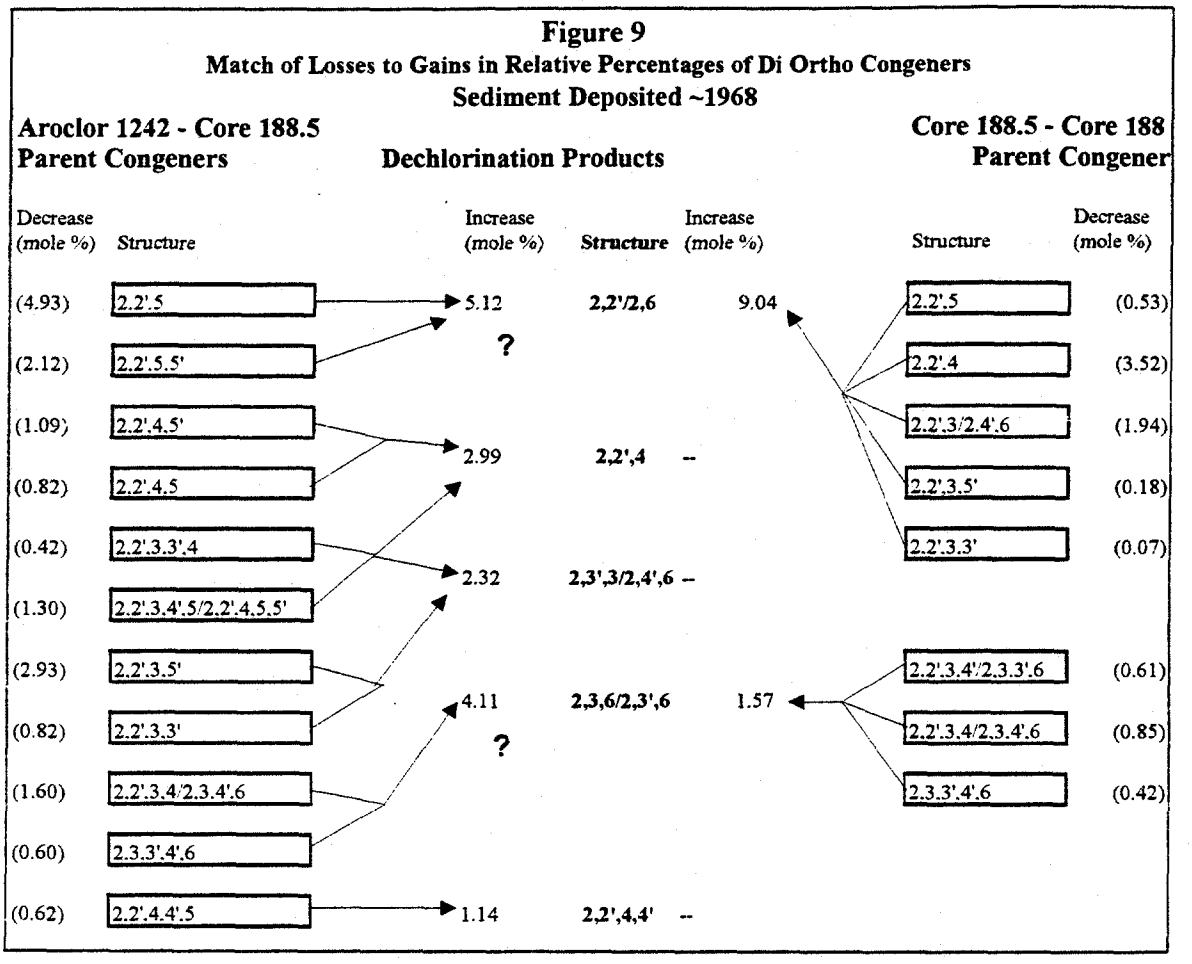
Table 12
Dechlorination Sequence - Di Ortho Substituted Congeners
Summary of Changes in All Paired Sections
Cores 188.5 and 188.6

Change: Aroclor 1242 and Core 188.5				Change: 188.5 and 188.6			
Increasing Peaks		Decreasing Peaks		Increasing Peaks		Decreasing Peaks	
BZ#	Structure	BZ#	Structure	BZ#	Structure	BZ#	Structure
4/10	2,2'/2,6	18	2,2',5	4/10	2,2',6	18	2,2',5
17	2,2',4	52	2,2',5,5'	18	2,2',5	17	2,2',4
24/27	2,3,6/2,3',6	49	2,2',4,5'	24/27	2,3,6/2,3',6	16/32	2,2',3;2,4',6
16/32	2,2',3;2,4',6	48	2,2',4,5	52	2,2',5,5'	44	2,2',3,5'
47	2,2',4,4'	44	2,2',3,5'			42/59	2,2',3,4'/2,3,3',6
		40	2,2',3,3'	Less Common		41/64	2,2',3,4/2,3,4',6
Less Common		42/59	2,2',3,4'/2,3,3',6	47	2,2',4,4'		
42/59	2,2',3,4'/2,3,3',6	41/64	2,2',3,4/2,3,4',6	49	2,2',4,5'	Less Common	
		82	2,2',3,3',4			49	2,2',4,5'
		99	2,2',4,4',5			47	2,2',4,4'
		90/101	2,2',3,4',5/2,2',4,5,5'			40	2,2',3,3'
Notes:		110	2,3,3',4',6				

Less common congeners were observed two or fewer times at a given sampling interval.
No change was observed in the concentrations of the congeners not listed.

The balance between the decreasing peaks and the increased observed in their possible daughter products does not correlate as well for the di-ortho substituted congeners (see Figure 9). For example, during the first sampling interval, increases in 2,3,6/2,3',6-CBP or 2,2',4,4'-CBP are insufficient to balance decreases of 2,3,4',6-CBP and 2,3,3',4',6-CBP or 2,2',4,4',5-CBP, respectively. After satisfying the increases in abundance of 2,2',4-CBP and 2,2',3/2,4',6-CBP, the remaining decreases in mole percentage must result in the increased abundance of 2,2'/2,6-CBP. However, the increases observed for 2,2'/2,6-CBP fall short of those predicted by the decreasing peaks. Some of the other paired core sections show similar results in the balances for the observed increases in 2,3,6/2,3',6-CBP, 2,2',4,4'-CBP and 2,2'/2,6-CBP. However, in several sections (e.g., 1976 sediment presented in Appendix C-1) the parent-daughter balances work out much better.

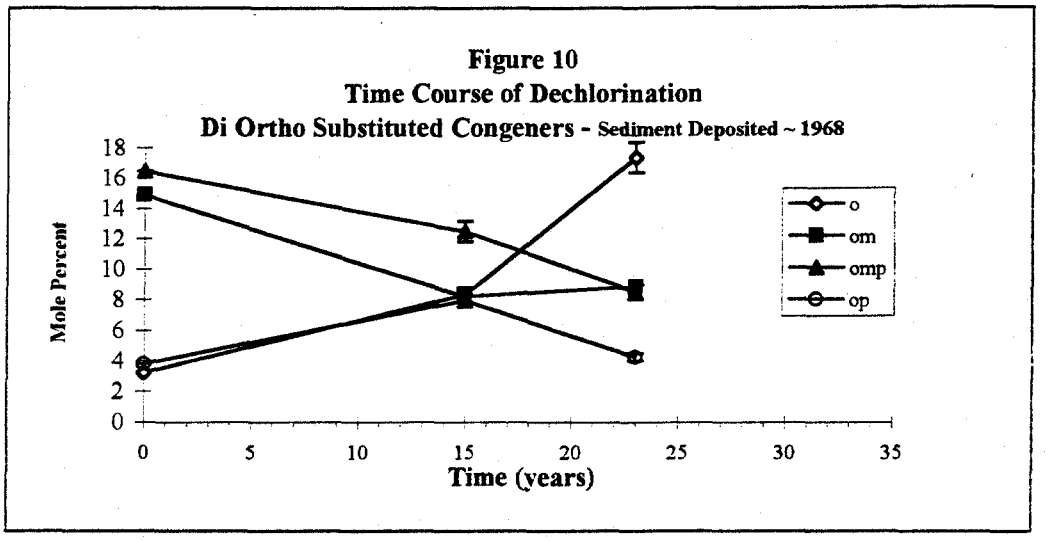
Figure 9
Match of Losses to Gains in Relative Percentages of Di Ortho Congeners
Sediment Deposited ~1968



During the second sampling interval the increased abundance of 2,3,6/2,3',6-CBP is reasonably matched by the observed decreases in the relevant parent congeners. In contrast to the initial sampling interval, it appears that the increase in 2,2'/2,6 is too high for the losses in the applicable parent congeners. Like the situation observed for the compositional balance of the tri-ortho substituted congeners and 2,2',6-CBP, it appears that 2,2'/2,6-CBP is a few mole percent too low in the earlier core. If the level of 2,2'/2,6 were slightly higher in 188.5, the observed increase during the second incubation would not be as high and the observed decreases would more closely balance the increases at both intervals. Because the observed increases in 2,2'/2,6-CBP are too low in the earlier core and too low high in the later core, losses of ortho chlorines are not indicated.

In direct contrast to the mono-ortho congeners, the di-ortho congeners are dechlorinated from the meta position first, resulting in accumulations of ortho-para substituted daughter products (See Figure 10). Over the second sampling interval,

congeners with only ortho and ortho-meta substitution accumulate as a result of dechlorinations of ortho-para substituted congeners (2,2',4-CBP) and ortho-meta-para substituted congeners.



Several laboratory incubation studies show similar results for the di ortho substituted congeners. Increased abundances of 2,3,6/2,3',6-CBP, 2,2',4-CBP, and 2,2'3/2,4',6-CBP, in addition to 2,2'/2,6-CBP, were commonly observed as dechlorination products (Brown et al., 1984; Quensen et al., 1988; Quensen et al., 1990; Rhee et al., 1993a). Similar to our findings, several studies noted the recalcitrant nature of 2,3,6/2,3',6-CBP and 2,2',4,4'-CBP (Quensen et al., 1990; Rhee et al., 1993a). Increased abundances of 2,2',5-CBP and 2,2',5,5'-CBP were also observed (Quensen et al., 1988; Rhee et al., 1993b). In contrast, Alder et al. (1993) found that the only di ortho peaks to show increases were 2,2'/2,6-CBPs. This study showed reduced abundances of 2,2',4-CBP and 2,2',3/2,4',6-CBP after 11 months of incubation.

Cultures amended with ethanol and pasteurized to select for spore-forming bacteria, dechlorinated primarily at the meta position to form 2,2',4-CBP, 2,4',6-CBP, 2,2',4,4'-CBP, and 2,2'/2,6-CBP (Ye 1994; Ye et al., 1996). Strictly methanogenic cultures only yielded increased concentrations of 2,2'/2,6-CBPs. These cultures were also unable to dechlorinate 2,2',3,5'-CBP, a congener consistently observed to be depleted (Ye et al., 1995).

3.1.4.3 Tri Ortho Substituted Congeners

During the first incubation period, the following three tri-ortho substituted congeners are elevated relative to the levels found in Aroclor 1242: 2,2'6-CBP, 2,2',4,6'-CBP, and 2,2',3,4',6-CBP. As shown in Table 13, these same three congeners are enriched and the following seven congeners are depleted in every paired section studied: 2,2',5,6'-CBP, 2,2',3,5',6-CBP, 2,2',3,6-CBP, 2,3',3,6'-CBP, 2,2',3,3',6-CBP, 2,2',3,3',4,6'-CBP, and 2,2',3,4',5',6-CBP. At the second sampling interval only 2,2',6-CBP shows an increase in abundance for the most dechlorinated sediments (like the 1968 sediment). In the sediments dechlorinated to a lesser extent, a slight increase in the 2,2',5,6'-CBP level is also noted. At the later sampling interval, significant decreases are not usually observed in the concentrations of most other tri-ortho substituted congeners.

Table 13
Dechlorination Sequence - Tri Ortho Substituted Congeners
Summary of Changes in All Paired Sections
Cores 188.5 and 188.6

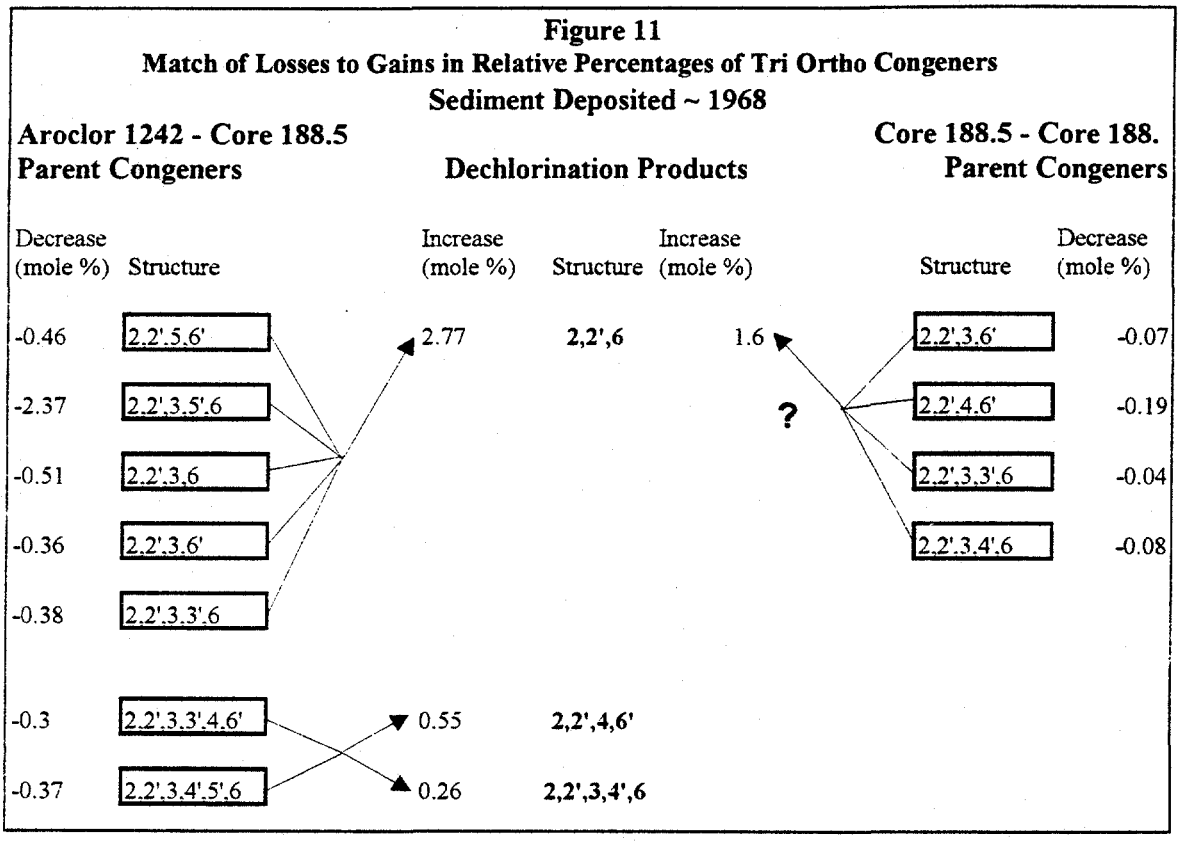
Change: Aroclor 1242 and Core 188.5				Change: 188.5 and 188.6			
Increasing Peaks		Decreasing Peaks		Increasing Peaks		Decreasing Peaks	
BZ#	Structure	BZ#	Structure	BZ#	Structure	BZ#	Structure
19	2,2',6	53	2,2',5,6'	19	2,2',6	46	2,2',3,6'
51	2,2',4,6'	95	2,2',3,5',6	53	2,2',5,6'	51	2,2',4,6'
91	2,2',3,4',6	45	2,2',3,6			84	2,2',3,3',6
		46	2,2',3,6'	Less Common		91	2,2',3,4',6
		84	2,2',3,3',6	95	2,2',3,5',6		
		132	2,2',3,3',4,6'	91	2,2',3,4',6	Less Common	
		149	2,2',3,4',5',6	84	2,2',3,3',6	95	2,2',3,5',6
				45	2,2',3,6	45	2,2',3,6
						91	2,2',3,4',6
						132	2,2',3,3',4,6'

Notes:
Less common congeners were observed two or fewer times at a given sampling interval.
No change was observed in the concentrations of the congeners not listed.

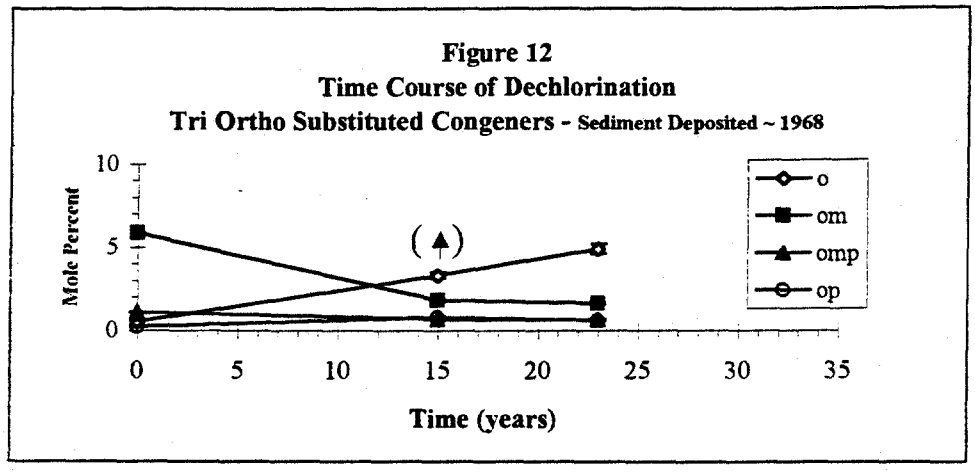
As previously discussed in Section 3.1.3, the percentages of 2,2',6-CBP in the earlier core appear to be lower than what would be dictated from the peaks exhibiting reduced abundances. In addition, only slight decreases of tri-ortho substituted congeners occur at the second sampling interval for the 1968 sediment. These small decreases do not balance the observed increase in 2,2',6-CBP. The decreased abundance of 2,2',6-CBP at the earlier sampling interval and increased abundance at the later sampling interval, argue against any loss of chlorines from the ortho position. In addition, several paired

sections show much better balances for the tri-ortho congeners at both sampling intervals. Figure 11 shows the proposed routes of dechlorination for the tri-ortho substituted congeners.

Figure 11
Match of Losses to Gains in Relative Percentages of Tri Ortho Congeners
Sediment Deposited ~ 1968



From the above discussion and Figure 12, it is obvious that the tri-ortho substituted congeners dechlorinate primarily from the meta position, resulting in congeners that are enriched in ortho-para chlorines. Because most of the tri-ortho substituted congeners are more highly chlorinated, they contain more meta chlorines. This figure further evidences the lack of change that occurs to the levels of tri ortho substituted congeners during the second incubation period. As discussed above, and in Section 3.1.3, the increase shown in the ortho only substituted congener (2,2',6-CBP) during the second incubation is not real. The type and extent of the losses and gains shown in Figure 12 are strikingly similar to those shown in the other depth sections studied. The only deviations are those samples where the levels of 2,2',6-CBP is balanced within both sampling intervals.



Most dechlorination studies note that 2,2',6 increases relative to the levels found in Aroclor 1242, but do mention possible parent congeners. Most studies concentrate on the changes to the mono- and di- ortho substituted congeners.

3.1.5 Extent and Time Course of Dechlorination

To evaluate the overall extent of dechlorination, an index consisting of the total mole percentages of the terminal (2-CBP, 2,2'/2,6-CBP, and 2,2',6-CBP) and recalcitrant congeners (2,3,6/2,3',6-CBP and 2,2',4,4'-CBP) was used. As shown in Table 14, the relative levels of these congeners in mole percentages were compared for each set of paired sections. Overall, the most dechlorinated sections are those that were deposited around 1968 and 1980, where the terminal dechlorination products and recalcitrant congeners comprise around 56 percent of the total concentration. The least dechlorinated sections are the oldest sediments (1960) studied. Even the unpaired sediment sections from the top of core 188.6 (deposited between 1984 and 1991) are more dechlorinated than those deposited around 1960. And, like the sediments deposited during the middle 1970s, they are intermediate in terms of the range observed in the extent of dechlorination.

The levels of terminal dechlorination products generally increase from the bottom (28-32 cm) to the top of core 188.5 (0-2 cm). The levels also increase during the time elapsed between core collection, but the increases do not follow a consistent trend. For example, the level of terminal dechlorination products in the 1968 sediments increases by

11.0249

Table 14
Levels of Terminal and Recalcitrant Dechlorination Products
Upper Hudson River - Thompson Island Pool

		Terminal (mole percent)								*Recalcitrant (mole percent)*							
Year of Deposition	*Core (Section)*	*2-CBP*	*error*	*2,2'/2,6-CBP*	*error*	*2,2',6-CBP*	*error*	*Sub-Total*	*error*	*2,3,6/2,3',6-CBP*	*error*	*2,2',4,4'-CBP*	*error*	*Sub-Total*	*error*	***Grand Total***	***error***
1991	188.6 (0-2 cm)	11.11	1.12	12.88	0.67	4.21	0.22	*28.20*	*2.01*	3.78	0.20	2.67	0.14	*6.45*	*0.34*	**34.65**	**2.35**
1982	188.5 (0-2 cm)	12.32	1.25	16.21	0.86	5.60	0.30	*34.13*	*2.41*	5.20	0.28	2.01	0.11	*7.21*	*0.39*	**41.34**	**2.80**
	188.6 (12-16 cm)	15.86	1.62	18.01	0.97	6.69	0.36	*40.56*	*2.95*	7.06	0.38	1.99	0.11	*9.05*	*0.49*	**49.61**	**3.44**
1980	188.5 (2-4 cm)	14.39	1.46	15.38	0.82	5.62	0.30	*35.39*	*2.58*	5.92	0.32	1.67	0.09	*7.59*	*0.41*	**42.98**	**2.99**
	188.6 (16-20 cm)	23.21	2.40	19.48	1.10	5.48	0.31	*48.17*	*3.81*	5.97	0.34	1.82	0.10	*7.79*	*0.44*	**55.96**	**4.25**
1979	188.5 (4-8 cm)	11.42	1.16	10.42	0.54	4.00	0.21	*25.84*	*1.91*	5.19	0.27	1.96	0.10	*7.15*	*0.37*	**32.99**	**2.28**
	188.6 (20-24 cm)	17.38	1.78	14.86	0.80	4.97	0.27	*37.21*	*2.85*	6.32	0.34	2.21	0.12	*8.53*	*0.46*	**45.74**	**3.31**
1976	188.5 (8-12 cm)	11.60	1.18	11.12	0.59	4.03	0.21	*26.75*	*1.98*	5.77	0.30	1.74	0.09	*7.51*	*0.39*	**34.26**	**2.37**
	188.6 (24-28 cm)	17.65	1.80	11.99	0.65	4.15	0.22	*33.79*	*2.67*	6.06	0.33	2.17	0.12	*8.23*	*0.45*	**42.02**	**3.12**
1975	188.5 (12-16 cm)	12.11	1.23	11.44	0.61	4.04	0.21	*27.59*	*2.05*	5.79	0.31	1.69	0.09	*7.48*	*0.40*	**35.07**	**2.45**
	188.6 (28-32 cm)	21.77	2.24	15.90	0.89	5.78	0.32	*43.45*	*3.45*	6.55	0.36	1.83	0.10	*8.38*	*0.46*	**51.83**	**3.91**
1973	188.5 (16-20 cm)	9.97	1.01	10.58	0.56	3.96	0.21	*24.51*	*1.78*	5.72	0.30	1.77	0.09	*7.49*	*0.39*	**32.00**	**2.17**
	188.6 (32-36 cm)	20.84	2.14	15.39	0.85	4.77	0.26	*41.00*	*3.25*	5.89	0.33	1.92	0.11	*7.81*	*0.44*	**48.81**	**3.69**
1968	188.5 (20-24 cm)	9.96	1.01	8.33	0.44	3.30	0.17	*21.59*	*1.62*	4.61	0.24	2.08	0.11	*6.69*	*0.35*	**28.28**	**1.97**
	188.6 (36-40 cm)	26.73	2.78	17.37	1.01	4.90	0.28	*49.00*	*4.07*	6.18	0.30	1.91	0.11	*8.09*	*0.41*	**57.09**	**4.48**
1963	188.5 (24-28 cm)	7.97	0.81	6.97	0.36	3.03	0.16	*17.97*	*1.33*	3.93	0.20	2.56	0.13	*6.49*	*0.33*	**24.46**	**1.66**
	188.6 (40-44 cm)	20.46	2.10	14.95	0.82	4.86	0.27	*40.27*	*3.19*	5.97	0.33	1.96	0.11	*7.93*	*0.44*	**48.20**	**3.63**
1960	188.5 (28-32 cm)	9.37	0.95	8.18	0.43	3.17	0.19	*20.72*	*1.57*	4.55	0.24	2.26	0.12	*6.81*	*0.36*	**27.53**	**1.93**
	188.6 (44-48 cm)	13.17	1.34	12.94	0.69	5.10	0.27	*31.21*	*2.30*	6.06	0.32	2.03	0.11	*8.09*	*0.43*	**39.30**	**2.73**
--	Aroclor 1242	0.00	--	3.21	--	0.53	--	*3.74*	--	0.50	--	0.94	--	*1.44*	--	**5.18**	--
--	Aroclor 1016	0.00	--	4.26	--	0.96	--	*5.22*	--	0.77	--	1.11	--	*1.88*	--	**7.10**	--

more than 28 percent, the largest increase observed. However, the levels rise by only about 8 percent in the 1982 and 1976 sediments.

The extent of dechlorination also does not follow the trend in total PCB concentrations. The sediments with the highest concentrations (1973, ca. 1000 ppm) are not the most dechlorinated. Interestingly, the most dechlorinated sediments had levels of total PCBs that varied from ca. 150 ppm (1980) to 700 ppm (1968). In addition, in the sediments from the top of core 188.6 (0-2 cm), about 30 percent of the 21 ppm of PCBs were dechlorination products. Overall, the extent of dechlorination in these sediments appeared to be less in that the congener pattern more closely resembles that of Aroclor 1242. Several laboratory studies have shown that the rate and extent of dechlorination are directly related to the total PCB concentration. Quensen et al. (1990), Abramowicz et al. (1993), Rhee et al. (1993a) and Fish et al. (1996) observed faster dechlorination rates in sediment slurries containing higher PCB concentrations. *In-situ* dechlorination is, as could be expected, much less predictable.

As previously discussed and shown in Figures 8, 10, and 12, the time course of dechlorination was evaluated by looking at the change in ortho, ortho-meta, ortho-para, and ortho-meta-para substituted congeners over the course of the study. The plots for the other paired sections are presented in Appendix C-1. The overwhelming similarity between each set of plots is remarkable considering that the first *in-situ* incubation period ranged in duration from 1 to 23 years. While the mole percentages of each group differ between each pair of sections, the pathways of dechlorination for the mono-, di-, and tri-ortho substituted congeners are essentially identical. Although the pathways remain the same, the more recently deposited sediments (e.g., 1980 and 1982) are much more dechlorinated at the first sampling interval than those deposited in the early 1960s. Generally, large changes occurred during the second sampling interval for some of the older sediments (e.g., 1963 and 1968).

For the mono-ortho congeners, the ortho-meta-para and ortho-para substituted congeners are preferentially dechlorinated at the para position resulting in concomitant increases in the ortho-meta substituted congeners and 2-CBP during the first incubation

11.0251

period. Para chlorines are removed from the 3,4- and 4,5-chlorobipheyl groups. Unflanked para and meta chlorines are also removed. During the second incubation period, the losses observed are a result of dechlorinations of the ortho-meta-para and ortho-meta substituted congeners. Chlorines in the 3 position on the primary ring and the 3, 4, or 5 position on opposite ring are removed. In a reverse fashion, the di-ortho congeners substituted in the ortho-meta positions are dechlorinated prior to those substituted in the ortho-para positions. Reactive chlorines include the meta chlorines from -4,5 and -3,4 chlorobiphenyl groups. Unflanked meta and para chlorines are also removed.

The dechlorination of the tri-ortho congeners occurs primarily during the first sampling interval. Meta chlorines in any position are removed preferentially to para chlorines during the first sampling interval. Some losses of ortho-para substituted congeners are evident during the second sampling interval in some paired sections.

3.1.6 EPA Sediment Core Data

As part of a re-assessment of the PCB contamination in the upper Hudson River, the Environmental Protection Agency (EPA) collected a series of sediment cores along the length of the Hudson river. These cores were dated using ^{137}Cs and PCB congener analyses were performed by Aquatech Laboratories in Burlington, Vermont. One of those cores, HR-019, was collected in the Thompson Island Pool at mile point 188.55.

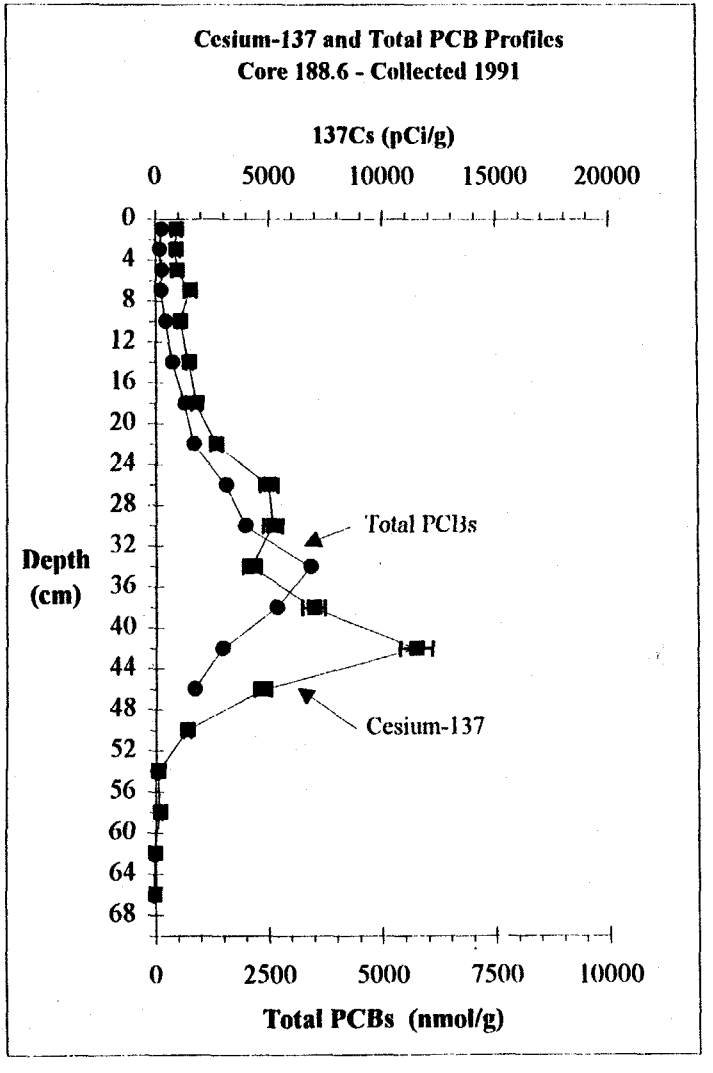
The congener data utilized in this section was taken from the March 1996, Release 3.1 database for the Hudson River reassessment phase II report. That database included two values for each of the PCB congeners that were analyzed. The "value 1" numbers include the sample quantitation limit in cases where a congener was not detected. However, these limits are very high in some cases as a result of the high levels of PCB contamination. Therefore, some of the congeners listed as undetected are likely to be present. Because these sample extracts were not run at high enough concentrations to allow quantification of all important congeners, they are of limited utility in a detailed dechlorination study.

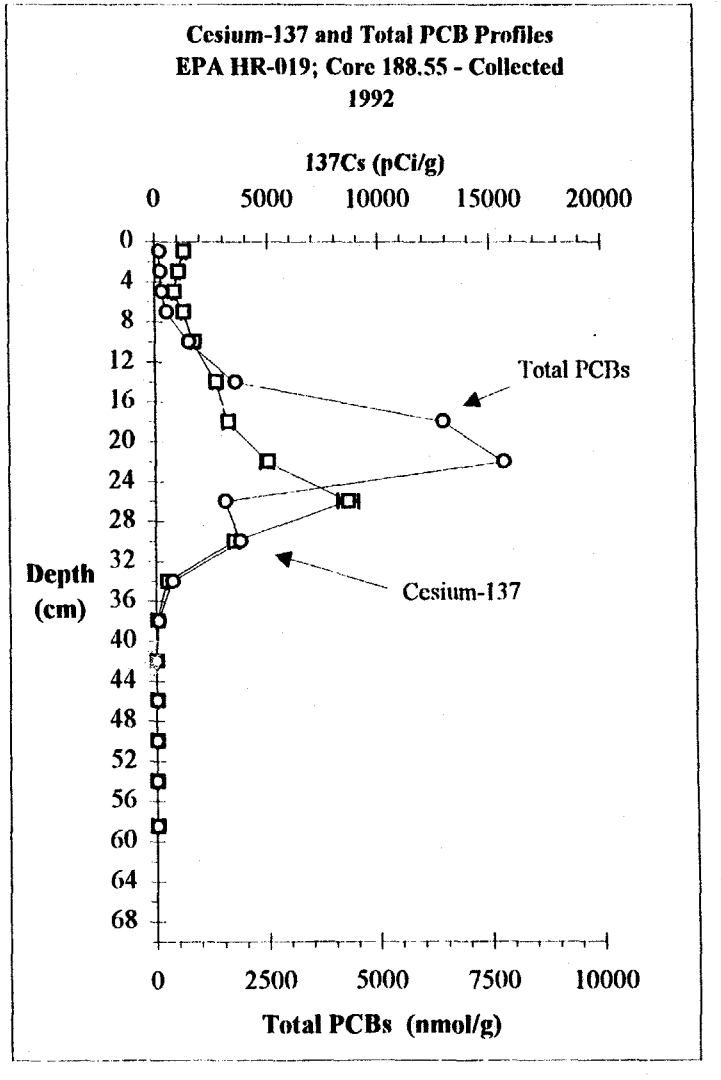
The "value 2" numbers were altered in the EPA validation process by assigning either one half of the detection limit or zero to congeners listed as undetected. While the actual values of the "undetected" congeners do lie below the quantitation limits, it is unknown if a value of one-half the quantitation limit or zero reflect those values. Many of the congeners set to zero or halved represent common dechlorination products or easily dechlorinated congeners.

For the purposes of this section, the "value 1" congener concentrations were utilized. The following three sections of HR-019 are discussed below: the top section (0-2 cm; deposited ~1991); the section with the peak PCB concentration (20-24 cm; deposited ~1973); and the section with the peak ^{137}Cs concentration (24-28 cm; deposited ~1963). This section will compare the congener profiles in these sections to the sections of core 188.6 that were deposited at about the same time. Core HR-019 was collected in 1992 and core 188.6 was collected in 1991.

The ^{137}Cs and total PCB depth profiles, presented in Figure, show that the match between these cores is not as good as between 188.5 and 188.6. Core HR-019 was collected in somewhat deeper water, about 1 meter compared to about 0.5 meter for the other two cores. The average sedimentation rate for HR-019 was ca. 1.1 cm/year, while it was ca. 1.5 cm/year for both 188.5 and 188.6. The sediment types also varied significantly between cores HR-019 and 188.6. The sediment in the former was generally described as gritty mud with leafy horizons to 20 cm, homogeneous mud from 20 cm to 32 cm, and sand with some organic matter below 32 cm. In contrast, 188.6 contained homogeneous, organic, gray mud, which became lighter in color with depth. In addition, the PCB-containing paper observed in almost every section of cores 188.5 and 188.6 (discussed in Section 3.1.1), was only noted in one section (24-28 cm) of core HR-019. These observations indicate that short distance-scale heterogeneity exists in the sediments trapped behind the Thompson Island Dam. While this can account for differences in the dechlorination process observed in paired samples from HR-019 and 188.6, the discussion presented below reveals that there are also strong similarities.

Figure 13 - Comparison of Cesium and PCB Profiles for Cores 188.6 and HR-019





11.0254

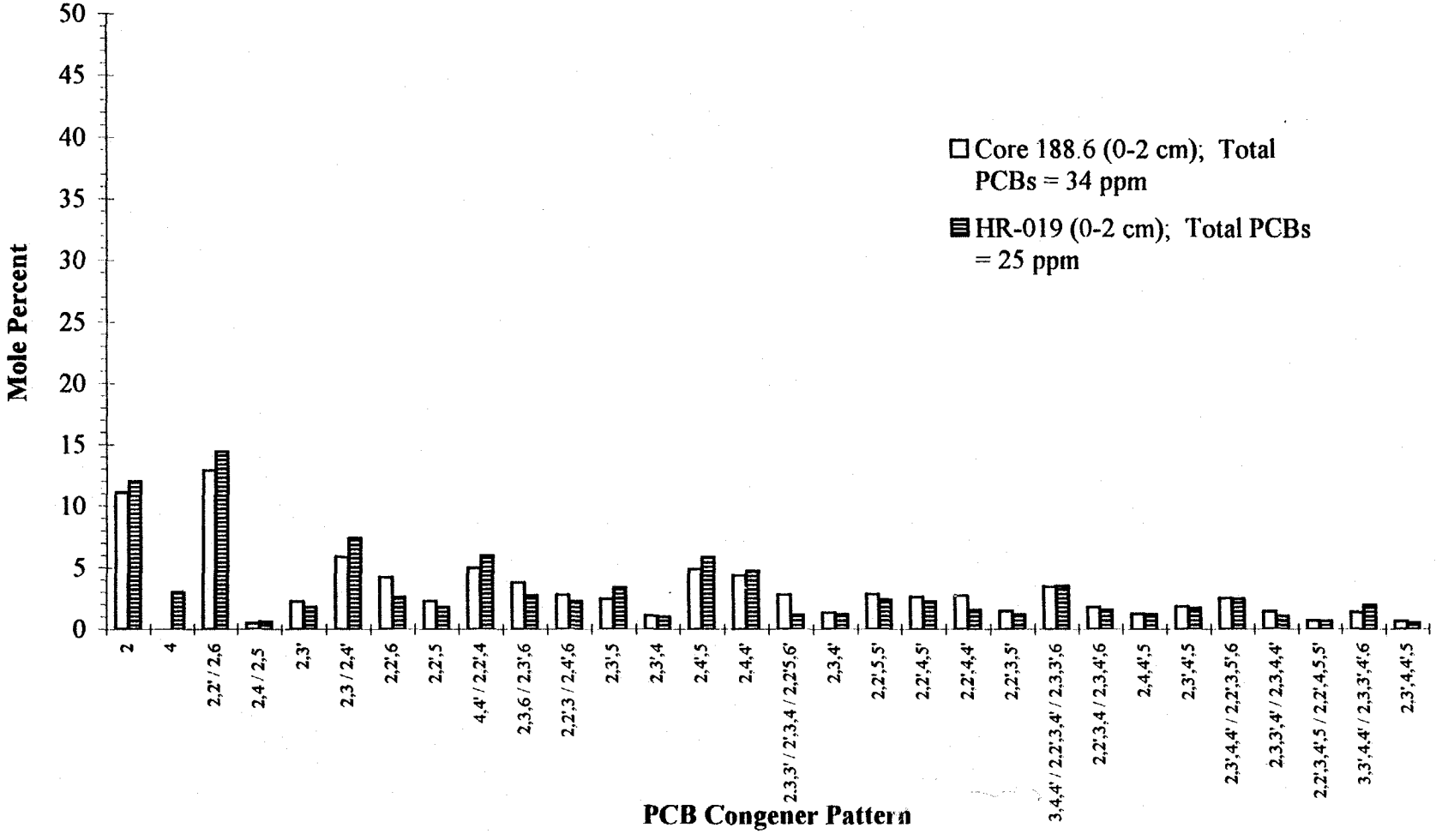
The nature and extent of dechlorination in the 0-2 cm sample from HR-019 is very similar to that observed in the 0-2 cm sample from 188.6 (see Figure 14). Generally, the same relative levels of 2-CBP, 2,2'/2,6-CBP, and 2,2',6-CBP are present in both cores. In addition, several of the more easily dechlorinated tri-, tetra-, and penta-CBPs (2,4',5-CBP, 2,4,4'-CBP, 2,3',4,4'/2,2',3,5',6-CBP), were still detected in both core tops, although to a lesser degree than what was is present in Aroclor 1242.

The 20-24 sample (deposited ~ 1973) from HR-019 is slightly more dechlorinated than the corresponding sample from 188.6 (32-36 cm), as evidenced by the higher levels of two terminal dechlorination products (2-CBP and 2,2'/2,6'-CBP) (see Figure 15). (The detected concentration of the other terminal dechlorination product, 2,2',6-CBP was less than that detected in 188.6, but was flagged as estimated in the EPA database). Accordingly, several congeners, including two recalcitrant peaks (2,3,6/2,3',6-CBP and 2,2',4,4'-CBP), were diminished in HR-019 in comparison to the corresponding section from 188.6. Easily dechlorinated congeners such as 2,4,4'-CBP and intermediate congeners such as 2,2',4- and 2,3'-CBP were present at comparable levels in both cores.

The samples deposited around 1963 from HR-019 (24-28 cm) and 188.6 (40-44 cm) are distinctly different (see Figure 16). The congener pattern from HR-019 reveals that this sample is almost totally dechlorinated. The terminal dechlorination products, 2-CBP and 2,2'/2,6-CBP account for nearly 90 mole percent of the PCBs present. The actual level of 2,2',6-CBP is unknown, because the EPA database lists this congener as undetected with a quantitation limit of 18 ppm. Therefore, it can only be said that the level of 2,2',6-CBP is less than ca. 3.5 mole percent. The recalcitrant congeners, 2,2',4,4'-CBP and 2,3,6/2,3',6-CBP are also diminished in comparison to the amounts detected in the corresponding section of core 188.6. Based on the degree of dechlorination in this sample, it appears that complete dechlorination of Aroclors 1242/1016 to the three terminal dechlorination products is possible.

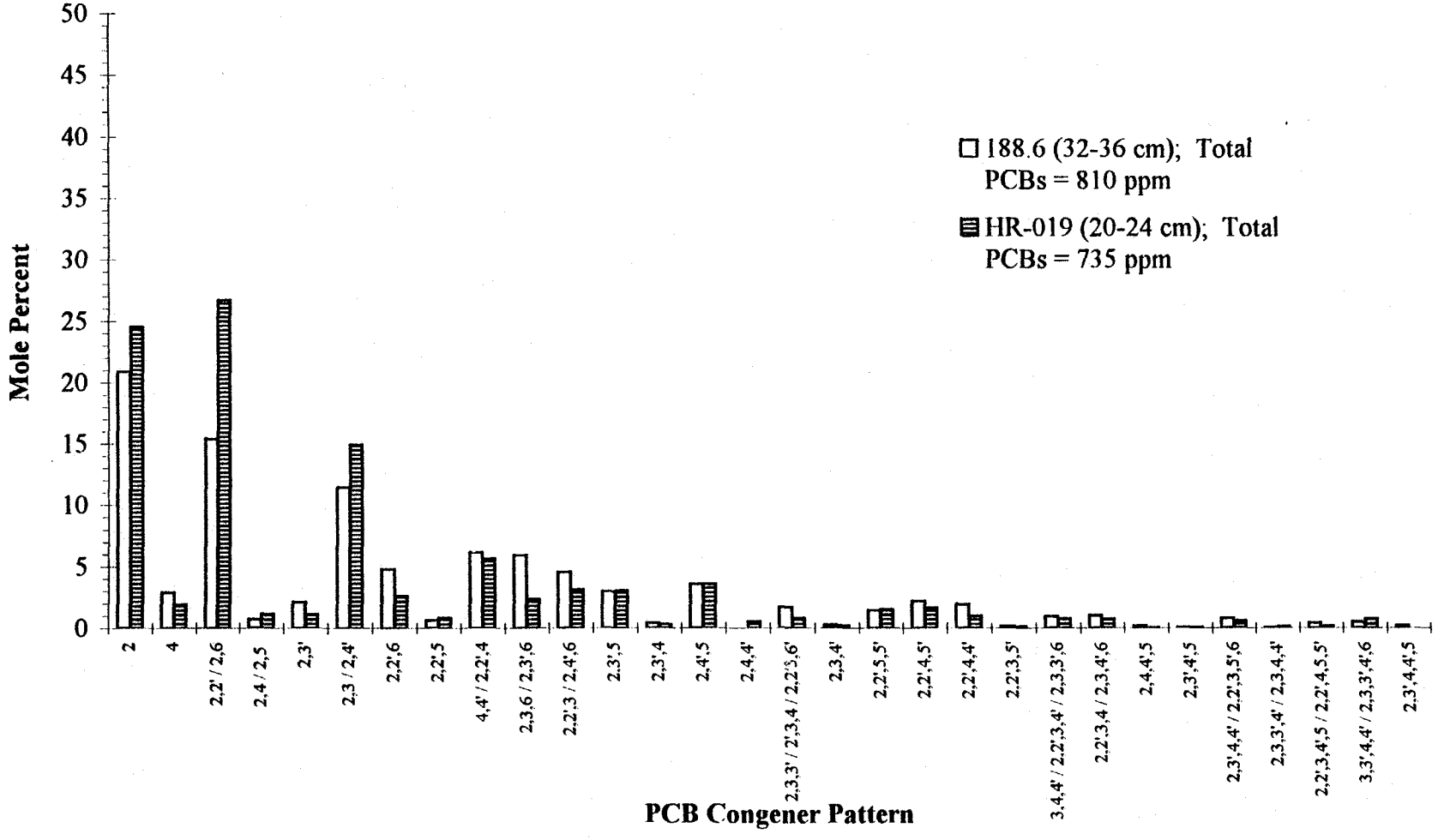
This comparison suggests that significant differences in the extent of dechlorination of PCBs may be found even in sediment samples with similar total PCB concentrations, deposited at approximately the same time in similar locations. Overall,

Figure 14
Comparison of PCB Congener Patterns
Core 188.6 and EPA Core HR-019 - Sediment Deposited ~ 1963
Upper Hudson River - Mile Point ~ 188.5



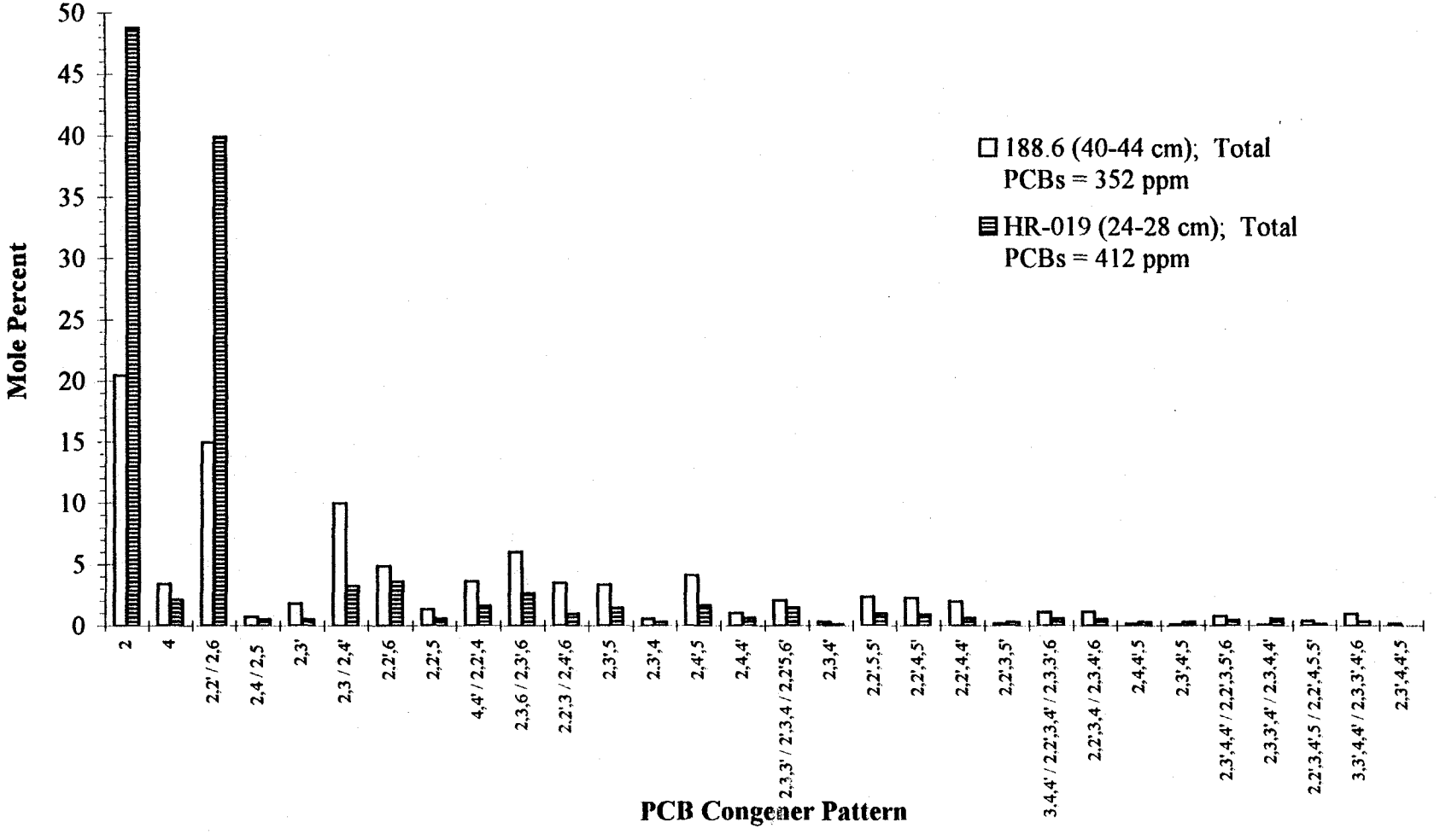
11.0256

Figure 15
Comparison of PCB Congener Patterns
Core 188.6 and EPA Core HR-019 - Sediment Deposited ~ 1973
Upper Hudson River - Mile Point ~ 188.5



11.0257

Figure 16
Comparison of PCB Congener Patterns
Core 188.6 and EPA Core HR-019 - Sediment Deposited ~ 1963
Upper Hudson River - Mile Point ~ 188.5



11.0258

however, the nature and extent of dechlorination in core 188.6 is within the ranges seen in HR-019 and the other EPA cores collected in the upper Hudson.

3.2 Tidal Hudson River

Concentrations of PCBs in the sediments of the tidal Hudson River near Kingston have ranged from 17 ppm (sediment dry weight) in the early 1970s to less than 1 ppm in the middle 1980s. Analysis of the congener distributions in the earlier core (core 91.8) reveals deviations from the source Aroclor mixtures that are primarily explained by preferential sediment-water and air-water partitioning of certain congeners during transport (Bopp et al., 1984). Changes in the congener distributions between the paired sections of the two cores will be used to elucidate the earlier stages of dechlorination in Hudson River sediments. The lesser extent of dechlorination in the Tidal Hudson is attributed primarily to the lower PCB concentrations.

3.2.1 Homolog Group Distributions

The enrichment of the higher chlorinated congeners due to the sediment-water and water-air partitioning that occurred during more than 100 miles of transport is readily apparent in Table 15 and Figure 17. In the nine years that elapsed between core collection, decreases in tetra- and penta-CBPs were accompanied by increases in tri- and di-CBPs. Levels of 2-CBP accounted for only a few percent of the PCBs in the oldest section studied in the later core (Core 88.6). The terminal dechlorination products 2,2',6-CBP and 2,2'/2,6-CBP account for 2 to 3 percent of the PCBs. The congener, 2-CBP, accounts for less than one mole percent of the congeners detected.

3.2.2 Changes in Congener Distributions

As shown in Figure 18, the change in the congener distribution between the two cores collected in the Tidal Hudson is much less than that seen in the upper Hudson. Although the congener composition is altered due to selective volatilization of certain lighter congeners, the distribution of the same 30 peaks is plotted for comparison purposes. The plot shown is for the sediment dated 1963 and is used for illustration purposes because it is the section with the largest degree of change between the two cores

Table 15

Homolog Group Distributions

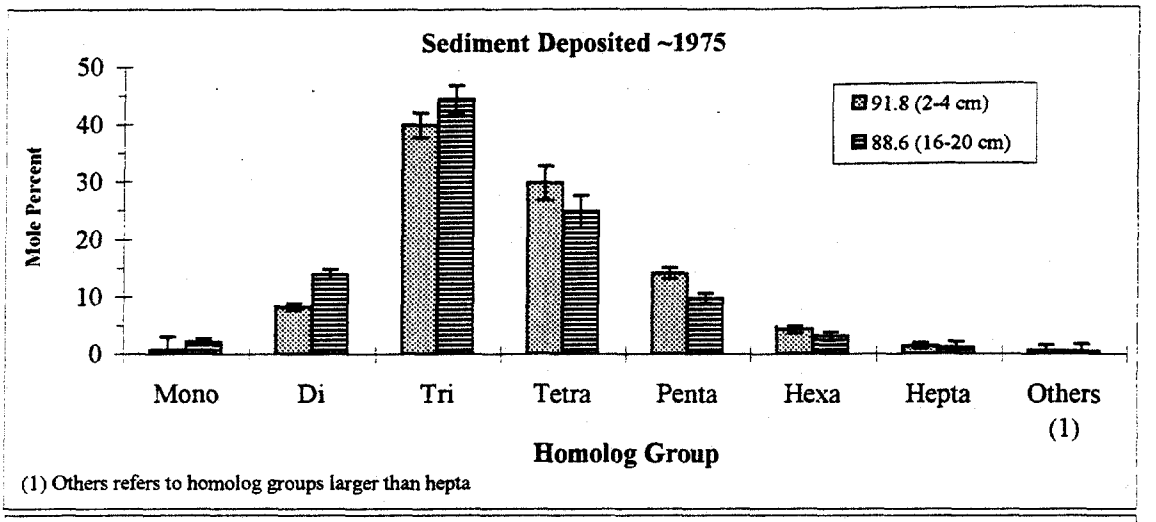
Tidal Hudson River - Kingston

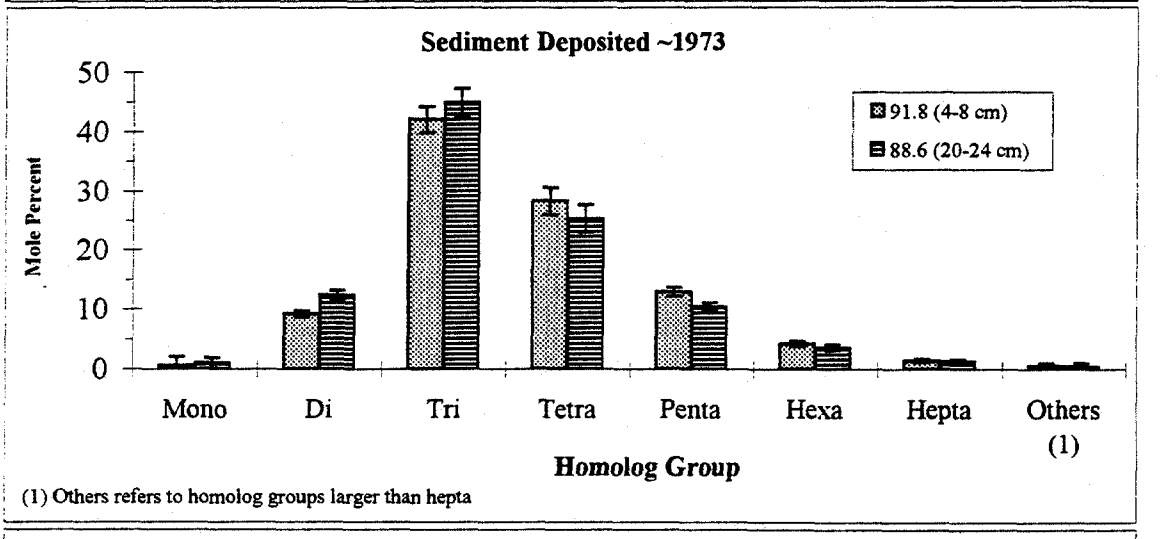
Homolog Group	Aroclor 1242	1963 Sediment				1973 Sediment				1975 Sediment			
		91.8 (24-28 cm)	error	88.6 (32-36 cm)	error	91.8 (4-8 cm)	error	88.6 (20-24 cm)	error	91.8 (2-4 cm)	error	88.6 (16-20 cm)	error
Mono	0.00	0.19	2.30	1.46	0.30	0.51	1.55	0.98	0.85	0.69	2.29	2.08	0.53
Di	18.36	3.21	0.43	13.31	0.75	9.16	0.53	12.40	0.71	8.25	0.56	13.89	0.85
Tri	38.10	29.63	1.68	46.90	2.46	42.10	2.20	44.94	2.37	39.89	2.15	44.37	2.43
Tetra	30.07	30.64	2.96	23.95	2.25	28.29	2.35	25.34	2.38	29.77	2.90	24.78	2.86
Penta	10.77	20.51	1.22	9.24	0.63	12.93	0.75	10.41	0.70	14.00	0.97	9.65	0.91
Hexa	1.87	10.26	0.79	3.07	0.42	4.17	0.41	3.59	0.46	4.28	0.63	3.07	0.72
Hepta	0.12	3.33	0.48	1.08	0.31	1.45	0.27	1.29	0.33	1.38	0.45	1.09	1.04
Others (1)	0.00	0.73	0.60	0.49	0.44	0.57	0.39	0.48	0.47	0.50	1.01	0.48	1.14

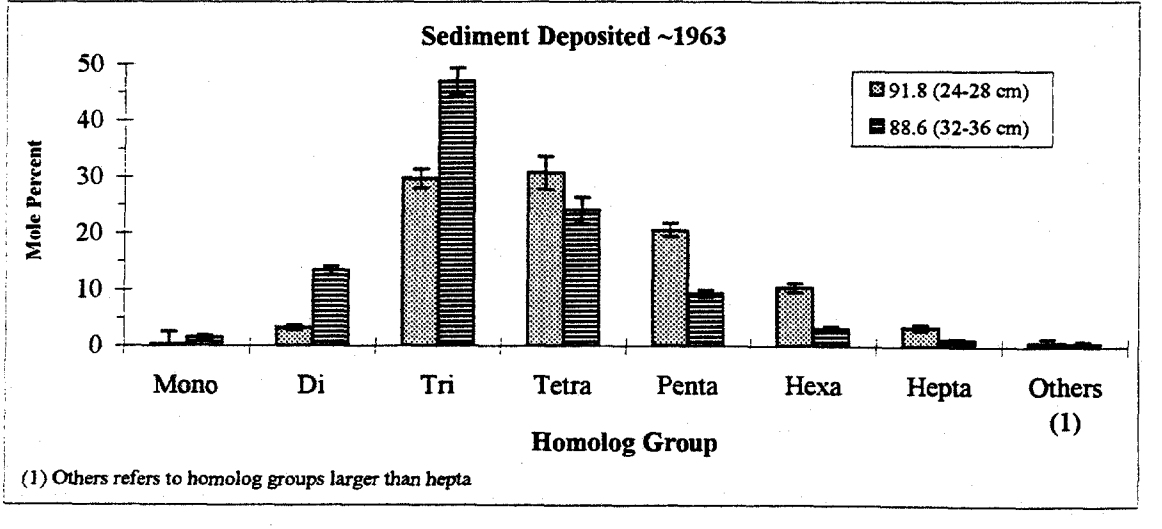
(1) Others refers to all homolog groups larger than hepta

11.0260

Figure 17
Relative Concentrations of Homolog Groups
Tidal Hudson - Kingston

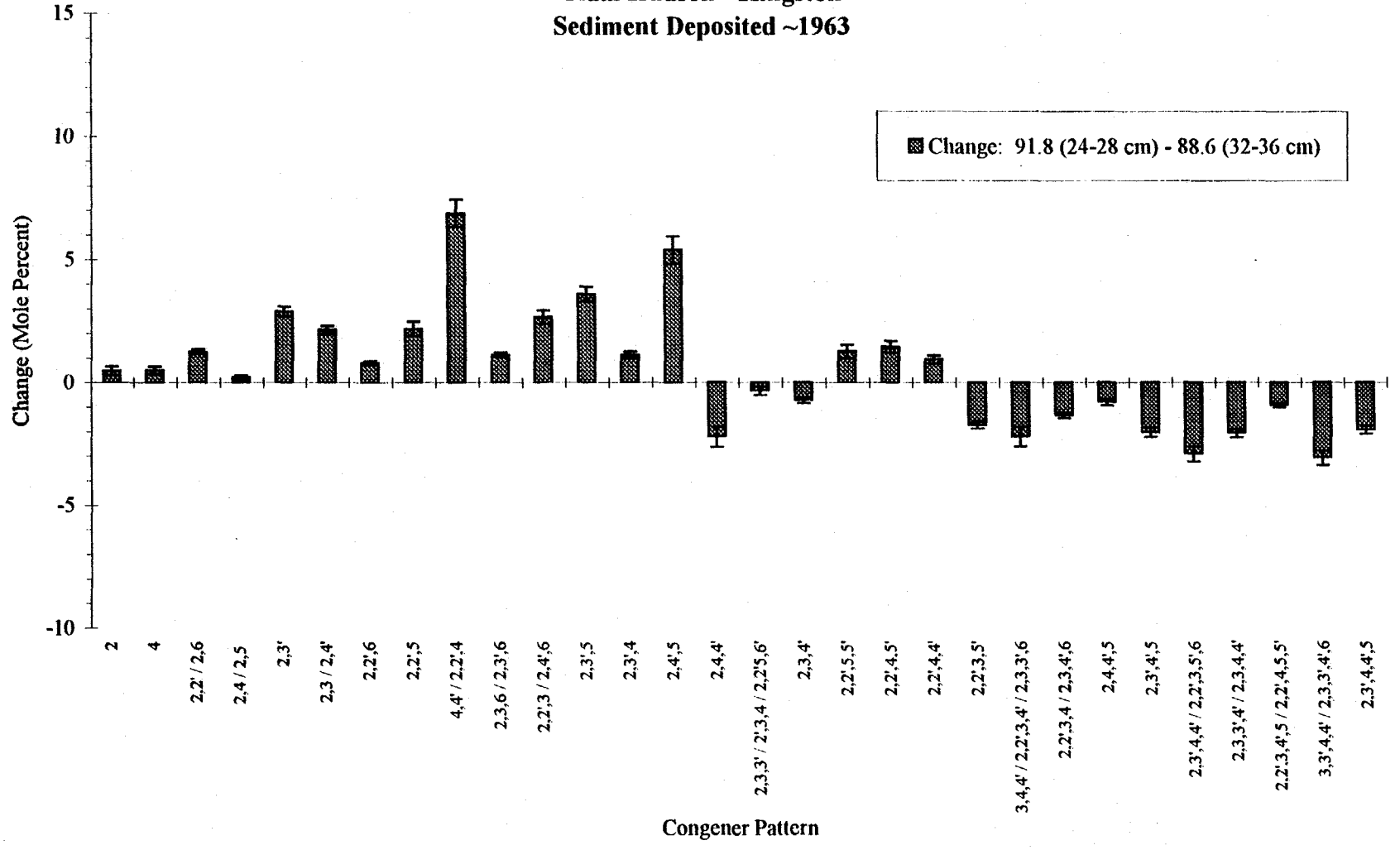






11.0261

Figure 18
Change in PCB Congener Distributions During In-Situ Incubation
Tidal Hudson - Kingston
Sediment Deposited ~1963



11.0262

Similar plots are presented in Appendix C-2 for the two other paired sections studied, which were deposited in ca. 1973 and 1963.

During the nine year *in-situ* incubation between core collection, enrichment of many di- and tri-CBPs, is apparent. Most of the same congeners that increase in abundance during the first sampling interval in the Upper Hudson, also increase in the tidal Hudson. Those congeners include: 2,3'-CBP, 2,3/2,4'-CBP, 2,2'4-CBP, 2,3,6/2,3',6-CBP, 2,2',3/2,4',6-CBP, 2,3',5-CBP, 2,3',4-CBP, and 2,2',4,4'-CBP. In addition, several other congeners, only observed to be elevated during the second incubation period in the upper Hudson, also increased (2,4/2,5-CBP, 2,2',5-CBP, 2,2',4,5'-CBP, and 2,2',5,5'-CBP). One congener, 2,4',5-CBP, that never accumulated in the upper Hudson, increased in abundance in the tidal Hudson.

The changes that occurred during the *in-situ* incubation period for the other paired sections were smaller than those observed in the 1963 sediments. However, the specific congeners involved were almost identical. In addition, the overall extent of the dechlorination in terms of the mole percent increases and decreases is much less in the Tidal Hudson. The levels of 2-CBP do not exceed one mole percent and the levels of 2,2'/2,6-CBP and 2,2',6-CBP do not exceed two mole percent in the later core.

3.2.3 Compositional Balance and Parent-Daughter Analysis

The compositional balance, shown in Table 16, shows that the relative amounts of the congeners with one, two, or three ortho chlorines generally remain the same over the 9 year sampling interval. Again, the congeners are divided into groups based on their differing degrees of ortho chlorination. In addition, 12 extra peaks were included to balance the changes observed in the older sediments of the tidal Hudson. These sediments were even more enriched in congeners with a higher degree of chlorination than those deposited more recently. The parent-daughter analysis, shown in Table 17, also utilizes these extra congeners and attempts to correlate the decreases of certain congeners with gains in others. The compositional balance and parent-daughter analysis presented are for sediments deposited in 1963. These sediments were chosen because they displayed the largest degree of change between these cores in comparison to the other sections studied

11.0263

Table 16
Compositional Balance
91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963

Congeners Contributing to 2-monochlorobiphenyl

		Core 91.8 (24-28 cm)		Core 88.6 (32-36 cm)		88.6 - 91.8	
BZ #	Structure	Mole Percent	error	Mole Percent	error	Change (Mole Percent)	error
1	2	0.07	0.14	0.54	0.10	0.47	0.17
7/9	2,4/2,5	0.07	0.06	0.27	0.04	0.20	0.07
6	2,3'	0.61	0.06	3.50	0.18	2.90	0.19
5/8	2,3/2,4'	0.78	0.06	2.92	0.15	2.14	0.16
26	2,3',5	1.90	0.10	5.49	0.28	3.59	0.30
25	2,3',4	1.16	0.06	2.28	0.12	1.12	0.13
31	2,4',5	4.43	0.23	9.83	0.50	5.40	0.55
28	2,4,4'	6.85	0.35	4.62	0.24	-2.23	0.42
20/33	2,3,3'/2',3,4	2.38	0.12	2.07	0.11	-0.31	0.16
22	2,3,4'	1.69	0.09	0.94	0.05	-0.75	0.10
67	2,3',4,5	0.27	0.05	0.17	0.03	-0.10	0.06
74	2,4,4',5	2.14	0.11	1.34	0.07	-0.80	0.13
70	2,3',4',5	3.25	0.17	1.21	0.06	-2.04	0.18
66	2,3',4,4'	1.96	0.10	0.89	0.05	-1.07	0.11
56/60	2,3,3',4/2,3,4,4'	3.35	0.17	1.27	0.07	-2.07	0.18
118	2,3',4,4',5	3.08	0.16	1.14	0.06	-1.94	0.17
107	2,3,3',4',5	0.70	0.04	0.13	0.01	-0.57	0.04
156	2,3,3',4,4',5	0.47	0.02	0.22	0.01	-0.25	0.02
Balance		**35.15**	**2.07**	**38.84**	**2.11**	**3.70**	**3.14**
						9.99%	

11.0264

Table 16 (Continued)

Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Core 91.8 (24-28 cm) Mole Percent	error	Core 88.6 (32-36 cm) Mole Percent	error	88.6 - 91.8 Change (Mole Percent)	error
4/10	2,2'/2,6	0.18	0.06	1.42	0.07	1.24	0.09
18	2,2',5	2.95	0.15	5.13	0.26	2.18	0.30
17	2,2',4	2.27	0.12	6.79	0.35	4.52	0.37
24/27	2,3,6/2,3',6	0.47	0.05	1.59	0.08	1.12	0.10
16/32	2,2',3/2,4',6	2.32	0.12	4.99	0.25	2.67	0.28
52	2,2',5,5'	3.07	0.16	4.33	0.22	1.27	0.27
49	2,2',4,5'	2.51	0.13	3.95	0.20	1.44	0.24
47	2,2',4,4'	1.67	0.09	2.61	0.13	0.94	0.16
48	2,2',4,5		0.65		0.50	Interference	0.82
44	2,2',3,5'	2.70	0.14	0.96	0.05	-1.74	0.15
40	2,2',3,3'	0.93	0.05	0.96	0.05	0.03	0.07
42/59	2,2',3,4'/2,3,3',6	5.40	0.28	3.60	0.18	-1.80	0.33
41/64	2,2',3,4/2,3,4',6	2.05	0.10	0.70	0.04	-1.34	0.11
82	2,2',3,3',4	0.33	0.04	0.10	0.03	-0.23	0.05
99	2,2',4,4',5	1.25	0.06	0.57	0.03	-0.68	0.07
90/101	2,2',3,4',5/2,2',4,5,5'	1.50	0.08	0.56	0.03	-0.93	0.08
110	2,3,3',4',6	4.16	0.21	1.77	0.09	-2.39	0.23
92	2,2',3,5,5'	0.59	0.04	0.38	0.03	-0.21	0.05
97	2,2',3',4,5	0.91	0.05	0.27	0.03	-0.64	0.06
87/115	2,2',3,4,5'/2,3,4,4',6	0.83	0.04	0.29	0.03	-0.54	0.05
153	2,2',4,4',5,5'	1.35	0.07	0.37	0.03	-0.98	0.07
138	2,2',3,4,4',5	2.78	0.14	0.72	0.04	-2.06	0.15
128	2,2',3,3',4,4'	0.62	0.04	0.14	0.03	-0.48	0.05
180	2,2',3,4,4',5,5'	0.76	0.04	0.22	0.02	-0.54	0.04
170/190	2,2',3,3',4,4',5/2,3,3',4,4',5,6	1.30	0.07	0.36	0.02	-0.94	0.07
Balance		**42.90**	**2.96**	**42.78**	**2.79**	**-0.12**	**4.26**
						0.29%	

11.0265

Table 16 (Continued)

Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Core 91.8 (24-28 cm) Mole Percent	error	Core 88.6 (32-36 cm) Mole Percent	error	88.6 - 91.8 Change (Mole Percent)	error
19	2,2',6	0.30	0.05	1.08	0.06	0.79	0.08
53	2,2',5,6'	0.30	0.02	0.26	0.01	-0.04	0.02
95	2,2',3,5',6	3.40	0.17	1.54	0.08	-1.86	0.19
45	2,2',3,6	0.67	0.05	0.70	0.04	0.03	0.06
46	2,2',3,6'	0.42	0.05	0.70	0.04	0.28	0.06
51	2,2',4,6'	0.31	0.05	0.83	0.04	0.52	0.06
84	2,2',3,3',6	0.80	0.04	0.74	0.04	-0.06	0.06
91	2,2',3,4',6	0.47	0.04	0.50	0.03	0.04	0.05
132	2,2',3,3',4,6'	0.78	0.04	0.32	0.02	-0.47	0.04
149	2,2',3,4',5',6	1.62	0.08	0.56	0.03	-1.06	0.09
Balance		**9.06**	**0.59**	**7.23**	**0.37**	**-1.82**	**0.71**
						22.39%	

11.0266

Table 17
Parent - Daughter Analysis
Cores 91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963

Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent	Possible Parents
1	2	0.47	0.17	All Listed Below
7/9	2,4/2,5	0.20	0.07	2,4,4'; 2,3',4,5; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
6	2,3'	2.90	0.19	2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
5/8	2,3/2,4'	2.14	0.16	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3,4,4'; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
26	2,3',5	3.59	0.30	2,3',4,5; 2,3',4',5; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
25	2,3',4	1.12	0.13	2,3',4,5; 2,3',4,4'; 2,3,3',4; 2,3,3',4,4',5
31	2,4',5	5.40	0.55	2,4,4',5; 2,3',4',5; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4',5; 2,3,3',4,4',5
		15.83	**1.58**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
28	2,4,4'	-2.23	0.42	2,4'; 2,4; 2	--
20/33	2,3,3'/2',3,4	-0.31	0.16	2,4'; 2,3'; 2,3; 2	--
22	2,3,4'	-0.75	0.10	2,4'; 2,3; 2	--
67	2,3',4,5	-0.10	0.06	2,3',5; 2,3',4; 2,3'; 2,4; 2,5; 2	--
74	2,4,4',5	-0.80	0.13	2,4',5; 2,4'; 2,4; 2,5; 2	2,4,4';
70	2,3',4',5	-2.04	0.18	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2,5; 2	2',3,4;
66	2,3',4,4'	-1.07	0.11	2,3',4; 2,4'; 2,3'; 2,4'; 2	2',3,4; 2,4,4'
56/60	2,3,3',4/2,3,4,4'	-2.07	0.18	2,3',4; 2,3; 2,4'; 2,3'; 2,4; 2	2,4,4'; 2,3,3'; 2,3,4';
118	2,3',4,4',5	-1.94	0.17	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2,4; 2,5; 2	2,3',4,4'; 2,3',4',5; 2,4,4',5; 2,3',4,5; 2',3,4; 2,4,4'
107	2,3,3',4',5	-0.57	0.04	2,4',5; 2,3',5; 2,3; 2,4'; 2,3'; 2,5; 2	2,3',4',5; 2,3,4'; 2,3,3'; 2',3,4
156	2,3,3',4,4',5	-0.25	0.02	2,4',5; 2,3',4'; 2,3',5; 2,3'; 2,4'; 2,3'; 2,4; 2,5; 2	All listed in this table.
		-12.13	**1.57**		

11.0267

Table 17 (Continued)

Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
4/10	2,2'/2,6	1.24	0.09	All decreasing peaks listed below.
18	2,2',5	2.18	0.30	2,2',3,3',4,4',5; 2,2',3,4,4',5,5'; 2,2',3,4,4',5; 2,2',4,4',5; 2,2',3,4,5'; 2,2',3',4,5; 2,2',3,5,5'; 2,2',3,4',5; 2,2',4,5,5'; 2,2',4,4',5; 2,2,3,5'; 2,2',4,5?
17	2,2',4	4.52	0.37	All decreasing peaks listed below, except BZ #'s 190, 115, 92, 110, 64, 59 and 44.
24/27	2,3,6/2,3',6	1.12	0.10	2,3,3',4,4',5,6; 2,3,4,4',6; 2,3,3',4',6; 2,3,4',6; 2,3,3',6
16/32	2,2',3/2,4',6	2.67	0.28	All decreasing peaks listed below, except BZ #'s 153, 10, 99, 59
52	2,2',5,5'	1.27	0.27	2,2',3,4,4',5,5'; 2,2',4,4',5,5'; 2,2',3,5,5'; 2,2',4,5,5'
49	2,2',4,5'	1.44	0.24	2,2',3,3',4,4',5; 2,2',3,4,4',5,5'; 2,2',3,4,4',5; 2,2',4,4',5,5'; 2,2',3,4,5'; 2,2',3,4',5; 2,2',4,5,5'; 2,2',4,4',5;
47	2,2',4,4'	0.94	0.16	2,2',3,3',4,4',5; 2,2',3,4,4',5,5'; 2,2',3,3',4,4'; 2,2',3',4,4',5; 2,2',3',4',5,5'; 2,2',4,4',5;
		15.36	**1.81**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
44	2,2',3,5'	-1.74	0.15	2,2',5; 2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-1.80	0.33	2,2',3; 2,2',4; 2,3,6; 2,3',6	--
41/64	2,2',3,4/2,3,4',6	-1.34	0.11	2,2',4; 2,2',3; 2,4',6; 2,3,6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.23	0.05	2,2',3,3'; 2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,4'
99	2,2',4,4',5	-0.68	0.07	2,2',4,4'; 2,2',4,5; 2,2',4,5'; 2,2',4; 2,2',5; 2,2'	--
90/101	2,2',3,4',5/2,2',4,5,5'	-0.93	0.08	2,2',4,5; 2,2',4,5'; 2,2',5,5'; 2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4'
110	2,3,3',4',6	-2.39	0.23	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,3',6; 2,3,4',6
92	2,2',3,5,5'	-0.21	0.05	2,2',5,5'; 2,2',3; 2,2',5; 2,2'	2,2',3,4'; 2,2',3,5'
97	2,2',3',4,5	-0.64	0.06	2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4'; 2,2',3,5'
87/115	2,2',3,4,5'/2,3,4,4',6	-0.54	0.05	2,2',4,5'; 2,2',3; 2,4',6; 2,3,6; 2,2',4; 2,2',5; 2,2'; 2,6	2,2',3,4; 2,3,4',6; 2,2',3,5'
153	2,2',4,4',5,5'	-0.98	0.07	2,2',4,4'; 2,2',4,5'; 2,2',5,5'; 2,2',4; 2,2',5; 2,2'	--
138	2,2',3,4,4',5	-2.06	0.15	2,2',4,4'; 2,2',4,5'; 2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4; 2,2',3,4'
128	2,2',3,3',4,4'	-0.48	0.05	2,2',4,4'; 2,2',4; 2,2'	2,2',3,4; 2,2',3,4'; 2,2',3,3'

11.0268

Table 17 (Continued)

Decreasing Peaks (Continued)

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
180	2,2',3,4,4',5,5'	-0.54	0.04	2,2',4,5; 2,2',4,4'; 2,2',4,5'; 2,2',5,5'; 2,2',4; 2,2',5; 2,2'	2,2',3,4; 2,2',3,4'; 2,2',3,5'
170/190	2,2',3,3',4,4',5/ 2,3,3',4,4',5,6	-0.94	0.07	All Increasing Peaks listed above	All decreasing peaks except BZ 92, 101, 153, and 180
		-15.51	**1.56**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
48	2,2',4,5	Int	Int
40	2,2',3,3'	0.03	0.07

Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
19	2,2',6	0.79	0.08	All decreasing peaks listed below
46	2,2',3,6'	0.28	0.06	2,2',3,3',4,6'
51	2,2',4,6'	0.52	0.06	2,2',3,4',5',6; 2,2',3,3',4,6'
		1.59	**0.20**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
95	2,2',3,5',6	-1.86	0.19	2,2',6	2,2',5,6
132	2,2',3,3',4,6'	-0.47	0.04	2,2',4,6'; 2,2',3,6'; 2,2',6	2,2',3,3',6
149	2,2',3,4',5',6	-1.06	0.09	2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6'
		-3.39	**0.32**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
45	2,2',3,6	0.03	0.06
91	2,2',3,4,6	0.04	0.05
53	2,2',5,6'	-0.04	0.02
84	2,2',3,3',6	-0.06	0.06

11.0269

(1973 and 1975). Overall, fewer pairs of samples were studied due to the lesser extent of dechlorination.

A measure of how well the overall increases balance the decreases in shown by the percentages listed on Table 16. The compositional balance for the mono-ortho substituted congeners balances to within 10 percent. The di-ortho and tri-ortho substituted congeners balance to within 1 and 23 percent, respectively. The other paired sections (1973 and 1975,) balance to within 1 to 2 percent, 3 to 7 percent, and 3 to 23 percent for the mono-ortho, di-ortho, and tri-ortho substituted congeners, respectively. Correlation of the loss of specific congeners with gains in others was done by completing a parent-daughter analysis. The parent-daughter analysis is also divided by the changes that occur to the congeners that can dechlorinate to the three terminal dechlorination products.

3.2.3.1 Mono Ortho Substituted Congeners

During the 9 years between core collection, the concentrations of several di- and tri-chlorobiphenyls increased, including: 2,4/2,5-CBP, 2,3'-CBF, 2,3/2,4'-CBP, 2,3'5-CBP, 2,3',4-CBP, and 2,4',5-CBP. These congeners are commonly formed intermediates for the more highly chlorinated congeners as they dechlorinate to 2-CBP. With the exception of 2,4/2,5-CBP and 2,4',5-CBP, the levels of these same congeners were also enhanced in the sediments of the upper Hudson at the first sampling interval. Because these congeners are common intermediates, it is quite possible that these congeners were also elevated prior to our first sampling of those sediments. In addition, the same 6 peaks are consistently elevated in all of the sections studied in the later core (88.6). It also appears that 2,4,4'-CBP dechlorinates to 2,4'-CBP. This congener was dechlorinated too rapidly to determine its pathway in the sediments of the upper Hudson.

The balances between specific increases and decreases in congener concentrations work fairly well for this pair of samples, although the gain in the concentrations of 2,3',5-CBP, 2,3',4-CBP and 2,4',5-CBP is somewhat higher than losses in concentrations of their potential parent congeners. The changes in concentrations are much smaller in the other paired sections studied, and better agreement between decreases in potential parents and increases in daughter products is achieved. Table 18 summarizes the congeners that

commonly decrease and increase in abundance during the nine year sampling interval for the three paired sections studied.

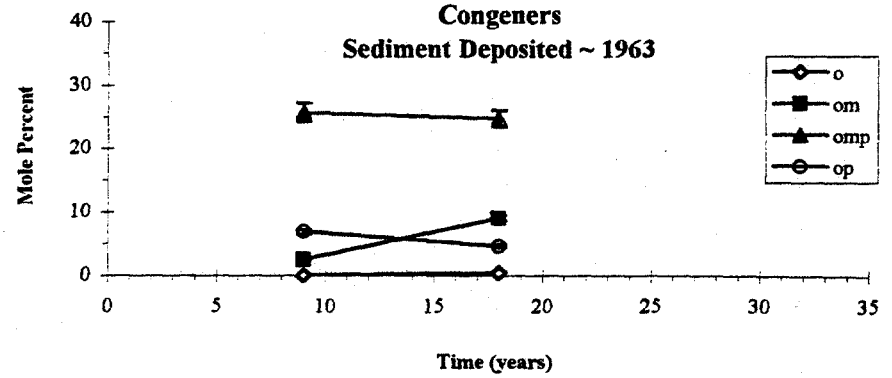
Table 18
Dechlorination Sequence - Mono Ortho Congeners
Summary of all Paired Sections - Tidal Hudson
Change: 91.8 and 88.6

Increasing Peaks		Decreasing Peaks	
BZ#	Structure	BZ#	Structure
7/9	2,4/2,5	28	2,4,4'
6	2,3'	20/33	2,3,3'/2',3,4
5/8	2,3/2,4'	22	2,3,4'
26	2,3',5	67	2,3',4,5
25	2,3',4	74	2,4,4',5
31	2,4',5	70	2,3',4',5
		66	2,3',4,4'
		56/60	2,3,3',4/2,3,4,4'
		118	2,3',4,4',5
		Less Common	
		107	2,3,3',4',5
		156	2,3,3',4,4',5

Notes:
Less common congeners were only observed in one of the three pairs studied.
No change observed in congeners not listed.

To investigate the time course of dechlorination, the change in the levels of the ortho, ortho-meta, ortho-para, and ortho-meta-para substituted congeners were plotted for the paired sections of cores 91.8 and 88.6 (see Figure 19). As observed for the upper Hudson, the level of ortho-meta substituted congeners increases as a result of decreases in the ortho-meta-para substituted congeners. Based on Figure 19, it does not appear that

Figure 19
Time Course of Dechlorination -Mono OrthoSubstituted Congeners
Sediment Deposited ~ 1963



sufficient loss of the ortho-meta-para congeners occurred to balance this increase. However, the imbalance in the compositional balance accounts for this discrepancy. Specifically, the losses in many of the hexa-, penta-, and tetra-CBPs, which are all ortho-meta-para substituted, do not account for all of the gains observed in the ortho-meta-para substituted tri-CBPs.

3.2.3.2 Di Ortho Substituted Congeners

Gains of 2,2',5-CBP, 2,2',4-CBP, 2,3,6/2,3',6-CBP, 2,2',3/2,4',6-CBP, 2,2',5,5'-CBP, 2,2',4,5'-CBP, and 2,2',4,4'-CBP are balanced by losses of the more highly chlorinated congeners (See Table 19). The increases in the terminal dechlorination products (2,2'/2,6-CBP) and the congeners observed to be recalcitrant (2,3,6/2,3',6-CBP and 2,2',4,4'-CBP) in the upper Hudson were very small (ca. 1 mole percent each). Several ortho-meta substituted congeners also accumulated (2,2'5-CBP and 2,2',5,5'-CBP). Such products only accumulated in several samples during the second incubation period in the sediment of the upper Hudson.

Table 19
Dechlorination Sequence - Di Ortho Congeners
Summary of All Pairs Studied - Tidal Hudson
Change: 91.8 and 88.6

Increasing Peaks		Decreasing Peaks	
BZ#	Structure	BZ#	Structure
18	2,2',5	40	2,2',3,3'
17	2,2',4	44	2,2',3,5'
24/27	2,3,6/2,3',6	42/59	2,2',3,4'/2,3,3',6
16/32	2,2',3/2,4',6	41/64	2,2',3,4/2,3,4',6
52	2,2',5,5'	82	2,2',3,3',4
49	2,2',4,5'	99	2,2',4,4',5
47	2,2',4,4'	90/101	2,2',3,4',5/2,2',4,5,5'
		110	2,3,3',4',6
		Less Common	
		97	2,2',3',4,5
		87/115	2,2',3,4,5'/2,3,4,4',6
		153	2,2',4,4',5,5'
		138	2,2',3,4,4',5
		128	2,2',3,3',4,4'
		180	2,2',3,4,4',5,5'
		170/190	2,2',3,3',4,4',5/2,3,3',4,4',5,6

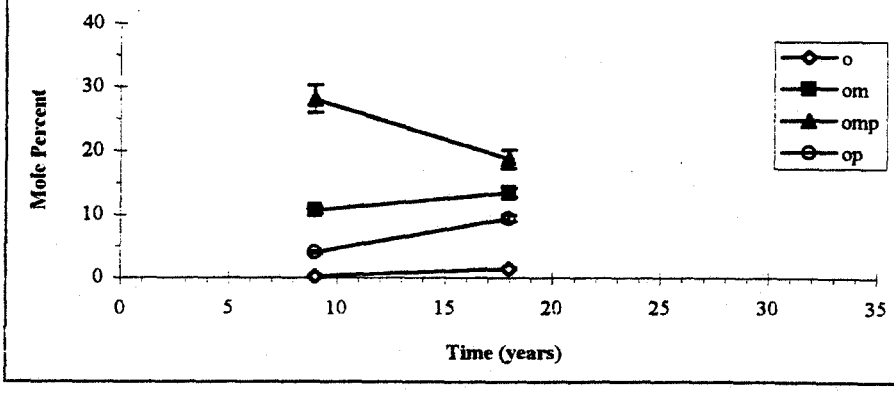
Notes:
Less common congeners were only observed in one of the three pairs studied.
No change observed in congeners not listed.

In the other paired sections the same congeners were elevated in core 88.6 relative to the levels found in core 91.8. However, decreases in the many of the penta-, hexa, and hepta congeners, especially 2,2',4,4',5,5'-CBP, 2,2',3,4,4',5-CBP, and 2,2',3,3',4,4',5 /2,3,3',4,4',5,6-CBP could not be detected in paired samples deposited in about 1973 and 1975. This may reflect the change in the source Aroclor mixture that occurred in the early 1970s.

General Electric switched from using Aroclor 1242 to using solely Aroclor 1016 in 1972 (Brown et al., 1984; Chillrud, 1996). These mixtures differ in that Aroclor 1016 does not contain congeners with more than 5 chlorines per biphenyl molecule. Therefore, a shift in the source of contamination would result in lower concentration of the more highly chlorinated congeners. This change in the source Aroclor mixture has been documented previously in the sediments of the tidal Hudson (Bopp, 1979; Bopp et al., 1981). Increased abundances of heavier congeners in the 1963 sediments may also reflect a small amount of Aroclor 1254 (Bopp, 1979).

As shown in Figure 20, the large decreases in the concentration of the ortho-meta-para substituted congeners result in accumulations of both ortho-para (2,2',4-CBP and 2,2',4,4'-CBP) and ortho-meta (2,2',5-CBP, 2,3,6/2,3',6-CBP and 2,2',5,5'-CBP) substituted congeners. Only ortho-para substituted congeners increased in abundance in the upper Hudson. Against the general trend, only one ortho-meta congener was observed

Figure 20
Time Course of Dechlorination -Di Ortho Substituted Congeners
Sediment Deposited ~ 1963



to decrease (2,2',3,5'-CBP) in abundance. And several ortho-meta-para substituted congeners increased in abundance (2,2',3/2,4',6-CBP and 2,2',4,5'-CBP).

3.2.3.3 Tri Ortho Substituted Congeners

During the nine year interval between core collection, losses of the more highly chlorinated congeners resulted in increases of 2,2',4,6'-CBP, 2,2',3,6'-CBP, and 2,2',6-CBP (see Table 20). Overall, dechlorination of the tri-ortho substituted congeners in the sediments of the tidal Hudson is limited, as evidenced by the smaller or undetectable increase in the relative abundance of 2,2',6-CBP. As shown in Table 20, the levels of the following congeners in core 88.6 are consistently depleted relative to those in core 91.8: 2,2',3,4',5',6-CBP, 2,2',3,3',4,6'-CBP, 2,2',3,5',6-CBP, 2,2',5,6'-CBP. The congener, 2,2',3,6-CBP, was also observed to be depleted in one pair of samples. The increased abundances observed in the more highly chlorinated tri-ortho substituted congeners relative to Aroclor 1242 can be attributed to the preferential concentration of those congeners that occurred during transport.

Table 20
Dechlorination Sequence - Tri Ortho Congeners
Summary of All Paired Samples - Tidal Hudson
Change: 91.8 and 88.6

Increasing Peaks		Decreasing Peaks	
BZ#	Structure	BZ#	Structure
46	2,2',3,6'	53	2,2',5.6'
51	2,2',4,6'	95	2,2',3,5',6
		132	2,2',3,3',4,6'
Less Common		149	2,2',3,4',5',6
19	2,2',6		
		Less Common	
		45	2,2',3,6

Notes:
Less common congeners were only observed in one of the three pairs studied.
No change observed in congeners not listed.

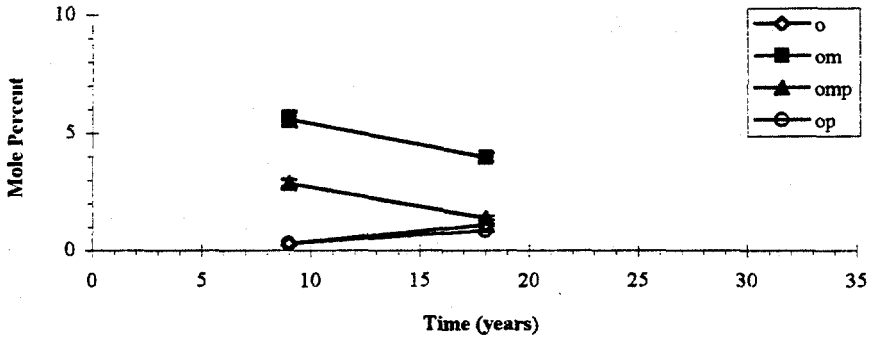
The small amount of Aroclor 1254 emitted from the capacitor plant during that time period may have also played a role. In 1963, General Electric utilized 95 percent Aroclor 1242 and five percent Aroclor 1254 (Bopp, 1979; Brown et al., 1984; Chillrud, 1996). Lower abundances of these same congeners, especially 2,2',3,4',5',6-CBP, is

apparent in the other paired sections studied. These sediments were deposited in 1973 and 1975, after the source Aroclor mixture was changed from Aroclor 1242 to Aroclor 1016.

In general, these observations suggest that the PCBs in the sediments of the tidal Hudson are simply at an earlier stage in the dechlorination process than those in the upper Hudson. Based on the dechlorination patterns observed and given sufficient time, it appears that the PCBs in sediments of the tidal Hudson could eventually reach the magnitude of dechlorination observed in the sediments of the upper Hudson.

Based on Figure 21 and the above discussion, it is obvious that losses of the ortho-meta-para and ortho-meta substituted congeners result in the gains observed in the ortho-para and ortho-only substituted congeners. These results are identical to those observed for the tri-ortho substituted congeners during the first sampling interval in the upper Hudson. Of course in the case of the tidal Hudson, the losses of the ortho-meta-para substituted congeners are more extensive, due to the selective enrichment of these congeners.

Figure 21
Time Course of Dechlorination - Tri Ortho Substituted Congeners
Sediment Deposited ~ 1963



3.2.4 Time Course and Extent of Dechlorination

The overall extent of dechlorination in the tidal Hudson is much less than that of the highly contaminated upper Hudson. As shown in Table 21, the levels of terminal dechlorination products and recalcitrant congeners are ca. 7 mole percent in the later core

Table 21
Levels of Terminal and Recalcitrant Dechlorination Products
Tidal Hudson River - Kingston

		Terminal (mole percent)								*Recalcitrant (mole percent)*							
Year of Deposition	*Core (Section)*	*2-CBP*	*error*	*2,2'/2,6-CBP*	*error*	*2,2',6-CBP*	*error*	*Sub-Total*	*error*	*2,3,6/2,3',6-CBP*	*error*	*2,2',4,4'-CBP*	*error*	*Sub-Total*	*error*	***Grand Total***	***error***
1975	91.8 (2-4 cm)	0.35	0.15	0.84	0.06	0.74	0.05	*1.93*	*0.26*	1.18	0.06	2.45	0.13	*3.63*	*0.19*	**5.55**	**0.45**
	88.6 (16-20 cm)	0.66	0.18	1.50	0.08	0.12	0.07	*2.29*	*0.32*	1.69	0.09	2.99	0.15	*4.68*	*0.24*	**6.96**	**0.56**
1973	91.8 (4-8 cm)	0.16	0.08	0.71	0.04	0.68	0.03	*1.54*	*0.16*	1.17	0.06	2.45	0.12	*3.62*	*0.18*	**5.17**	**0.34**
	88.6 (20-24 cm)	0.48	0.11	1.44	0.07	1.09	0.06	*3.01*	*0.24*	1.48	0.08	2.69	0.14	*4.17*	*0.21*	**7.18**	**0.45**
1963	91.8 (24-28 cm)	0.07	0.14	0.18	0.06	0.30	0.05	*0.55*	*0.26*	0.47	0.05	1.67	0.09	*2.15*	*0.14*	**2.70**	**0.40**
	88.6 (32-36 cm)	0.54	0.10	1.42	0.07	1.08	0.06	*3.04*	*0.23*	1.59	0.08	2.61	0.13	*4.20*	*0.21*	**7.25**	**0.44**
--	Aroclor 1242	0.00	--	3.21	--	0.53	--	*3.74*	--	0.50	--	0.94	--	*1.44*	--	**5.18**	--
--	Aroclor 1016	0.00	--	4.26	--	0.96	--	*5.22*	--	0.77	--	1.11	--	*1.88*	--	**7.10**	--

11.0276

(88.6). The most dechlorinated sediments of the three pairs studied are those deposited around 1963. The sediments deposited around 1973 and 1975 are slightly less dechlorinated. It is interesting to note that the levels of terminal dechlorination products in the earlier core (91.8) are much lower in the 1963 sediments than in the 1973 or 1975 sediments. In addition, larger changes occurred in the congener distribution during the nine year incubation for the 1963 sediments than for the 1973 or 1975 sediments suggesting that acclimation of the microbial population occurred prior to their deposition.

As previously discussed and shown in Figures 15, 16, and 17, the time course of dechlorination was evaluated by plotting the changes in the levels of ortho, ortho-meta, ortho-para, and ortho-meta-para substituted congeners between the two cores. Similar plots were completed for the other sections studied and are presented in Appendix C-2. Again, the consistency in the time course of dechlorination for each set of pairs studied is remarkable. With the exception of the di-ortho substituted congeners, the time course of dechlorination in the tidal Hudson proceeds in a manner similar to the initial sampling interval in the upper Hudson. In the tidal Hudson, the di-ortho substituted congeners with chlorines in only the ortho and meta positions (2,2',5-CBP, 2,2',5,5'-CBP) accumulate, while in the upper Hudson during the first sampling interval, they do not. These same congeners, however, do accumulate during the second sampling interval in many of the paired sediment samples from the upper Hudson. A simple explanation of these inconsistencies is that the congeners in question can serve as common intermediates in the dechlorination of many of the higher chlorinated congeners. Therefore, it is possible that they were elevated in the sediments of the upper Hudson at some point prior to our first sampling interval.

The mono-ortho congeners are dechlorinated primarily from the para position, resulting in an accumulation of ortho-meta congeners. Losses of ortho-meta-para substituted congeners appear to be minimal but are in actuality are not. Some are dechlorinated to other ortho-meta-para substituted congeners. Insignificant levels of the ortho-only congener, 2-CBP, accumulated during the nine year incubation period. Reactive chlorines include, flanked para chlorines from -4,5 and -3,4 groups and unflanked para chlorines. Some flanked and unflanked meta chlorines are also removed from ortho-

meta-para substituted congeners. Meta chlorines in the 5 position appear to be conserved, while those in the 3 or 3' position are easily removed.

The di-ortho substituted congeners are dechlorinated from both the meta and para positions to produce ortho-meta and ortho-para substituted congeners. Again, only a small amounts of the ortho-only substituted congeners (2,2'/2,6-CBP) are produced. Flanked and unflanked chlorines in the -3, -3', -4, -4' are easily removed, while chlorines in the -5 and -5' positions appear to be somewhat more resistant, resulting in accumulations of such congeners as 2,2',5-CBP and 2,2',5,5'-CBP. The tri-ortho substituted congeners are dechlorinated primarily from the meta position on ortho-meta-para and ortho-meta substituted congeners. Para chlorines appear to be conserved and small increases in 2,2',6-CBP are observed.

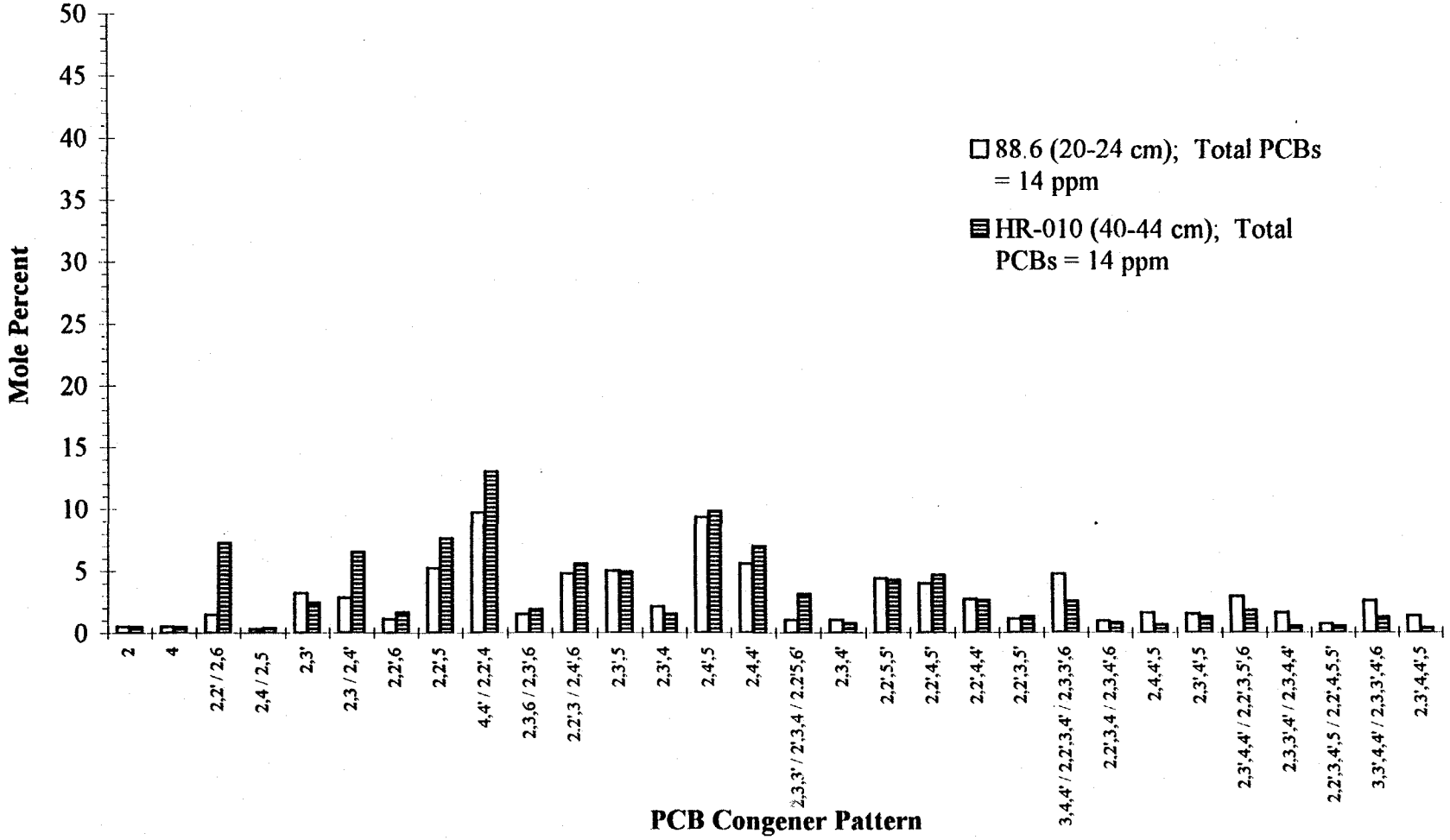
3.2.5 EPA Sediment Core Data

As previously discussed in Section 3.1.6, the EPA collected sediment cores along the length of the Hudson River in the 1992. One of those cores, HR-010, was collected in the tidal Hudson in the vicinity Kingston at mile point 88.5. The congener patterns in various sections of this core will be compared to core 88.6 which was collected in 1986 and is discussed above.

Generally, the nature and extent of dechlorination in the samples from core HR-010 are similar to that discussed above for core 88.6 (see Figure 22). The congener profile from the 40-44 cm section, like the 20-24 cm section in core 88.6 (deposited ~1973), shows increased concentrations of many tri-CBPs (2,3',5-CBP, 2,3',4-CBP, 2,4',5-CBP, 2,4,4'-CBP, 2,2',4-CBP and 2,2',5-CBP) that are easily formed intermediates for the tetra-, penta-, and hexa-CBPs that are enriched in the tidal Hudson. The sample from this section may be slightly more dechlorinated, as evidenced by slightly higher levels of 2,2'/2,6-CBP, 2,2',4-CBP and 2,2',5-CBP. It should be noted that most of the peaks quantified in this section are flagged as uncertain in the EPA database.

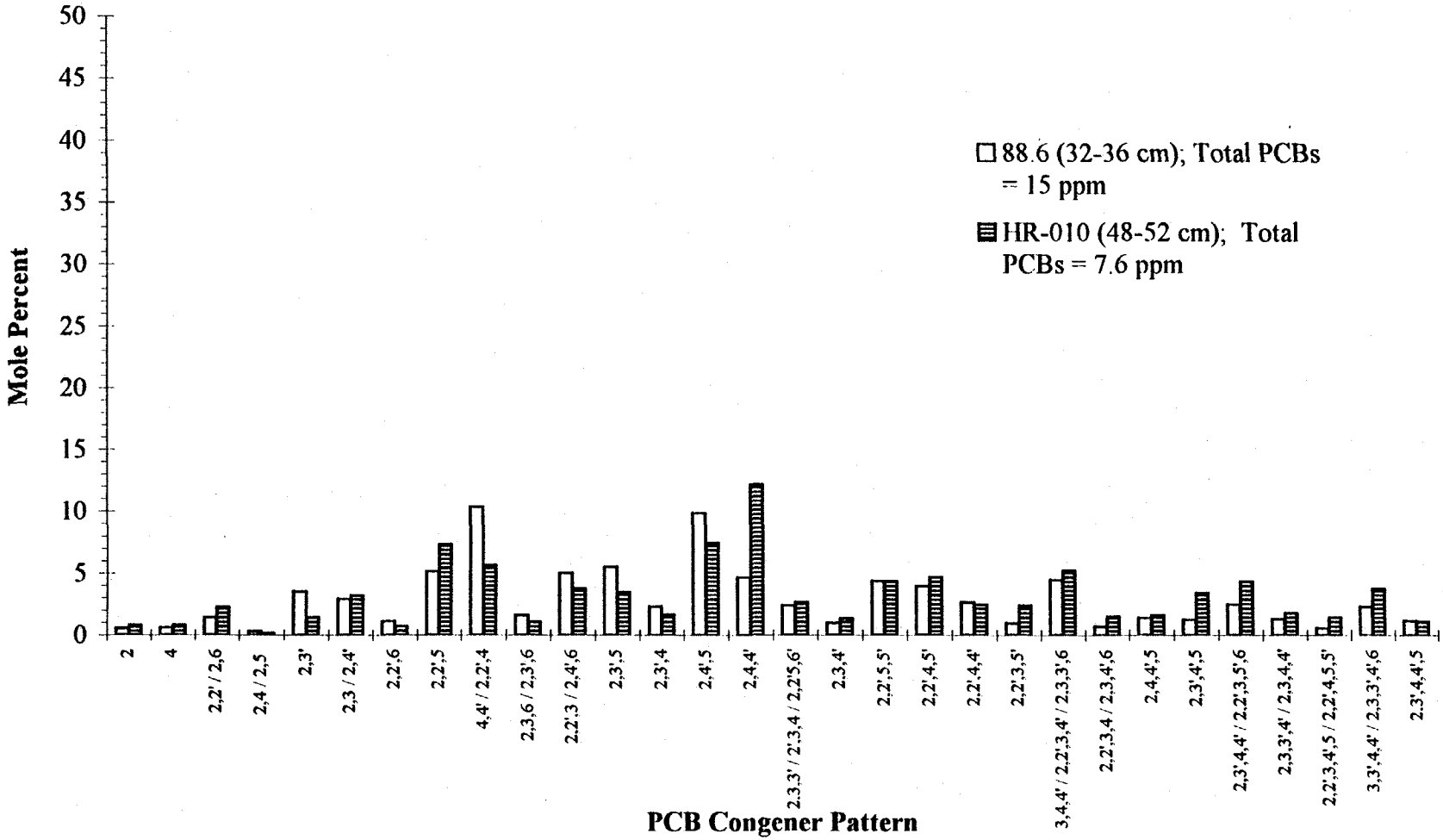
The extent of dechlorination in the 48-52 cm section from HR-010 is somewhat less than that described in Section 3.2 for the 1963 sediment in core 88.6 (see Figure 23). In fact, the 40-44 cm section from HR-010, discussed above, is more similar to the 1963

Figure 22
Comparison of PCB Congener Patterns
Core 88.6 and EPA Core HR-010 - Sediment Deposited ~ 1973
Tidal Hudson River - Mile Point ~ 88.6



11.0279

Figure 23
Comparison of PCB Congener Patterns
Core 88.6 and EPA Core HR-010 - Sediment Deposited ~ 1963
Tidal Hudson River - Mile Point ~ 88.6



11.0280

sediment, in terms of the nature and extent of dechlorination. Again, most of the peaks quantified for this section in the EPA database are flagged as uncertain.

3.3 *In-Situ* Dechlorination Rates

Dechlorination rates are typically expressed in terms of the micromoles of chlorine removed per kilogram sediment (dry weight) per week (or equivalent units). Because the number of dechlorinating microorganisms in each sediment sample is unknown, the rates can only be normalized to the amount of sediment contained in each sample. The rate calculations are based on an assumed first-order change in the average number of chlorine atoms (Cl atoms) per biphenyl between distinct time intervals, as shown below:

$$-dCl/dt = k[C] \qquad \text{Equation 1}$$

where, k is the rate constant and C is the total PCB concentration. The rate constant is simply the change in the number of Cl atoms per biphenyl divided by the length of the time interval in weeks. It should be noted, however, that the change in the average number of Cl atoms per biphenyl can be a rather insensitive indicator of dechlorination. For example, in several instances no change in the average number of Cl atoms per biphenyl could be detected during the second incubation period in the upper Hudson. However, the congener distribution plots shown in Appendix C-1 reveal that significant changes in the congener composition did indeed occur. The average number of Cl atoms per biphenyl was calculated in each sample by the method discussed in Section 2.3.2.

As shown in Table 22, the following three rates of dechlorination and corresponding first-order rate constants were calculated for each section studied in the upper Hudson: an initial rate, defined as the rate of dechlorination from initial deposition of the contaminated sediment to collection of the earlier core (188.5); and a mean rate, defined as the rate of dechlorination from deposition of the contaminated sediment to collection of the later core (188.6); and a secondary rate, defined as the rate of dechlorination from the date of collection of the earlier core to the latter core. Laboratory studies have focused on determination of the maximum rates of dechlorination for incubation times ranging from several weeks to several months. The results of these

Table 22
Dechlorination Rates in Hudson River Sediment
In-Situ

Location	Approximate Date of Sediment Deposition	PCB Conc. Core 188.5 ppm	PCB Conc. Core 188.5 umol/kg	Initial Rates[1] d[Cl⁻]/dt (umol Cl⁻/kg sediment/wk)	Initial Rates[1] rate constant (umol Cl⁻/umol PCB/wk)	PCB Conc. Core 188.6 ppm	PCB Conc. Core 188.6 umol/Kg	Mean Rates[2] d[Cl⁻]/dt (umol Cl⁻/kg sediment/wk)	Mean Rates[2] rate constant (umol Cl⁻/umol PCB/wk)	Secondary Rates[3] d[Cl⁻]/dt (umol Cl⁻/kg sediment/wk)	Secondary Rates[3] rate constant (umol Cl⁻/umol PCB/wk)
Upper Hudson	1982	75	310	5.2	1.68E-02	88	361	0.58	1.73E-03	--	--
	1980	187	781	4.6	5.89E-03	148	630	1.3	1.87E-03	0.25	3.61E-04
	1979	615	2521	9.7	3.85E-03	202	836	2.3	1.39E-03	0.28	1.69E-04
	1976	827	3413	7.9	2.34E-03	375	1544	2.6	1.06E-03	--	--
	1975	974	4035	8.4	2.09E-03	464	1963	3.4	1.14E-03	0.58	1.92E-04
	1973	1212	4997	8.1	1.62E-03	811	3408	4.4	1.05E-03	1.4	3.36E-04
	1968	855	3496	3.5	1.01E-03	624	2657	2.8	8.95E-04	2.1	6.73E-04
	1963	442	1769	1.1	6.06E-04	352	1463	1.0	6.18E-04	1.04	6.49E-04
	1960	397	1623	1.05	6.52E-04	204	845	0.66	5.35E-04	0.24	1.92E-04

[1] Initial rates were determined the using the change in the mean number of chlorine atoms per biphenyl between the more recent core and Aroclor 1242.

[2] Mean rates were determined using the change in the average number of chlorine atoms per biphenyl between the later core and Aroclor 1242.

[3] Secondary rates were determined using the change in the average number of chlorine atoms per biphenyl between the two cores.

11.0282

studies are summarized in Table 23. With the exception of the anomalously high rate constants derived from studies of Quensen et al. (1988 and 1990), laboratory data for PCB concentrations up to about 1500 ppm (about 5000 umol/kg) are reasonably represented by a single maximum first-order rate constant of about 0.03 umol Cl^-/umol PCB/week. The higher rates observed by Quensen et al. (1988 and 1990) may be related to the manner in which their sediment slurries or inoculum of dechlorinating microorganisms was prepared. Enrichment of dechlorinating populations, as evidenced by reduced lag times and/or faster rates of dechlorination, through additions of various carbon and energy sources has been shown (Neis and Vogel, 1990; Morris et al., 1992; Kim, 1997). Figure 24 compares the dechlorination rates attained in various laboratory studies.

Data from Abramowicz et al. (1993) indicates that above about 1500 ppm, a zero order relationship is approximated with the maximum dechlorination rate essentially independent of PCB concentration to over 8000 ppm (Table 23, Figure 24). Above PCB concentrations of 1500 ppm, the maximum rate of dechlorination could be enzyme limited as a result of various biological, ecological, or population constraints (Kim, 1997; Alexander, 1994). An explanation that is generally consistent with Michaelis-Menton kinetics. Alternatively, at high concentrations, PCB bioavailability could be limited simply by aqueous solubility. The PCB concentration "available" to microbes in sediments contaminated with 1500 ppm PCBs could be similar to that available in sediments contaminated with higher levels. This could result in similar maximum rates of dechlorination over a range of high PCB concentrations without enzyme limitation. It should be noted that, in contrast to the studies of Abramowicz et al. (1993), Rhee et al. (1993a) did not observe dechlorination in sediment slurries inoculated with PCB concentrations of 1000 ppm or 1500 ppm even after seven months of incubation. It was suggested that an upper threshold concentration for the inhibition of dechlorination exists between 800 ppm and 1000 ppm (Rhee et al., 1993a).

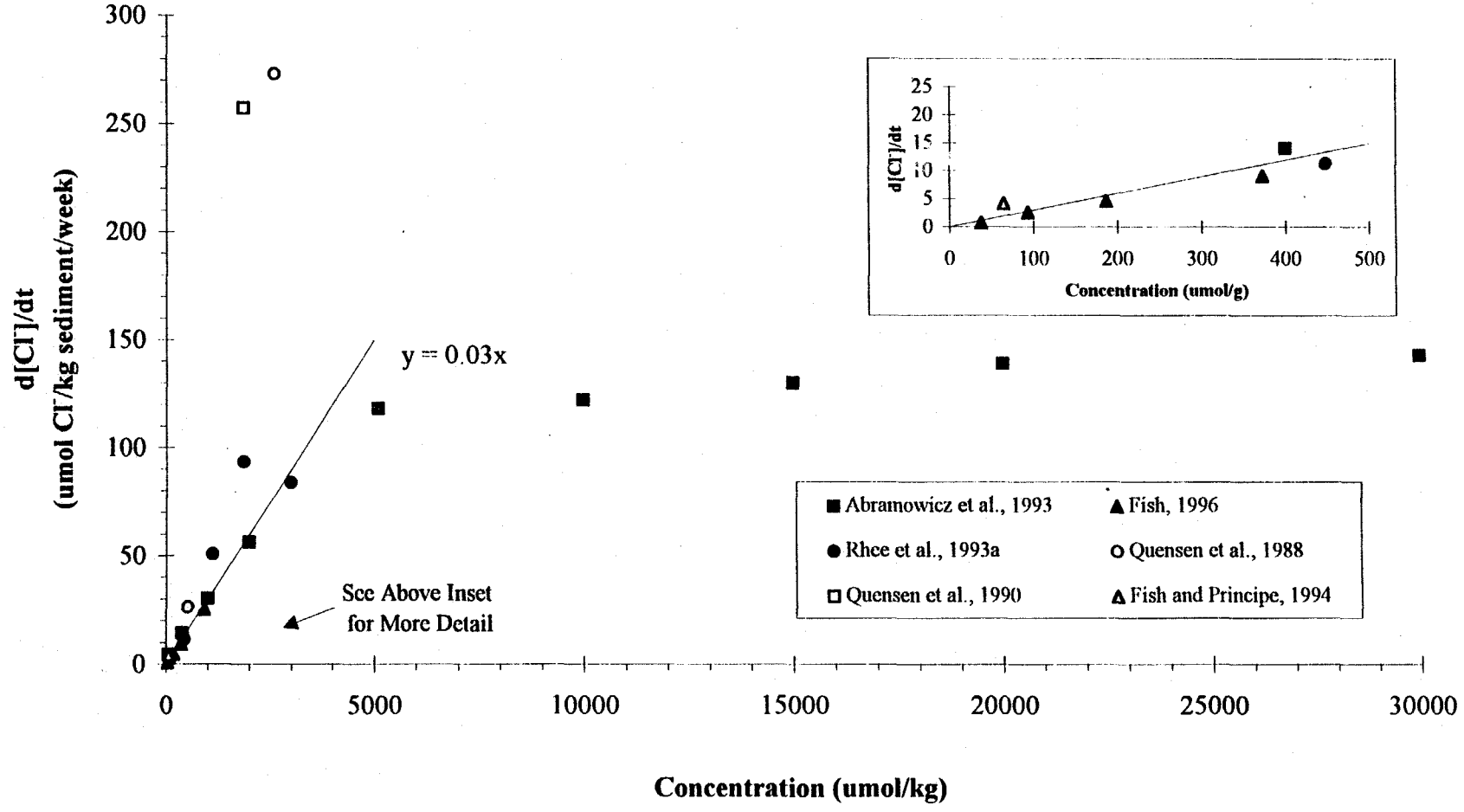
An important characteristic common to laboratory incubation studies is that after several weeks to several months, the rates of dechlorination slow dramatically, in many cases to undetectable levels when analyzed in terms of the relatively insensitive parameter,

Table 23
Comparison of Dechlorination Rates in Hudson River Sediments
Laboratory Studies

PCB Concentration (ppm - dry weight)	PCB Concentration (umol/kg)	d[Cl⁻]/dt (umol Cl⁻/kg sediment/week)	Maximum 1st order rate constant (umol Cl⁻/umol PCB/week)	Reference
10	37.3	0.58	0.016	Fish, 1996
19	64.8	4.11	0.064	Fish and Principe, 1994
25	93.3	2.50	0.027	Fish, 1996
50	187	4.50	0.024	Fish, 1996
100	373	9.00	0.024	Fish, 1996
116	400	14.0	0.035	Abramowicz et al., 1993
120	448	11.2	0.025	Rhee et al., 1993
140	523	26.0	0.049	Quensen et al., 1988
250	933	25.0	0.027	Fish, 1996
289	1000	30.0	0.030	Abramowicz et al., 1993
300	1120	50.4	0.045	Rhee et al., 1993a
500	1866	93.3	0.050	Rhee et al., 1993a
500	1866	257	0.140	Quensen et al., 1990
578	2000	56.0	0.028	Abramowicz et al., 1993
700	2613	273	0.104	Quensen et al., 1988
800	2986	83.6	0.028	Rhee et al., 1993a
1478	5116	118	0.023	Abramowicz et al., 1993
2890	10000	122	0.012	Abramowicz et al., 1993
4335	15000	130	0.009	Abramowicz et al., 1993
5780	20000	139	0.007	Abramowicz et al., 1993
8671	30000	143	0.005	Abramowicz et al., 1993

11.0284

Figure 24
Comparison of Dechlorination Rates
in Hudson River Sediments
Laboratory Studies



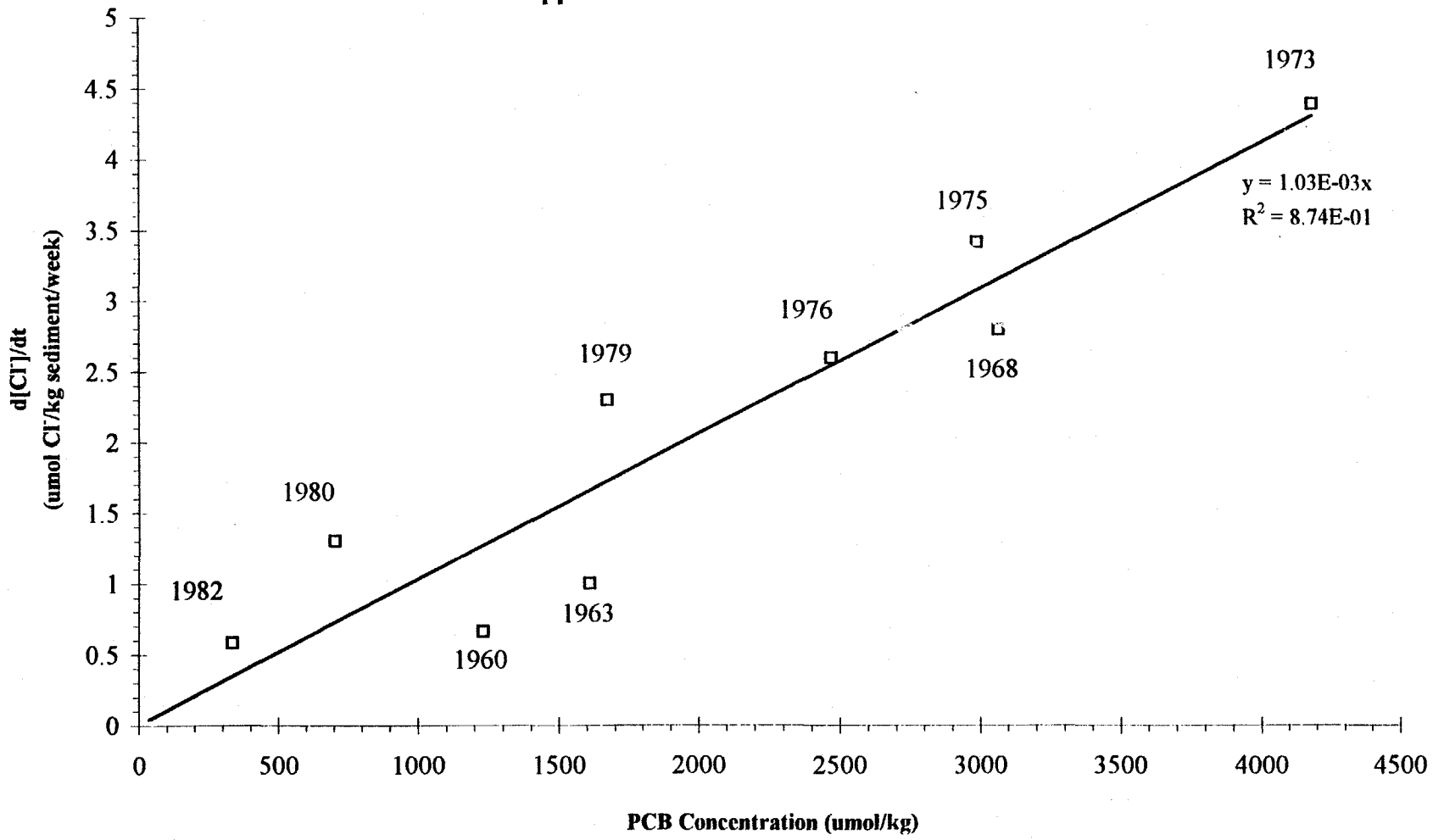
11.0285

Cl atoms per biphenyl (umol Cl^-/umol PCB). This decrease in rate is due to a decline in the relative concentration of easily dechlorinated congeners and a corresponding increase in the abundance of more recalcitrant congeners. As demonstrated previously in this thesis, detailed congener analysis shows that *in-situ* dechlorination in upper Hudson sediments continues at much slower than maximum rates for decades. It does appear likely, however, that Aroclor 1242 could eventually be dechlorinated to four terminal congeners (2-mono CBP, 2,2'- and 2,6-di CBP, and 2,2'6-tri CBP). In the discussion that follows, *in-situ* dechlorination rates in upper Hudson sediments will be analyzed in terms of the maximum rates determined in laboratory incubation studies and expressed in terms of umol Cl^-/umol PCB/week.

Because of the duration (years to decades) of the *in-situ* incubations in the upper Hudson, even the initial rate constants would be expected to be much lower than the maximum rates derived from laboratory studies. The one sample expected to be the most similar to the laboratory studies is the 0-2 cm section from core 188.5 because its initial incubation time was only about one year. In fact, the rate constant for the initial incubation of this sample was 0.017 umol Cl^-/umol PCB/week (see Table 22), a value which is in reasonable agreement with the average maximum laboratory rate constant of 0.03 umol Cl^-/umol PCB/week. Actually, it falls within the range of maximum rate constants determined from the individual laboratory experiments (see Table 23). Two other samples from the same area (188.6, 0-2 cm; and HR-019, 0-2 cm) with *in-situ* incubations of approximately one year had almost identical initial rate constants for dechlorination (0.016 and 0.018 umol Cl^-/umol PCB/week, respectively). As would be expected, all the other initial and mean rate constants calculated for the upper Hudson core sections were smaller and showed a general decrease with increasing *in-situ* incubation time (see Table 22). The secondary rate constants, which represent an eight year *in-situ* incubation that started with previously dechlorinated PCBs, are one to two orders of magnitude slower than the maximum initial rate constant. The trend of decreasing rate constants with increasing *in-situ* incubation time is illustrated nicely in Figure 25.

11.0286

Figure 25
Mean *In - Situ* Dechlorination Rates
Upper Hudson River Sediments



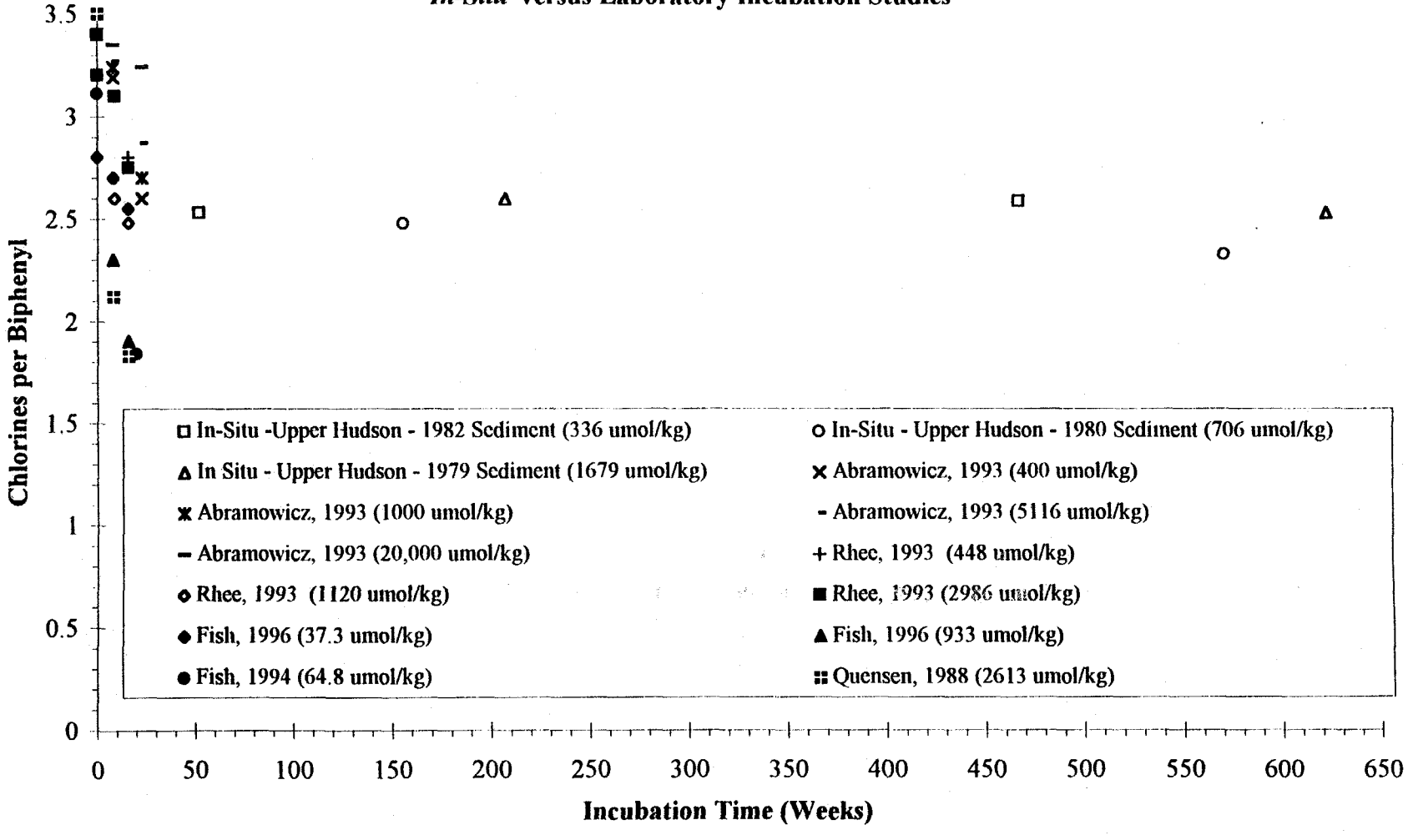
The mean *in-situ* incubations are reasonably modeled with a single first order rate constant of about 0.001 umol Cl^-/umol PCB/week, the slope of the solid line. However, closer inspection of the data reveals that the longer incubations (points labeled 1960 and 1963) have the slowest rate constants (shallowest slope) while the shortest incubations (1982 and 1980) have the fastest rate constants (steepest slope). It should be noted, however, that despite this general trend, the longest *in-situ* incubation periods and highest PCB concentrations do not necessarily produce the most dechlorinated sediments (see the discussion in Sections 3.1.1 and 3.1.5).

Figure 26 compares the chlorine per biphenyl losses for laboratory and upper Hudson *in-situ* incubations. Note that the *in-situ* dechlorination observed in 188.5 and 188.6 proceeds quite slowly to a level of ca. 2.5 Cl atoms per biphenyl while some of the laboratory studies, even at relatively low PCB concentrations, show dechlorination to fewer than two Cl atoms per biphenyl in much shorter periods of time. It should be remembered, however, that some of the EPA samples showed more extensive dechlorination than samples from 188.5 and 188.6. Specifically, as described in Section 3.1.6, more than 90 percent of the PCBs present in the 24-28 cm section from core HR-019 were terminal dechlorination products. Based on the ^{137}Cs profile, this section was deposited around 1963 and sampled in 1992 (a 29 year *in-situ* incubation), contained a PCB concentration of ca. 410 ppm, and had approximately 2.1 Cl atoms per biphenyl.

With respect to dechlorination in areas with relatively low PCB concentrations, such as the tidal Hudson, the laboratory results are significantly different from *in-situ* incubation results. Fish (1996) used test tube microcosms to study dechlorination rates at such low PCB concentrations. At a concentration of 10 ppm (37.3 umol/kg), Aroclor 1242 was dechlorinated to about 2.55 Cl atoms per biphenyl in just a few months. For a similar incubation time, the sediments containing 19 ppm (64.8 umol/kg) were much more extensively dechlorinated, reaching fewer than two Cl atoms per biphenyl. At similar levels of total PCBs, the six samples from cores 91.8 and 88.6 that were studied in detail (see Section 3.2), all had greater than 3.4 Cl atoms per biphenyl even after years of *in-situ* incubation (see Table 24).

11.0288

Figure 26
Comparison of Chlorine per Biphenyl Losses
***In-Situ* versus Laboratory Incubation Studies**



11.0289

Table 24
Tidal Hudson River - Kingston
Number and Type of Chlorines Per Biphenyl

Date of Deposition	Years Since Deposition	Core	Section	# Cl/Biphenyl	error	# ortho Cl/Biphenyl	error	# para Cl/Biphenyl	error	# meta Cl/Biphenyl	error
1963	9	91.8	24-28 cm	4.18	0.21	1.60	0.08	1.13	0.06	1.45	0.07
	18	88.6	32-36 cm	3.42	0.18	1.48	0.08	0.87	0.04	1.07	0,05
1973	4	91.8	4-8 cm	3.66	0.19	1.52	0.08	0.98	0.05	1.17	0.06
	13	88.6	20-24 cm	3.50	0.18	1.50	0.08	0.91	0.05	1.09	0.06
1975	2	91.8	2-4 cm	3.71	0.19	1.52	0.08	1.00	0.05	1.18	0.06
	11	88.6	16-20 cm	3.42	0.18	1.46	0.08	0.90	0.05	1.06	0.06

11.0290

The very slow rate of *in-situ* dechlorination in the tidal Hudson samples, described on a congener specific basis in Section 3.2.3, is clearly not due to a lack of readily dechlorinated congeners. In addition, the laboratory studies cited above indicate that the PCBs in the sediments are not below some threshold concentration for dechlorination. The lower rates appear to be a function of the differences between *in-situ* and laboratory acclimation of the dechlorinating microbes at lower PCB concentrations. In any case, the very slow rates of *in-situ* dechlorination of PCBs at levels of around or below 20 ppm support the general and important observation that in sediments throughout the tidal Hudson, PCB compositions strongly resemble those of the source Aroclors (Bopp et al., 1982; Bopp et al., 1983, Bopp et al., 1984; Bopp and Simpson, 1989; Chillrud, 1996).

CHAPTER FOUR
CONCLUSIONS

The similarity of the changes in congener composition during each sampling interval for all of the paired sections is striking. The biggest differences are the extent to which certain congeners become enriched or depleted relative to the source Aroclor mixtures. While the mole percentages of the individual congeners do vary, the pathways and time-course of dechlorination for the mono-, di-, and tri-ortho substituted congeners are almost identical in each pair studied. This is especially noteworthy, considering that the *in-situ* incubation periods ranged in duration from about a year to decades.

Although large alterations of original Aroclor patterns are observed, reductions in total PCB concentrations are not required to explain any of the compositional changes. The compositional balances and parent-daughter analyses clearly show that all of the PCB congeners appear to be dechlorinated to four common terminal dechlorination products (2-, 2,2'-, 2,6-, and 2,2',6-CBPs) through a series of intermediate and recalcitrant congeners. Although the recalcitrant congeners (2,3,6/2,3',6-CBP and 2,2',4,4'-CBP) generally appear quite stable over long time intervals, they do show some signs of reduction in abundance in some of the oldest sediments studied.

In the upper Hudson, chlorines in the para position are preferentially removed from the mono-ortho substituted congeners, resulting in large accumulations of the ortho-meta substituted congeners and 2-CBP. Flanked para chlorines from -3,4 and -4,5 groups and some unflanked para chlorines are removed. Removal of meta chlorines ensues only after most or all of the congeners with para substitution are eliminated. During this second phase of dechlorination, unflanked meta chlorines are removed. In addition, other than 2-CBP, none of the mono-ortho substituted congeners appear to be recalcitrant.

In direct contrast to the mono-ortho substituted congeners, the di-ortho substituted congeners are initially dechlorinated from the meta position, resulting in accumulations of ortho-para substituted congeners, 2,2'-CBP, and 2,6-CBP. Reactive chlorines include those in the meta position in -4,5 and -3,4 groups. Subsequent

dechlorination primarily removes unflanked chlorines in the para position. Recalcitrant di-ortho substituted congeners include 2,3,6/2,3',6-CBP and 2,2',4,4'-CBP. The tri-ortho substituted congeners are dechlorinated first from the meta position, resulting in accumulations of 2,2',6-CBP.

Review of the PCB congener patterns in the cores collected in the tidal Hudson provided some clues as to what the early stages of dechlorination in the upper Hudson may have looked like. With the exception of the very low levels of the terminal dechlorination products, the time-course of the dechlorination in the tidal Hudson is extremely consistent with that observed during the first sampling interval in upper Hudson. The most notable difference was that both ortho-para and ortho-meta di-ortho substituted congeners accumulate suggesting that ortho-meta-para substituted di-ortho congeners may be initially dechlorinated at either the meta or para position. This difference may simply represent an earlier stage of dechlorination that was not observed in the upper Hudson due to the length of the first sampling interval and greater rate of dechlorination.

The *in-situ* dechlorination process is generally consistent with the laboratory incubation studies conducted using Aroclor 1242 and other sediment coring programs in the Hudson River that conducted individual congener analyses. Comparison of the congener patterns from some of these studies to the *in-situ* patterns reveals some significant differences in the overall extent of dechlorination. However, the nature of the dechlorination, in terms of the actual changes in congener composition and the time course of dechlorination, appears to be entirely consistent.

An index consisting of the levels of terminal dechlorination products was used to evaluate the overall extent of dechlorination. Based on this index, the PCBs in the sediments of the upper Hudson appear to be between 30 and 90 percent dechlorinated, while the sediments of the tidal Hudson are only about 3 percent dechlorinated. The extent of *in-situ* dechlorination over long time periods (years to decades) could not be accurately predicted from PCB concentration and the length of the incubation period.

A large portion of the dechlorination in the upper Hudson sediments that were studied occurs within about a year after sediment deposition. In general, this would be

expected in areas where deposition rates are high (on the order of 1 cm/yr or greater) and sediments would experience anaerobic conditions within months of deposition. The initial rate constants for the in-situ dechlorination in the upper Hudson appear to approximate the average maximum rates determined for several laboratory studies. However, the remaining congeners are being dechlorinated at significantly slower rates over decades. The decrease in the rate of dechlorination is likely related to the decline in the easily dechlorinated congeners and the corresponding increase in the abundance of the more recalcitrant congeners.

Based on the sediment cores studied, it appears likely that the PCBs in the sediments of the Hudson River could eventually be dechlorinated to four terminal congeners (2-CBP, 2,2'-CBP, 2,6-CBP, and 2,2',6-CBP). Terminal dechlorination products comprised between 30 and 90 percent of the PCBs in the sediments studied. However, in lesser contaminated sediments, such as those of the tidal Hudson, where the initial dechlorination rate constants are significantly smaller and the overall PCB concentrations are much lower, total *in-situ* dechlorination to terminal congeners would not be expected to occur for centuries.

Future studies of *in-situ* dechlorination in the Hudson River should focus on locations with intermediate and lower total PCB concentrations such as Albany and New York Harbor, respectively. Dechlorination rates determined from such studies would further the understanding of the factors controlling the initial faster and slower secondary rate constants. These studies could also explain the concentration dependence of the rates and possibly provide more insight into the variables controlling the extent of dechlorination. *In-situ* dechlorination studies at locations such as New York Harbor would also provide valuable information on the dechlorination process in an estuarine environment. Such a study would be significant because ortho dechlorination was detected in a laboratory incubation study that used microorganisms from estuarine sediments.

CHAPTER FIVE

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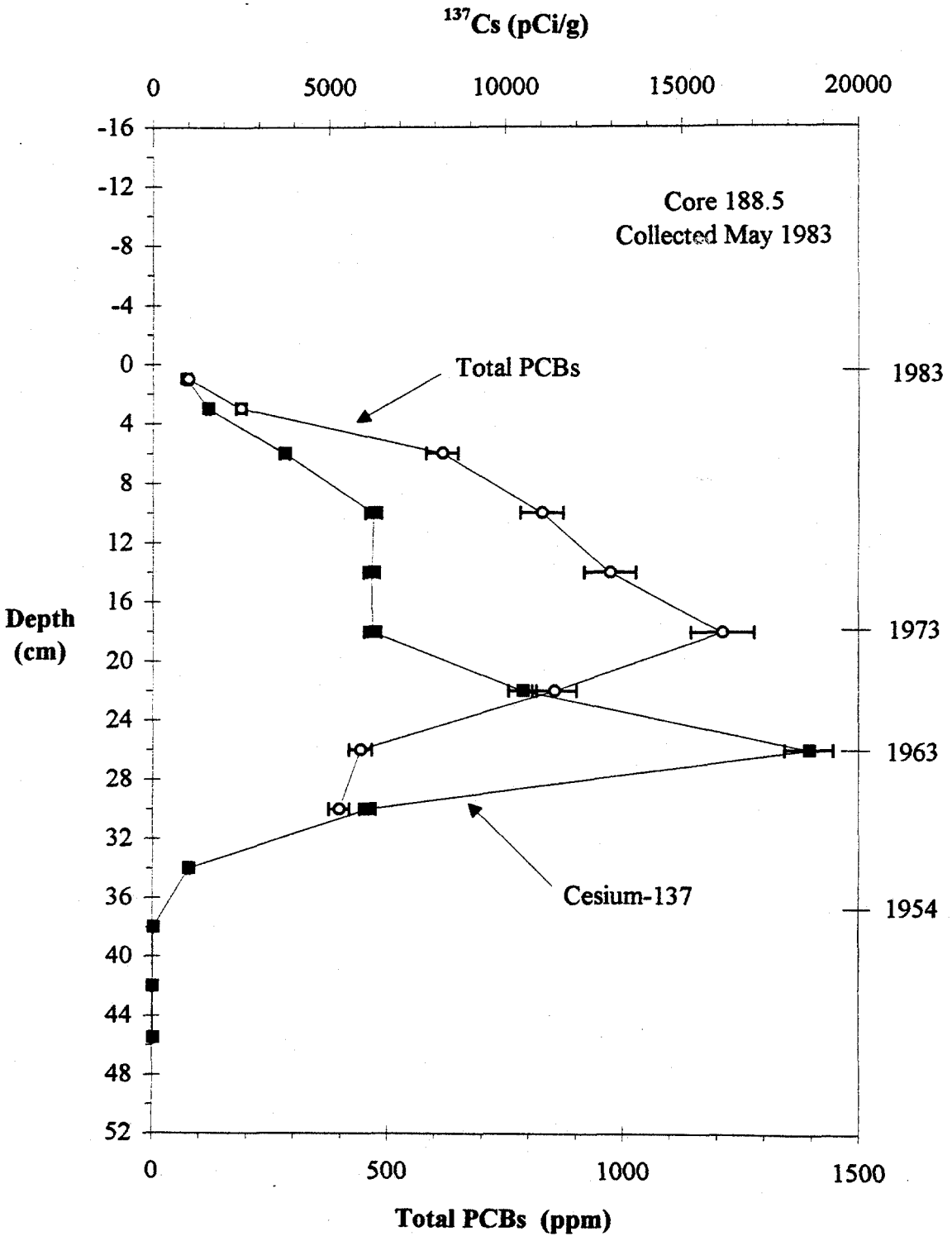
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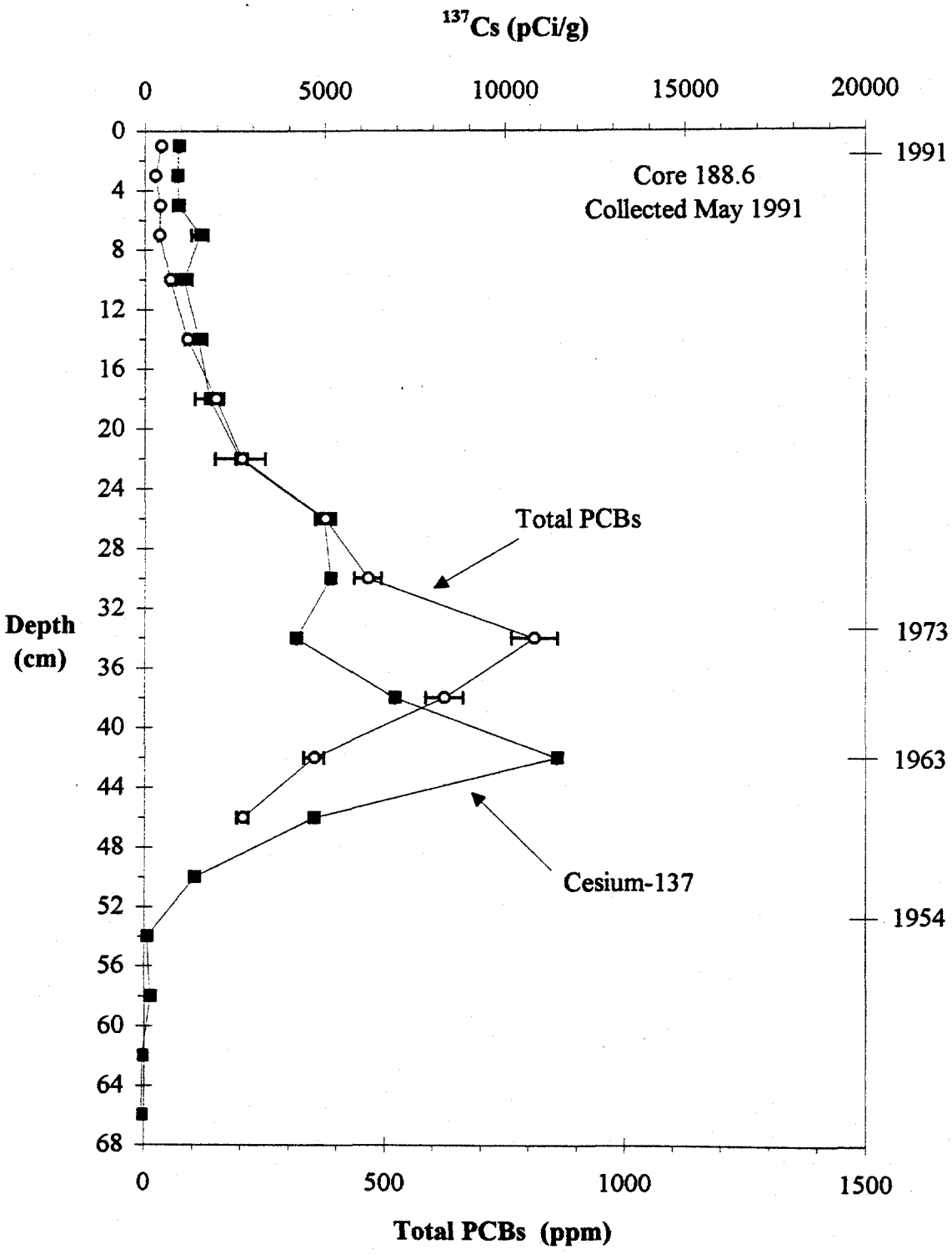
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APPENDIX A
SEDIMENT CORE DATA

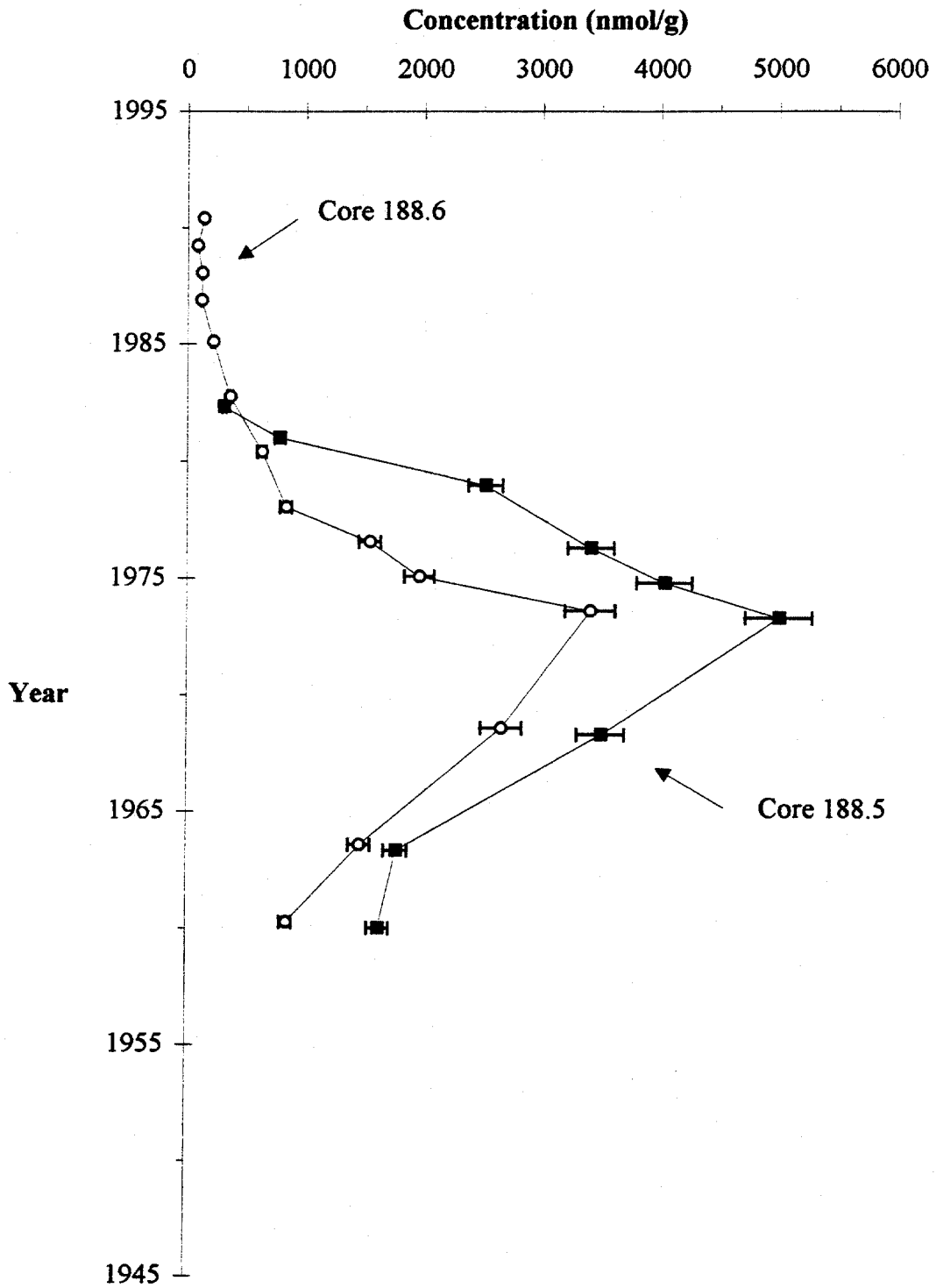
Cesium-137 Profile
Upper Hudson - Thompson Island Pool



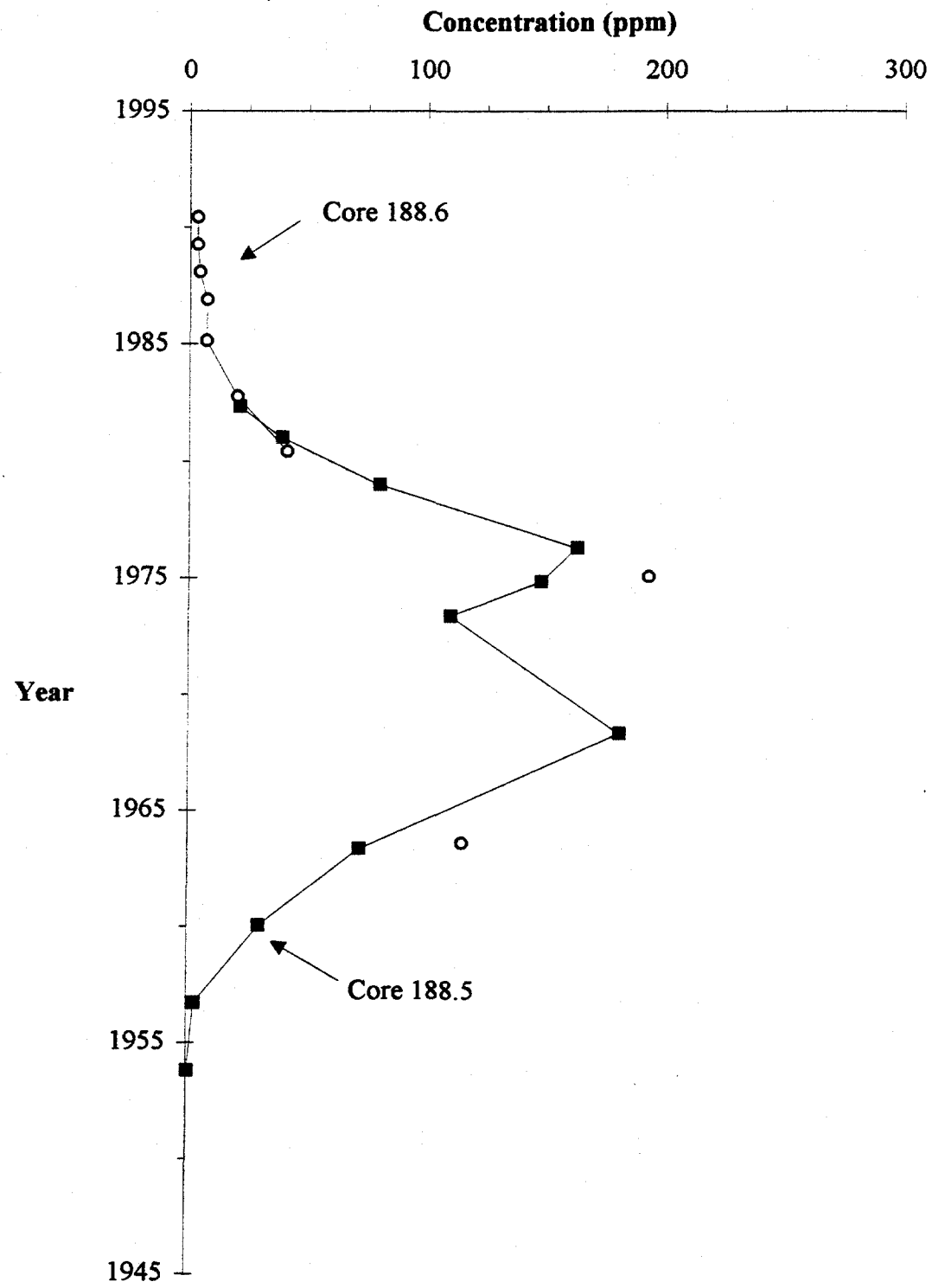
Cesium-137 Profile
Upper Hudson - Thompson Island Pool



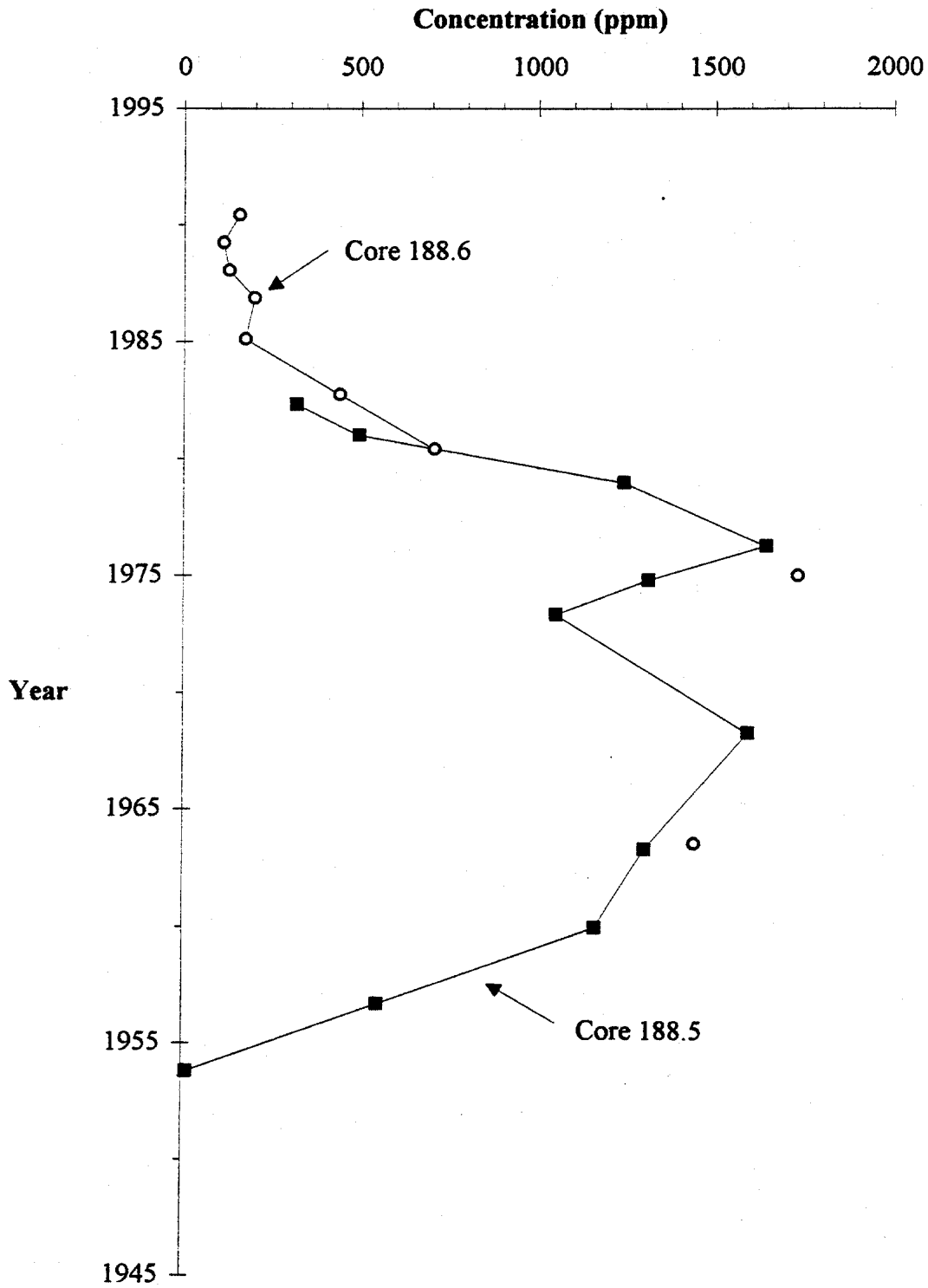
Total PCB Profile
Upper Hudson - Thompson Island Pool



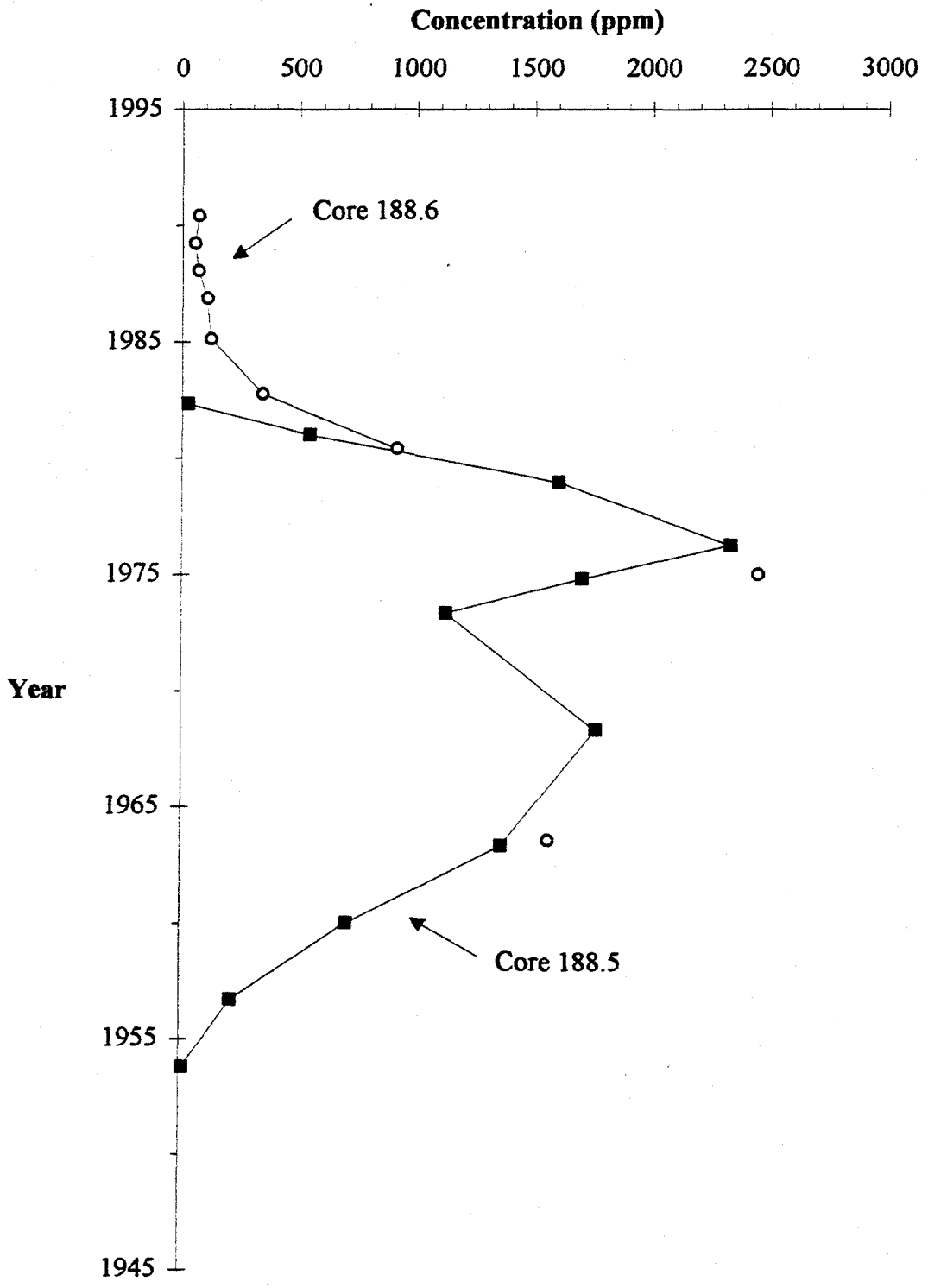
Cadmium Profile
Upper Hudson - Thompson Island Pool



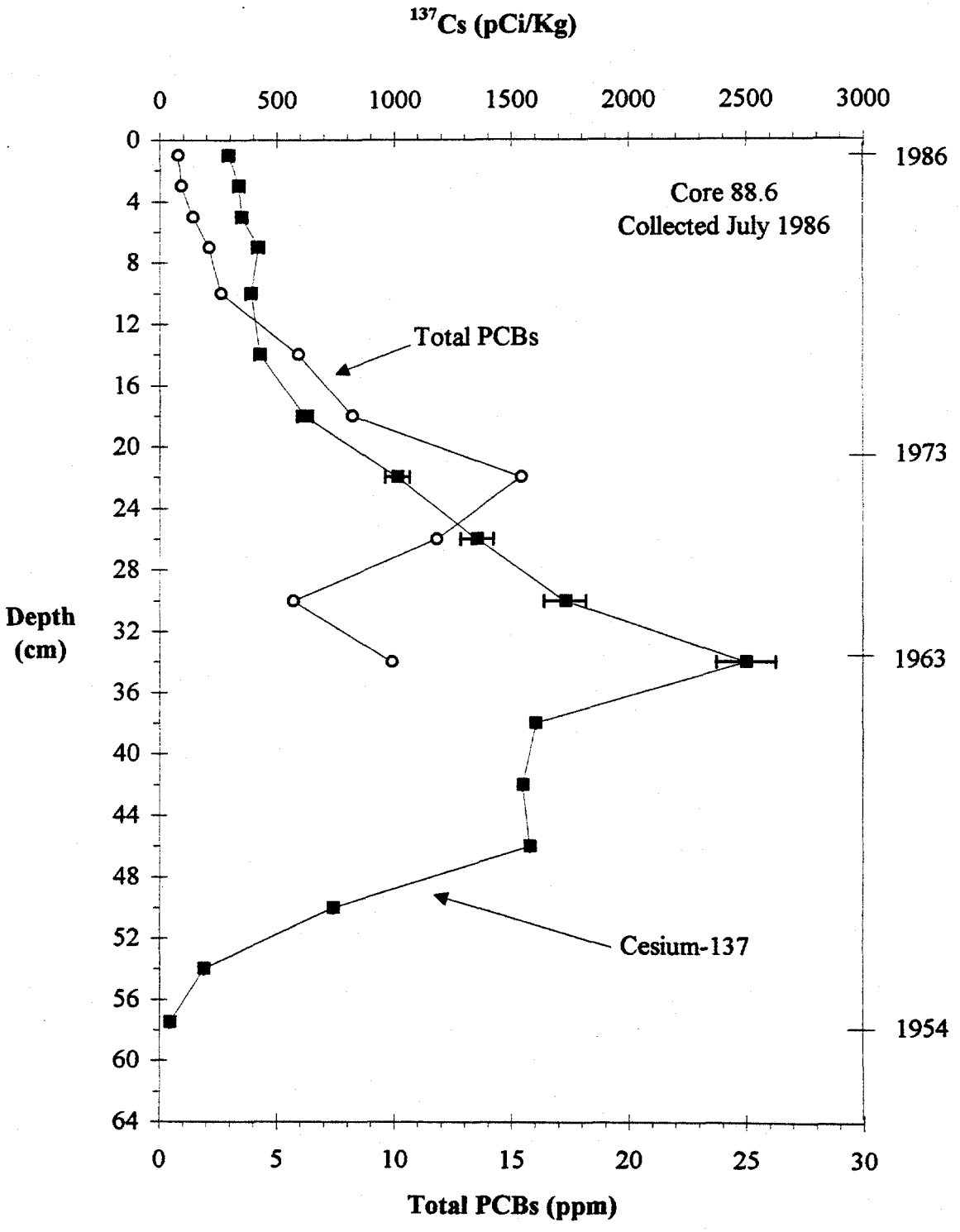
Chromium Profile
Upper Hudson - Thompson Island Pool



Lead Profile
Upper Hudson - Thompson Island Pool

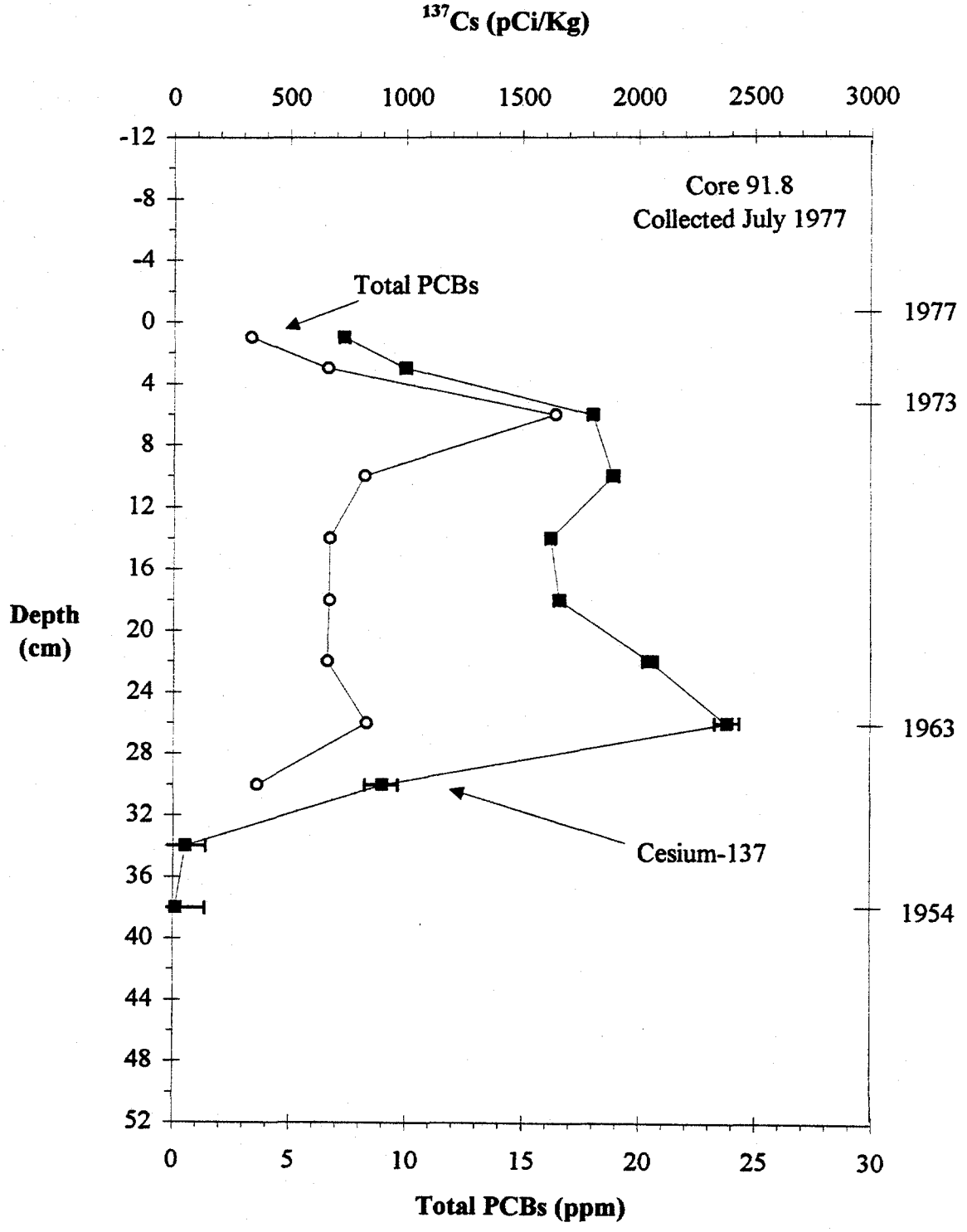


Cesium 137 Profile
Tidal Hudson - Kingston



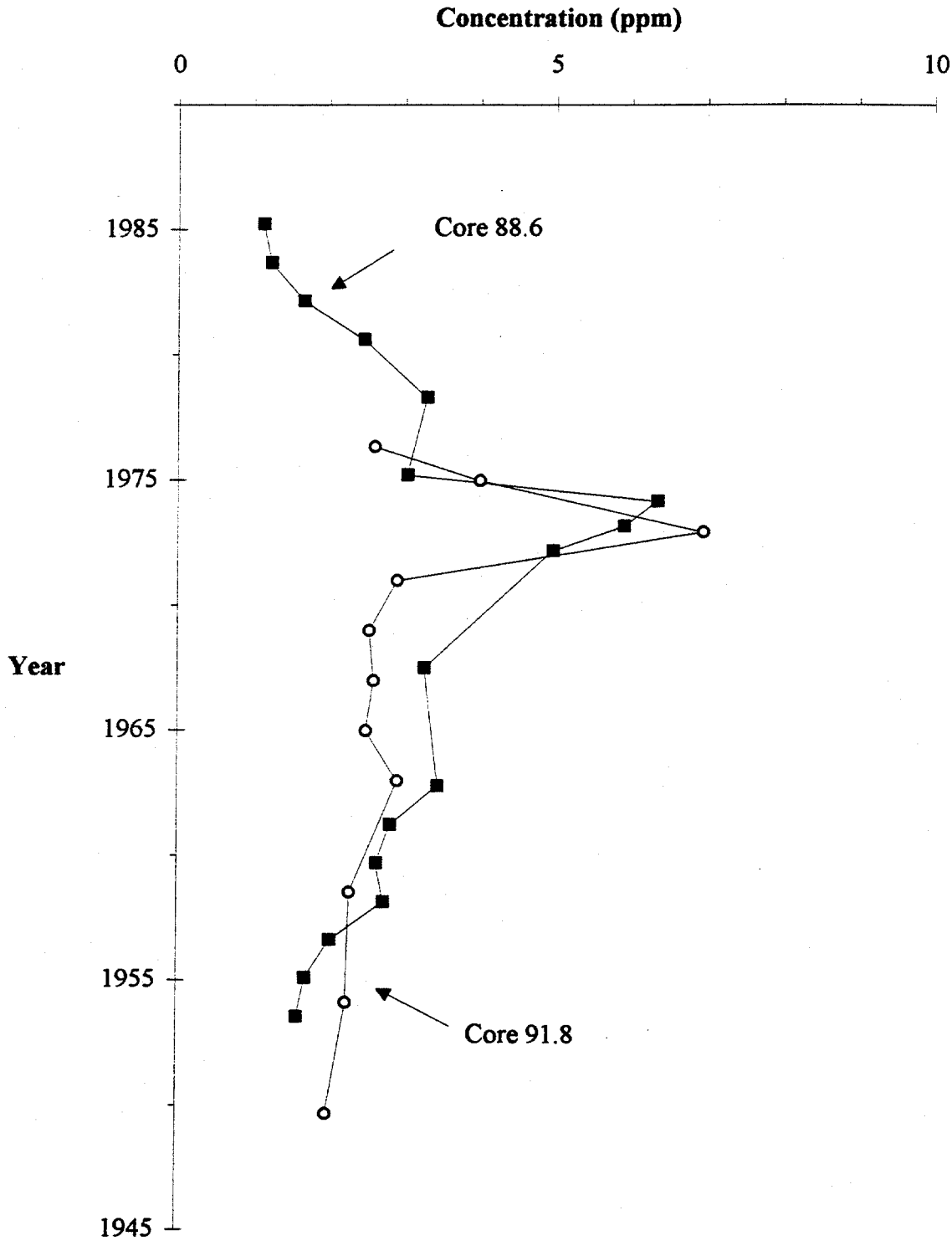
11.0307

Cesium 137 Profile
Tidal Hudson - Kingston



11.0308

Cadmium Profile
Tidal Hudson - Kingston



11.0309

APPENDIX B
PCB CONGENER DATA

PCB Congener Data

The PCB congener analysis was conducted by the New York State Department of Health Laboratory according to NYSDEC Method 91-11 modified for analysis of sediment. The results are listed by BZ number according to the system set up by Ballschmitter and Zell (1980). The congeners shown in bold face type are represented by 30 peaks characteristic of Aroclors 1242 and 1016 and dechlorination products. The underlined congeners are among the extras necessary to compute the mass balances.

In cases of non-detects, a value of zero was entered. In cases of interference, no value was entered. For the highly contaminated upper Hudson samples, non-detects were listed as less than 50 ng/g for congeners with more than one chlorine and less than 10 ng/g for the mono-chlorobiphenyls. For the tidal Hudson samples, non-detects were listed as less than 1ng/g for congeners with more than one chlorine and less than 5 ng/g for the mono-chlorobiphenyls. An error of 10 percent or 10 ng/g, whichever was greater, was assigned to the mono-chlorinated congeners and error of 5 percent or 5 ng/g, whichever was greater, was assigned to all congeners with more than one chlorine. These errors were propagated throughout all calculations.

Several surrogates, including TCX, HBB, and deca-chlorobiphenyl, were added to the sediment extracts as time references. In the case of deca-chlorobiphenyl, the values reported for each sample were assumed to reflect this addition and were zeroed. This is a valid assumption because deca-chlorobiphenyl is not a component of any of the Aroclor mixtures that originally contaminated the sediments, nor is it a dechlorination product.

Core 188.5

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				0-2 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	7200	720	12.32	1.251
mono	3	2	188.7	0	10	0.00	0.290
mono	4	3	188.7	980	98	1.68	0.170
di	2,2' / 2,6	4, 10	223.1	11200	560	16.21	0.860
di	2,4 / 2,5	7, 9	223.1	360	18	0.52	0.028
di	2,3'	6	223.1	3720	186	5.38	0.285
di	2,3 / 2,4'	5, 8	223.1	8700	435	12.59	0.668
di	3,5	14	223.1	0	5	0.00	0.123
tri	2,2',6	19	257.5	4470	223.5	5.60	0.297
di	3,4	12	223.1	410	20.5	0.59	0.031
tri	2,2',5	18	257.5	980	49	1.23	0.065
di, tri	4,4' / 2,2',4	15, 17	242.7	4150	207.5	5.52	0.293
tri	2,3,6 / 2,3',6	24, 27	257.5	4150	207.5	5.20	0.276
tri	2,2',3 / 2,4',6	16, 32	257.5	3700	185	4.64	0.246
tri	2,4,5	29	257.5	73	5	0.09	0.006
tri	2,3',5	26	257.5	2520	126	3.16	0.168
tri	2,3',4	25	257.5	1010	50.5	1.27	0.067
tri	2,4',5	31	257.5	4400	220	5.52	0.293
tri	2,4,4'	28	257.5	1340	67	1.68	0.089
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	1330	66.5	1.63	0.087
tetra	2,2',4,6'	51	292.0	510	25.5	0.56	0.030
tri	2,3,4'	22	257.5	560	28	0.70	0.037
tetra	2,2',3,6	45	292.0	510	25.5	0.56	0.030
tetra	2,2',3,6'	46	292.0	69	5	0.08	0.006
tri	3,4',5	39	257.5	0	5	0.00	0.106
tetra	2,2',5,5'	52	292.0	1570	78.5	1.74	0.092
tetra	2,2',4,5'	49	292.0	750	37.5	0.83	0.044
tetra	2,2',4,4'	47	292.0	1820	91	2.01	0.107
tetra	2,2',4,5	48	292.0	0	5	0.00	0.094
tetra	2,3,5,6	65	292.0	0	5	0.00	0.094
tetra	2,2',3,5'	44	292.0	280	14	0.31	0.016
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	1400	70	1.58	0.084
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	1310	65.5	1.45	0.077
tetra	2,2',3,3'	40	292.0	105	5.25	0.12	0.006
tetra	2,3',4,5	67	292.0	45	5	0.05	0.006
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.091
tetra	2,4,4',5	74	292.0	300	15	0.33	0.018
tetra	2,3',4',5	70	292.0	230	11.5	0.25	0.013
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	750	37.5	0.77	0.041
penta	2,2',3,4',6	91	326.4	300	15	0.30	0.016
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	160	8	0.18	0.009
penta	2,2',3,5,5'	92	326.4	290	14.5	0.29	0.015
penta	2,2',3,3',6	84	326.4	210	10.5	0.21	0.011
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	250	12.5	0.25	0.013
penta	2,2',4,4',5	99	326.4	180	9	0.18	0.009
penta	2,3',4,4',6	119	326.4	29	5	0.03	0.005
penta	2,2',3,3',5	83	326.4	59	5	0.06	0.005
penta	2,2',3',4,5	97	326.4	64	5	0.06	0.005
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	140	7	0.14	0.007

11.0313

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				0-2 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	69	5	0.07	0.005
hexa	2,2',3,3',6,6'	136	360.9	46	5	0.04	0.005
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	670	33.5	0.68	0.036
penta	2,2',3,3',4	82	326.4	33	5	0.03	0.005
hexa	2,2',3,5,5',6	151	360.9	76	5	0.07	0.005
hexa	2,2',3,3',5,6'	135	360.9	55	5	0.05	0.005
penta	2,3,3',4',5	107	326.4	24	5	0.02	0.005
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	170	8.5	0.16	0.009
penta	**2,3',4,4',5**	118	326.4	180	9	0.18	0.009
hexa	2,2',3,3',5,6	134	360.9	24	5	0.02	0.004
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.084
hexa	2,2',3,4',5,5'	146	360.9	38	5	0.03	0.005
hexa	2,2',4,4',5,5'	153	360.9	94	5	0.08	0.005
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	150	7.5	0.14	0.007
hexa	2,2',3,4,5,5'	141	360.9	17	5	0.02	0.004
hepta	2,2',3,3',5,6,6'	179	395.3	23	5	0.02	0.004
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.076
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	16	5	0.01	0.004
hexa	2,2',3,4,4',5'	138	360.9	200	10	0.18	0.009
hexa	2,3,3',4,4',6	158	360.9	19	5	0.02	0.004
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.076
hepta	2,2',3,3',5,5',6	178	395.3	24	5	0.02	0.004
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.070
hepta	2,2',3,4',5,5,6	187	395.3	54	5	0.04	0.004
hepta	2,2',3,4,4',5',6	183	395.3	17	5	0.01	0.004
hexa	2,2',3,3',4,4'	128	360.9	26	5	0.02	0.004
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.076
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.069
hepta	2,2',3,3',4,5,6'	174	395.3	24	5	0.02	0.004
hepta	2,2',3,3',4',5,6	177	395.3	25	5	0.02	0.004
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	0	5	0.00	0.068
hexa	2,3,3',4,4',5	156	360.9	0	5	0.00	0.076
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.070
hepta	2,2',3,3',4,5,5'	172	395.3	0	5	0.00	0.069
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.064
hepta	2,2',3,4,4',5,5'	180	395.3	48	5	0.04	0.004
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.069
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.069
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.064
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	67	5	0.05	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	18	5	0.01	0.004
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	21	5	0.02	0.004
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.069
octa	2,2',3,3',4,4',5,6	195	429.8	0	5	0.00	0.064
octa	2,2',3,3',4,4',5,5'	194	429.8	22	5	0.02	0.004
nona	2,2',3,3',4,4',5,5',6	206	464.2	14	5	0.01	0.003
deca	deca	209	498.7	0	5	0.00	0.055
				74848	4364.75	100.00	8.05

11.0314

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				2-4 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	21200	2120	14.39	1.464
mono	3	2	188.7	0	10	0.00	0.115
mono	4	3	188.7	4240	424	2.88	0.293
di	2,2' / 2,6	4, 10	223.1	26800	1340	15.38	0.823
di	2,4 / 2,5	7, 9	223.1	1160	58	0.67	0.036
di	2,3'	6	223.1	10100	505	5.80	0.310
di	2,3 / 2,4'	5, 8	223.1	21700	1085	12.45	0.666
di	3,5	14	223.1	0	5	0.00	0.049
tri	2,2',6	19	257.5	11300	565	5.62	0.300
di	3,4	12	223.1	1210	60.5	0.69	0.037
tri	2,2',5	18	257.5	1760	88	0.87	0.047
di, tri	4,4' / 2,2',4	15, 17	242.7	9100	455	4.80	0.257
tri	2,3,6 / 2,3',6	24, 27	257.5	11900	595	5.92	0.316
tri	2,2',3 / 2,4',6	16, 32	257.5	7900	395	3.93	0.210
tri	2,4,5	29	257.5	210	10.5	0.10	0.006
tri	2,3',5	26	257.5	6600	330	3.28	0.175
tri	2,3',4	25	257.5	2700	135	1.34	0.072
tri	2,4',5	31	257.5	9100	455	4.52	0.242
tri	2,4,4'	28	257.5	2300	115	1.14	0.061
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	2300	115	1.12	0.060
tetra	2,2',4,6'	51	292.0	1130	56.5	0.50	0.026
tri	2,3,4'	22	257.5	1150	57.5	0.57	0.031
tetra	2,2',3,6	45	292.0	1100	55	0.48	0.026
tetra	2,2',3,6'	46	292.0	129	6.45	0.06	0.003
tri	3,4',5	39	257.5	100	5	0.05	0.003
tetra	2,2',5,5'	52	292.0	3250	162.5	1.42	0.076
tetra	2,2',4,5'	49	292.0	3900	195	1.71	0.091
tetra	2,2',4,4'	47	292.0	3800	190	1.67	0.089
tetra	2,2',4,5	48	292.0	0	5	0.00	0.037
tetra	2,3,5,6	65	292.0	160	8	0.07	0.004
tetra	2,2',3,5'	44	292.0	570	28.5	0.25	0.013
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	2740	137	1.23	0.066
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	2430	121.5	1.07	0.057
tetra	2,2',3,3'	40	292.0	189	9.45	0.08	0.004
tetra	2,3',4,5	67	292.0	125	6.25	0.05	0.003
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	1160	58	0.50	0.026
tetra	2,4,4',5	74	292.0	740	37	0.32	0.017
tetra	2,3',4',5	70	292.0	580	29	0.25	0.014
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	1780	89	0.73	0.039
penta	2,2',3,4',6	91	326.4	760	38	0.30	0.016
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	440	22	0.19	0.010
penta	2,2',3,5,5'	92	326.4	830	41.5	0.33	0.017
penta	2,2',3,3',6	84	326.4	540	27	0.21	0.011
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	700	35	0.27	0.015
penta	2,2',4,4',5	99	326.4	500	25	0.20	0.010
penta	2,3',4,4',6	119	326.4	80	5	0.03	0.002
penta	2,2',3,3',5	83	326.4	180	9	0.07	0.004
penta	2,2',3',4,5	97	326.4	210	10.5	0.08	0.004
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	260	13	0.10	0.005

11.0315

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				2-4 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	210	10.5	0.08	0.004
hexa	2,2',3,3',6,6'	136	360.9	140	7	0.05	0.003
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	1600	80	0.64	0.034
penta	2,2',3,3',4	82	326.4	100	5	0.04	0.002
hexa	2,2',3,5,5',6	151	360.9	230	11.5	0.08	0.004
hexa	2,2',3,3',5,6'	135	360.9	160	8	0.06	0.003
penta	2,3,3',4',5	107	326.4	78	5	0.03	0.002
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	450	22.5	0.17	0.009
penta	**2,3',4,4',5**	118	326.4	530	26.5	0.21	0.011
hexa	2,2',3,3',5,6	134	360.9	71	5	0.03	0.002
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.033
hexa	2,2',3,4',5,5'	146	360.9	99	5	0.04	0.002
hexa	2,2',4,4',5,5'	153	360.9	240	12	0.09	0.005
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	460	23	0.17	0.009
hexa	2,2',3,4,5,5'	141	360.9	47	5	0.02	0.002
hepta	2,2',3,3',5,6,6'	179	395.3	76	5	0.02	0.002
hexa	2,2',3,4,4',5	137	360.9	28	5	0.01	0.002
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	50	5	0.02	0.002
hexa	2,2',3,4,4',5'	138	360.9	470	23.5	0.17	0.009
hexa	2,3,3',4,4',6	158	360.9	50	5	0.02	0.002
hexa	2,2',3,3',4,5	129	360.9	17	5	0.01	0.002
hepta	2,2',3,3',5,5',6	178	395.3	52	5	0.02	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.028
hepta	2,2',3,4',5,5,6	187	395.3	160	8	0.05	0.003
hepta	2,2',3,4,4',5',6	183	395.3	50	5	0.02	0.002
hexa	2,2',3,3',4,4'	128	360.9	77	5	0.03	0.002
hexa	2,3',4,4',5,5'	167	360.9	16	5	0.01	0.002
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.027
hepta	2,2',3,3',4,5,6'	174	395.3	69	5	0.02	0.002
hepta	2,2',3,3',4',5,6	177	395.3	70	5	0.02	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	44	5	0.01	0.002
hexa	2,3,3',4,4',5	156	360.9	32	5	0.01	0.002
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	35	5	0.01	0.002
hepta	2,2',3,3',4,5,5'	172	395.3	14	5	0.00	0.002
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.025
hepta	2,2',3,4,4',5,5'	180	395.3	130	6.5	0.04	0.002
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.027
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.027
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.025
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	190	9.5	0.06	0.003
octa	2,2',3,3',4,5,5',6'	201	429.8	56	5	0.02	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	61	5	0.02	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.027
octa	2,2',3,3',4,4',5,6	195	429.8	26	5	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	46	5	0.01	0.002
nona	2,2',3,3',4,4',5,5',6	206	464.2	36	5	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.022
				187383	10767.15	100.00	6.64

11.0316

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
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				4-8 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	54300	5430	11.42	1.157
mono	3	2	188.7	0	10	0.00	0.037
mono	4	3	188.7	13100	1310	2.75	0.279
di	2,2' / 2,6	4, 10	223.1	57600	2880	10.24	0.540
di	2,4 / 2,5	7, 9	223.1	2520	126	0.45	0.024
di	2,3'	6	223.1	46100	2305	8.20	0.432
di	2,3 / 2,4'	5, 8	223.1	81900	4095	14.56	0.767
di	3,5	14	223.1	0	5	0.00	0.016
tri	2,2',6	19	257.5	26000	1300	4.00	0.211
di	3,4	12	223.1	3590	179.5	0.64	0.034
tri	2,2',5	18	257.5	6430	321.5	0.99	0.052
di, tri	4,4' / 2,2',4	15, 17	242.7	33300	1665	5.44	0.287
tri	2,3,6 / 2,3',6	24, 27	257.5	33700	1685	5.19	0.273
tri	2,2',3 / 2,4',6	16, 32	257.5	30400	1520	4.68	0.247
tri	2,4,5	29	257.5	500	25	0.08	0.004
tri	2,3',5	26	257.5	25200	1260	3.88	0.204
tri	2,3',4	25	257.5	9870	493.5	1.52	0.080
tri	2,4',5	31	257.5	35500	1775	5.47	0.288
tri	2,4,4'	28	257.5	0	5	0.00	0.013
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	9860	493	1.49	0.078
tetra	2,2',4,6'	51	292.0	4080	204	0.55	0.029
tri	2,3,4'	22	257.5	4860	243	0.75	0.039
tetra	2,2',3,6	45	292.0	4670	233.5	0.63	0.033
tetra	2,2',3,6'	46	292.0	840	42	0.11	0.006
tri	3,4',5	39	257.5	520	26	0.08	0.004
tetra	2,2',5,5'	52	292.0	12500	625	1.70	0.089
tetra	2,2',4,5'	49	292.0	17500	875	2.38	0.125
tetra	2,2',4,4'	47	292.0	14400	720	1.96	0.103
tetra	2,2',4,5	48	292.0	0	5	0.00	0.012
tetra	2,3,5,6	65	292.0	350	17.5	0.05	0.003
tetra	2,2',3,5'	44	292.0	1630	81.5	0.22	0.012
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	10600	530	1.47	0.078
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	14500	725	1.97	0.104
tetra	2,2',3,3'	40	292.0	480	24	0.07	0.003
tetra	2,3',4,5	67	292.0	510	25.5	0.07	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	5750	287.5	0.76	0.040
tetra	2,4,4',5	74	292.0	1410	70.5	0.19	0.010
tetra	2,3',4',5	70	292.0	730	36.5	0.10	0.005
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	6400	320	0.81	0.043
penta	2,2',3,4',6	91	326.4	3680	184	0.45	0.024
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	500	25	0.07	0.004
penta	2,2',3,5,5'	92	326.4	3480	174	0.42	0.022
penta	2,2',3,3',6	84	326.4	2860	143	0.35	0.018
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	2900	145	0.35	0.019
penta	2,2',4,4',5	99	326.4	2200	110	0.27	0.014
penta	2,3',4,4',6	119	326.4	470	23.5	0.06	0.003
penta	2,2',3,3',5	83	326.4	1080	54	0.13	0.007
penta	2,2',3',4,5	97	326.4	610	30.5	0.07	0.004
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.011

11.0317

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				4-8 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	540	27	0.07	0.003
hexa	2,2',3,3',6,6'	136	360.9	660	33	0.07	0.004
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	7130	356.5	0.89	0.047
penta	2,2',3,3',4	82	326.4	200	10	0.02	0.001
hexa	2,2',3,5,5',6	151	360.9	860	43	0.09	0.005
hexa	2,2',3,3',5,6'	135	360.9	670	33.5	0.07	0.004
penta	2,3,3',4',5	107	326.4	660	33	0.08	0.004
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	1890	94.5	0.22	0.012
penta	2,3',4,4',5	118	326.4	1700	85	0.21	0.011
hexa	2,2',3,3',5,6	134	360.9	390	19.5	0.04	0.002
penta	2',3,3',4,5	122	326.4	46	5	0.01	0.001
hexa	2,2',3,4',5,5'	146	360.9	510	25.5	0.06	0.003
hexa	2,2',4,4',5,5'	153	360.9	1140	57	0.13	0.007
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	2670	133.5	0.30	0.016
hexa	2,2',3,4,5,5'	141	360.9	130	6.5	0.01	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	260	13	0.03	0.001
hexa	2,2',3,4,4',5	137	360.9	91	5	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	240	12	0.02	0.001
hexa	2,2',3,4,4',5'	138	360.9	1690	84.5	0.19	0.010
hexa	2,3,3',4,4',6	158	360.9	140	7	0.02	0.001
hexa	2,2',3,3',4,5	129	360.9	57	5	0.01	0.001
hepta	2,2',3,3',5,5',6	178	395.3	170	8.5	0.02	0.001
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	29	5	0.00	0.001
hepta	2,2',3,4',5,5,6	187	395.3	530	26.5	0.05	0.003
hepta	2,2',3,4,4',5',6	183	395.3	160	8	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	300	15	0.03	0.002
hexa	2,3',4,4',5,5'	167	360.9	80	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	34	5	0.00	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	260	13	0.03	0.001
hepta	2,2',3,3',4',5,6	177	395.3	270	13.5	0.03	0.001
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	160	8	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	120	6	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	140	7	0.01	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	52	5	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.008
hepta	2,2',3,4,4',5,5'	180	395.3	460	23	0.05	0.002
hepta	2,3,3',4',5,5',6	193	395.3	39	5	0.00	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.009
octa	2,2',3,3',4,5,6,6'	199	429.8	24	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	670	33.5	0.07	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	200	10	0.02	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	220	11	0.02	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	16	5	0.00	0.001
octa	2,2',3,3',4,4',5,6	195	429.8	91	5	0.01	0.000
octa	2,2',3,3',4,4',5,5'	194	429.8	160	8	0.01	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	140	7	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.007

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				8-12 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	74700	7470	11.60	1.177
mono	3	2	188.7	0	10	0.00	0.027
mono	4	3	188.7	21500	2150	3.34	0.339
di	2,2' / 2,6	4, 10	223.1	84700	4235	11.12	0.588
di	2,4 / 2,5	7, 9	223.1	4330	216.5	0.57	0.030
di	2,3'	6	223.1	63400	3170	8.33	0.440
di	2,3 / 2,4'	5, 8	223.1	121000	6050	15.89	0.840
di	3,5	14	223.1	190	9.5	0.02	0.001
tri	2,2',6	19	257.5	35400	1770	4.03	0.213
di	3,4	12	223.1	2980	149	0.39	0.021
tri	2,2',5	18	257.5	14700	735	1.67	0.088
di, tri	4,4' / 2,2',4	15, 17	242.7	35800	1790	4.32	0.228
tri	2,3,6 / 2,3',6	24, 27	257.5	50700	2535	5.77	0.305
tri	2,2',3 / 2,4',6	16, 32	257.5	45300	2265	5.15	0.272
tri	2,4,5	29	257.5	930	46.5	0.11	0.006
tri	2,3',5	26	257.5	29100	1455	3.31	0.175
tri	2,3',4	25	257.5	7200	360	0.82	0.043
tri	2,4',5	31	257.5	36400	1820	4.14	0.219
tri	2,4,4'	28	257.5	0	5	0.00	0.010
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20.33,53	263.1	17600	880	1.96	0.104
tetra	2,2',4,6'	51	292.0	6000	300	0.60	0.032
tri	2,3,4'	22	257.5	4050	202.5	0.46	0.024
tetra	2,2',3,6	45	292.0	5070	253.5	0.51	0.027
tetra	2,2',3,6'	46	292.0	1280	64	0.13	0.007
tri	3,4',5	39	257.5	840	42	0.10	0.005
tetra	2,2',5,5'	52	292.0	18200	910	1.83	0.097
tetra	2,2',4,5'	49	292.0	24400	1220	2.45	0.129
tetra	2,2',4,4'	47	292.0	17300	865	1.74	0.092
tetra	2,2',4,5	48	292.0	0	5	0.00	0.009
tetra	2,3,5,6	65	292.0	440	22	0.04	0.002
tetra	2,2',3,5'	44	292.0	2330	116.5	0.23	0.012
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	12400	620	1.27	0.067
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	15700	785	1.58	0.083
tetra	2,2',3,3'	40	292.0	660	33	0.07	0.004
tetra	2,3',4,5	67	292.0	690	34.5	0.07	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	8770	438.5	0.86	0.045
tetra	2,4,4',5	74	292.0	1680	84	0.17	0.009
tetra	2,3',4',5	70	292.0	790	39.5	0.08	0.004
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	8040	402	0.75	0.040
penta	2,2',3,4',6	91	326.4	4240	212	0.38	0.020
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	510	25.5	0.05	0.003
penta	2,2',3,5,5'	92	326.4	4740	237	0.43	0.022
penta	2,2',3,3',6	84	326.4	3440	172	0.31	0.016
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	3970	198.5	0.36	0.019
penta	2,2',4,4',5	99	326.4	2920	146	0.26	0.014
penta	2,3',4,4',6	119	326.4	610	30.5	0.05	0.003
penta	2,2',3,3',5	83	326.4	1770	88.5	0.16	0.008
penta	2,2',3',4,5	97	326.4	960	48	0.09	0.005
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.008

11.0319

Hudson River Core Data
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				8-12 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	770	38.5	0.07	0.004
hexa	2,2',3,3',6,6'	136	360.9	840	42	0.07	0.004
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	6880	344	0.63	0.033
penta	2,2',3,3',4	82	326.4	290	14.5	0.03	0.001
hexa	2,2',3,5,5',6	151	360.9	1350	67.5	0.11	0.006
hexa	2,2',3,3',5,6'	135	360.9	990	49.5	0.08	0.004
penta	2,3,3',4',5	107	326.4	920	46	0.08	0.004
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	2330	116.5	0.20	0.011
penta	**2,3',4,4',5**	118	326.4	2130	106.5	0.19	0.010
hexa	2,2',3,3',5,6	134	360.9	590	29.5	0.05	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.008
hexa	2,2',3,4',5,5'	146	360.9	800	40	0.06	0.003
hexa	2,2',4,4',5,5'	153	360.9	1550	77.5	0.13	0.007
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.007
hexa	2,2',3,4,5,5'	141	360.9	150	7.5	0.01	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	470	23.5	0.03	0.002
hexa	2,2',3,4,4',5	137	360.9	110	5.5	0.01	0.000
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	370	18.5	0.03	0.002
hexa	2,2',3,4,4',5'	158	360.9	2190	109.5	0.18	0.009
hexa	2,3,3',4,4',6	158	360.9	170	8.5	0.01	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.007
hepta	2,2',3,3',5,5',6	178	395.3	410	20.5	0.03	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	58	5	0.00	0.000
hepta	2,2',3,4',5,5,6	187	395.3	910	45.5	0.07	0.004
hepta	2,2',3,4,4',5',6	183	395.3	240	12	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	360	18	0.03	0.002
hexa	2,3',4,4',5,5'	167	360.9	92	5	0.01	0.000
hepta	2,2',3,4,5,5',6	185	395.3	49	5	0.00	0.000
hepta	2,2',3,3',4,5,6'	174	395.3	400	20	0.03	0.002
hepta	2,2',3,3',4',5,6	177	395.3	430	21.5	0.03	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	260	13	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	120	6	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	190	9.5	0.01	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	88	5	0.01	0.000
octa	2,2',3,3',4,4',6,6'	197	429.8	15	5	0.00	0.000
hepta	2,2',3,4,4',5,5'	180	395.3	660	33	0.05	0.003
hepta	2,3,3',4',5,5',6	193	395.3	68	5	0.01	0.000
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.006
octa	2,2',3,3',4,5,6,6'	199	429.8	41	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	900	45	0.07	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	330	16.5	0.02	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	330	16.5	0.02	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	20	5	0.00	0.000
octa	2,2',3,3',4,4',5,6	195	429.8	150	7.5	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	250	12.5	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	210	10.5	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.005
				827211	46239	100.00	6.10

11.0320

Hudson River Core Data
Milepoint 188.5
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				12-16 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	92200	9220	12.11	1.230
mono	3	2	188.7	0	10	0.00	0.023
mono	**4**	3	188.7	26100	2610	3.43	0.348
di	**2,2' / 2,6**	4, 10	223.1	103000	5150	11.44	0.607
di	**2,4 / 2,5**	7, 9	223.1	5270	264	0.59	0.031
di	**2,3'**	6	223.1	74600	3730	8.29	0.439
di	**2,3 / 2,4'**	5, 8	223.1	145000	7250	16.11	0.854
di	3,5	14	223.1	230	12	0.03	0.001
tri	**2,2',6**	19	257.5	42000	2100	4.04	0.214
di	3,4	12	223.1	3300	165	0.37	0.019
tri	**2,2',5**	18	257.5	18100	905	1.74	0.092
di, tri	**4,4' / 2,2',4**	15, 17	242.7	42600	2130	4.35	0.231
tri	**2,3,6 / 2,3',6**	24, 27	257.5	60200	3010	5.79	0.307
tri	**2,2',3 / 2,4',6**	16, 32	257.5	54100	2705	5.21	0.276
tri	2,4,5	29	257.5	1110	56	0.11	0.006
tri	**2,3',5**	26	257.5	33000	1650	3.18	0.168
tri	**2,3',4**	25	257.5	7610	381	0.73	0.039
tri	**2,4',5**	31	257.5	40800	2040	3.93	0.208
tri	**2,4,4'**	28	257.5	0	5	0.00	0.008
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	21000	1050	1.98	0.105
tetra	2,2',4,6'	51	292.0	7230	362	0.61	0.033
tri	**2,3,4'**	22	257.5	4280	214	0.41	0.022
tetra	2,2',3,6	45	292.0	5560	278	0.47	0.025
tetra	2,2',3,6'	46	292.0	1430	72	0.12	0.006
tri	3,4',5	39	257.5	980	49	0.09	0.005
tetra	**2,2',5,5'**	52	292.0	20900	1045	1.77	0.094
tetra	**2,2',4,5'**	49	292.0	28300	1415	2.40	0.127
tetra	**2,2',4,4'**	47	292.0	19900	995	1.69	0.090
tetra	2,2',4,5	48	292.0	0	5	0.00	0.007
tetra	2,3,5,6	65	292.0	510	26	0.04	0.002
tetra	**2,2',3,5'**	44	292.0	2570	129	0.22	0.012
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	13600	680	1.18	0.063
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	15400	770	1.31	0.069
tetra	2,2',3,3'	40	292.0	730	37	0.06	0.003
tetra	2,3',4,5	67	292.0	770	39	0.07	0.003
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	10300	515	0.85	0.045
tetra	**2,4,4',5**	74	292.0	1950	98	0.17	0.009
tetra	**2,3',4',5**	70	292.0	970	49	0.08	0.004
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	9040	452	0.71	0.038
penta	2,2',3,4',6	91	326.4	4740	237	0.36	0.019
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	630	32	0.05	0.003
penta	2,2',3,5,5'	92	326.4	5380	269	0.41	0.022
penta	2,2',3,3',6	84	326.4	3790	190	0.29	0.015
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	4510	226	0.34	0.018
penta	2,2',4,4',5	99	326.4	3270	164	0.25	0.013
penta	2,3',4,4',6	119	326.4	680	34	0.05	0.003
penta	2,2',3,3',5	83	326.4	2000	100	0.15	0.008
penta	2,2',3',4,5	97	326.4	1070	54	0.08	0.004
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.007

11.0321

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				12-16 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	890	45	0.07	0.004
hexa	2,2',3,3',6,6'	136	360.9	940	47	0.06	0.003
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	7340	367	0.57	0.030
penta	2,2',3,3',4	82	326.4	340	17	0.03	0.001
hexa	2,2',3,5,5',6	151	360.9	1550	78	0.11	0.006
hexa	2,2',3,3',5,6'	135	360.9	1120	56	0.08	0.004
penta	2,3,3',4',5	107	326.4	1050	53	0.08	0.004
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	2600	130	0.19	0.010
penta	**2,3',4,4',5**	118	326.4	2430	122	0.18	0.010
hexa	2,2',3,3',5,6	134	360.9	670	34	0.05	0.002
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.007
hexa	2,2',3,4',5,5'	146	360.9	900	45	0.06	0.003
hexa	2,2',4,4',5,5'	153	360.9	1740	87	0.12	0.006
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.006
hexa	2,2',3,4,5,5'	141	360.9	190	10	0.01	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	540	27	0.03	0.002
hexa	2,2',3,4,4',5	137	360.9	130	7	0.01	0.000
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	420	21	0.03	0.001
hexa	2,2',3,4,4',5'	138	360.9	2510	126	0.17	0.009
hexa	2,3,3',4,4',6	158	360.9	200	10	0.01	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.006
hepta	2,2',3,3',5,5',6	178	395.3	480	24	0.03	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	68	5	0.00	0.000
hepta	2,2',3,4',5,5,6	187	395.3	1040	52	0.07	0.003
hepta	2,2',3,4,4',5',6	183	395.3	280	14	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	410	21	0.03	0.001
hexa	2,3',4,4',5,5'	167	360.9	110	6	0.01	0.000
hepta	2,2',3,4,5,5',6	185	395.3	57	5	0.00	0.000
hepta	2,2',3,3',4,5,6'	174	395.3	460	23	0.03	0.002
hepta	2,2',3,3',4',5,6	177	395.3	500	25	0.03	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	300	15	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	140	7	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	220	11	0.01	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	100	5	0.01	0.000
octa	2,2',3,3',4,4',6,6'	197	429.8	17	5	0.00	0.000
hepta	2,2',3,4,4',5,5'	180	395.3	770	39	0.05	0.003
hepta	2,3,3',4',5,5',6	193	395.3	79	5	0.00	0.000
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.005
octa	2,2',3,3',4,5,6,6'	199	429.8	47	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	1040	52	0.07	0.003
octa	2,2',3,3',4,5,5',6'	201	429.8	380	19	0.02	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	380	19	0.02	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	24	5	0.00	0.000
octa	2,2',3,3',4,4',5,6	195	429.8	170	9	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	300	15	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	230	12	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.004
				973872	54674	100.00	6.13

11.0322

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				16-20 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	94000	9400	9.97	1.011
mono	3	2	188.7	950	95	0.10	0.010
mono	**4**	3	188.7	28900	2890	3.07	0.311
di	**2,2' / 2,6**	4, 10	223.1	118000	5900	10.58	0.557
di	**2,4 / 2,5**	7, 9	223.1	4350	218	0.39	0.021
di	**2,3'**	6	223.1	101000	5050	9.06	0.477
di	**2,3 / 2,4'**	5, 8	223.1	191000	9550	17.13	0.902
di	3,5	14	223.1	270	14	0.02	0.001
tri	**2,2',6**	19	257.5	51000	2550	3.96	0.209
di	3,4	12	223.1	3200	160	0.29	0.015
tri	**2,2',5**	18	257.5	19900	995	1.55	0.081
di, tri	**4,4' / 2,2',4**	15, 17	242.7	76700	3835	6.32	0.333
tri	**2,3,6 / 2,3',6**	24, 27	257.5	73600	3680	5.72	0.301
tri	**2,2',3 / 2,4',6**	16, 32	257.5	75300	3765	5.85	0.308
tri	2,4,5	29	257.5	1390	70	0.11	0.006
tri	**2,3',5**	26	257.5	41000	2050	3.19	0.168
tri	**2,3',4**	25	257.5	5420	271	0.42	0.022
tri	**2,4',5**	31	257.5	47300	2365	3.68	0.194
tri	**2,4,4'**	28	257.5	0	5	0.00	0.007
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	27000	1350	2.05	0.108
tetra	2,2',4,6'	51	292.0	11700	585	0.80	0.042
tri	**2,3,4'**	22	257.5	4360	218	0.34	0.018
tetra	2,2',3,6	45	292.0	7400	370	0.51	0.027
tetra	2,2',3,6'	46	292.0	1820	91	0.12	0.007
tri	3,4',5	39	257.5	1180	59	0.09	0.005
tetra	**2,2',5,5'**	52	292.0	27600	1380	1.89	0.100
tetra	**2,2',4,5'**	49	292.0	36100	1805	2.47	0.130
tetra	**2,2',4,4'**	47	292.0	25900	1295	1.77	0.093
tetra	2,2',4,5	48	292.0	0	5	0.00	0.006
tetra	2,3,5,6	65	292.0	570	29	0.04	0.002
tetra	**2,2',3,5'**	44	292.0	6070	304	0.42	0.022
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	18800	940	1.32	0.069
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	1760	88	0.12	0.006
tetra	2,2',3,3'	40	292.0	1000	50	0.07	0.004
tetra	2,3',4,5	67	292.0	12900	645	0.88	0.047
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	2700	135	0.18	0.009
tetra	**2,4,4',5**	74	292.0	1230	62	0.08	0.004
tetra	**2,3',4',5**	70	292.0	11800	590	0.81	0.043
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	5700	285	0.36	0.019
penta	2,2',3,4',6	91	326.4	730	37	0.04	0.002
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	6370	319	0.44	0.023
penta	2,2',3,5,5'	92	326.4	4680	234	0.29	0.015
penta	2,2',3,3',6	84	326.4	5800	290	0.36	0.019
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	4290	215	0.26	0.014
penta	2,2',4,4',5	99	326.4	770	39	0.05	0.002
penta	2,3',4,4',6	119	326.4	2500	125	0.15	0.008
penta	2,2',3,3',5	83	326.4	1530	77	0.09	0.005
penta	2,2',3',4,5	97	326.4	0	5	0.00	0.005
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	1640	82	0.10	0.005

11.0323

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				16-20 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	1130	57	0.07	0.004
hexa	2,2',3,3',6,6'	136	360.9	8320	416	0.46	0.024
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	680	34	0.04	0.002
penta	2,2',3,3',4	82	326.4	1920	96	0.12	0.006
hexa	2,2',3,5,5',6	151	360.9	1920	96	0.11	0.006
hexa	2,2',3,3',5,6'	135	360.9	1450	73	0.08	0.004
penta	2,3,3',4',5	107	326.4	1340	67	0.08	0.004
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	3280	164	0.20	0.010
penta	**2,3',4,4',5**	118	326.4	3000	150	0.18	0.010
hexa	2,2',3,3',5,6	134	360.9	810	41	0.04	0.002
penta	2',3,3',4,5	122	326.4	170	9	0.01	0.001
hexa	2,2',3,4',5,5'	146	360.9	1100	55	0.06	0.003
hexa	2,2',4,4',5,5'	153	360.9	2360	118	0.13	0.007
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.005
hexa	2,2',3,4,5,5'	141	360.9	420	21	0.02	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	730	37	0.04	0.002
hexa	2,2',3,4,4',5	137	360.9	250	13	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	620	31	0.03	0.002
hexa	2,2',3,4,4',5'	138	360.9	3550	178	0.20	0.010
hexa	2,3,3',4,4',6	158	360.9	360	18	0.02	0.001
hexa	2,2',3,3',4,5	129	360.9	190	10	0.01	0.001
hepta	2,2',3,3',5,5',6	178	395.3	450	23	0.02	0.001
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	110	6	0.01	0.000
hepta	2,2',3,4',5,5,6	187	395.3	1380	69	0.07	0.004
hepta	2,2',3,4,4',5',6	183	395.3	460	23	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	690	35	0.04	0.002
hexa	2,3',4,4',5,5'	167	360.9	170	9	0.01	0.000
hepta	2,2',3,4,5,5',6	185	395.3	100	5	0.01	0.000
hepta	2,2',3,3',4,5,6'	174	395.3	700	35	0.04	0.002
hepta	2,2',3,3',4',5,6	177	395.3	660	33	0.03	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	410	21	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	280	14	0.02	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	370	19	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	170	9	0.01	0.000
octa	2,2',3,3',4,4',6,6'	197	429.8	30	5	0.00	0.000
hepta	2,2',3,4,4',5,5'	180	395.3	1250	63	0.06	0.003
hepta	2,3,3',4',5,5',6	193	395.3	140	7	0.01	0.000
hepta	2,3,3',4,4',5',6	191	395.3	35	5	0.00	0.000
octa	2,2',3,3',4,5,6,6'	199	429.8	74	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	1650	83	0.08	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	480	24	0.02	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	500	25	0.02	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	33	5	0.00	0.000
octa	2,2',3,3',4,4',5,6	195	429.8	200	10	0.01	0.000
octa	2,2',3,3',4,4',5,5'	194	429.8	400	20	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	250	13	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.004
				1211772	66818	100.00	5.93

11.0324

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				20-24 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	65700	6570	9.96	1.009
mono	3	2	188.7	0	10	0.00	0.027
mono	**4**	3	188.7	21600	2160	3.27	0.332
di	**2,2' / 2,6**	4, 10	223.1	65000	3250	8.33	0.438
di	**2,4 / 2,5**	7, 9	223.1	4100	205	0.53	0.028
di	**2,3'**	6	223.1	64300	3215	8.24	0.433
di	**2,3 / 2,4'**	5, 8	223.1	130000	6500	16.67	0.876
di	3,5	14	223.1	0	5	0.00	0.011
tri	**2,2',6**	19	257.5	29700	1485	3.30	0.173
di	3,4	12	223.1	3070	153.5	0.39	0.021
tri	**2,2',5**	18	257.5	12200	610	1.35	0.071
di, tri	**4,4' / 2,2',4**	15, 17	242.7	76000	3800	8.96	0.471
tri	**2,3,6 / 2,3',6**	24, 27	257.5	41500	2075	4.61	0.242
tri	**2,2',3 / 2,4',6**	16, 32	257.5	46900	2345	5.21	0.274
tri	2,4,5	29	257.5	750	37.5	0.08	0.004
tri	**2,3',5**	26	257.5	29800	1490	3.31	0.174
tri	**2,3',4**	25	257.5	4670	233.5	0.52	0.027
tri	**2,4',5**	31	257.5	38200	1910	4.24	0.223
tri	**2,4,4'**	28	257.5	0	5	0.00	0.010
tri, tri. tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	14600	730	1.59	0.083
tetra	2,2',4,6'	51	292.0	8010	400.5	0.78	0.041
tri	**2,3,4'**	22	257.5	4020	201	0.45	0.023
tetra	2,2',3,6	45	292.0	6590	329.5	0.65	0.034
tetra	2,2',3,6'	46	292.0	1370	68.5	0.13	0.007
tri	3,4',5	39	257.5	780	39	0.09	0.005
tetra	**2,2',5,5'**	52	292.0	19600	980	1.92	0.101
tetra	**2,2',4,5'**	49	292.0	25600	1280	2.51	0.132
tetra	**2,2',4,4'**	47	292.0	21200	1060	2.08	0.109
tetra	2,2',4,5	48	292.0	0	5	0.00	0.009
tetra	2,3,5,6	65	292.0	340	17	0.03	0.002
tetra	**2,2',3,5'**	44	292.0	2710	135.5	0.27	0.014
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	16500	825	1.65	0.087
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	19400	970	1.90	0.100
tetra	2,2',3,3'	40	292.0	700	35	0.07	0.004
tetra	2,3',4,5	67	292.0	620	31	0.06	0.003
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	5970	298.5	0.57	0.030
tetra	**2,4,4',5**	74	292.0	930	46.5	0.09	0.005
tetra	**2,3',4',5**	70	292.0	540	27	0.05	0.003
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	8710	435.5	0.79	0.042
penta	2,2',3,4',6	91	326.4	4960	248	0.43	0.023
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	340	17	0.03	0.002
penta	2,2',3,5,5'	92	326.4	4220	211	0.37	0.019
penta	2,2',3,3',6	84	326.4	3860	193	0.34	0.018
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	4000	200	0.35	0.018
penta	2,2',4,4',5	99	326.4	2750	137.5	0.24	0.013
penta	2,3',4,4',6	119	326.4	840	42	0.07	0.004
penta	2,2',3,3',5	83	326.4	1540	77	0.13	0.007
penta	2,2',3',4,5	97	326.4	770	38.5	0.07	0.004
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.008

11.0325

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				20-24 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	856	42.8	0.08	0.004
hexa	2,2',3,3',6,6'	136	360.9	1050	52.5	0.08	0.004
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	13400	670	1.20	0.063
penta	2,2',3,3',4	82	326.4	282	14.1	0.02	0.001
hexa	2,2',3,5,5',6	151	360.9	1490	74.5	0.12	0.006
hexa	2,2',3,3',5,6'	135	360.9	1120	56	0.09	0.005
penta	2,3,3',4',5	107	326.4	890	44.5	0.08	0.004
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	3100	155	0.26	0.014
penta	**2,3',4,4',5**	118	326.4	1540	77	0.13	0.007
hexa	2,2',3,3',5,6	134	360.9	670	33.5	0.05	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.008
hexa	2,2',3,4',5,5'	146	360.9	890	44.5	0.07	0.004
hexa	2,2',4,4',5,5'	153	360.9	1970	98.5	0.16	0.008
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.007
hexa	2,2',3,4,5,5'	141	360.9	260	13	0.02	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	560	28	0.04	0.002
hexa	2,2',3,4,4',5	137	360.9	160	8	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	440	22	0.03	0.002
hexa	2,2',3,4,4',5'	138	360.9	2750	137.5	0.22	0.011
hexa	2,3,3',4,4',6	158	360.9	270	13.5	0.02	0.001
hexa	2,2',3,3',4,5	129	360.9	110	5.5	0.01	0.000
hepta	2,2',3,3',5,5',6	178	395.3	300	15	0.02	0.001
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	76	5	0.01	0.000
hepta	2,2',3,4',5,5,6	187	395.3	1040	52	0.08	0.004
hepta	2,2',3,4,4',5',6	183	395.3	350	17.5	0.03	0.001
hexa	2,2',3,3',4,4'	128	360.9	500	25	0.04	0.002
hexa	2,3',4,4',5,5'	167	360.9	120	6	0.01	0.000
hepta	2,2',3,4,5,5',6	185	395.3	67	5	0.00	0.000
hepta	2,2',3,3',4,5,6'	174	395.3	560	28	0.04	0.002
hepta	2,2',3,3',4',5,6	177	395.3	540	27	0.04	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	330	16.5	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	180	9	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	240	12	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	120	6	0.01	0.000
octa	2,2',3,3',4,4',6,6'	197	429.8	17	5	0.00	0.000
hepta	2,2',3,4,4',5,5'	180	395.3	930	46.5	0.07	0.004
hepta	2,3,3',4',5,5',6	193	395.3	100	5	0.01	0.000
hepta	2,3,3',4,4',5',6	191	395.3	18	5	0.00	0.000
octa	2,2',3,3',4,5,6,6'	199	429.8	45	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	1340	67	0.10	0.005
octa	2,2',3,3',4,5,5',6'	201	429.8	350	17.5	0.02	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	370	18.5	0.02	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	31	5	0.00	0.000
octa	2,2',3,3',4,4',5,6	195	429.8	170	8.5	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	280	14	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	220	11	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.005
				855062	47180.4	100.00	5.99

11.0326

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				24-28 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	26600	2660	7.97	0.805
mono	3	2	188.7	0	10	0.00	0.054
mono	**4**	3	188.7	7200	720	2.16	0.218
di	**2,2' / 2,6**	4, 10	223.1	27500	1375	6.97	0.362
di	**2,4 / 2,5**	7, 9	223.1	1730	86.5	0.44	0.023
di	**2,3'**	6	223.1	28000	1400	7.10	0.369
di	**2,3 / 2,4'**	5, 8	223.1	53100	2655	13.46	0.700
di	3,5	14	223.1	0	5	0.00	0.023
tri	**2,2',6**	19	257.5	13800	690	3.03	0.158
di	3,4	12	223.1	2780	139	0.70	0.037
tri	**2,2',5**	18	257.5	5040	252	1.11	0.058
di, tri	**4,4' / 2,2',4**	15, 17	242.7	49700	2485	11.58	0.602
tri	**2,3,6 / 2,3',6**	24, 27	257.5	17900	895	3.93	0.204
tri	**2,2',3 / 2,4',6**	16, 32	257.5	20700	1035	4.54	0.236
tri	2,4,5	29	257.5	310	15.5	0.07	0.004
tri	**2,3',5**	26	257.5	19500	975	4.28	0.223
tri	**2,3',4**	25	257.5	4080	204	0.90	0.047
tri	**2,4',5**	31	257.5	25800	1290	5.66	0.295
tri	**2,4,4'**	28	257.5	8250	412.5	1.81	0.094
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	6750	337.5	1.45	0.075
tetra	2,2',4,6'	51	292.0	4230	211.5	0.82	0.043
tri	**2,3,4'**	22	257.5	3490	174.5	0.77	0.040
tetra	2,2',3,6	45	292.0	4120	206	0.80	0.041
tetra	2,2',3,6'	46	292.0	750	37.5	0.15	0.008
tri	3,4',5	39	257.5	320	16	0.07	0.004
tetra	**2,2',5,5'**	52	292.0	11100	555	2.15	0.112
tetra	**2,2',4,5'**	49	292.0	12900	645	2.50	0.130
tetra	**2,2',4,4'**	47	292.0	13200	660	2.56	0.133
tetra	2,2',4,5	48	292.0	0	5	0.00	0.018
tetra	2,3,5,6	65	292.0	0	5	0.00	0.018
tetra	**2,2',3,5'**	44	292.0	2170	108.5	0.42	0.022
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	10500	525	2.08	0.108
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	11300	565	2.19	0.114
tetra	2,2',3,3'	40	292.0	1060	53	0.21	0.011
tetra	2,3',4,5	67	292.0	380	19	0.07	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	1510	75.5	0.28	0.015
tetra	**2,4,4',5**	74	292.0	940	47	0.18	0.009
tetra	**2,3',4',5**	70	292.0	570	28.5	0.11	0.006
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	5450	272.5	0.98	0.051
penta	2,2',3,4',6	91	326.4	2930	146.5	0.51	0.026
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	420	21	0.08	0.004
penta	2,2',3,5,5'	92	326.4	2330	116.5	0.40	0.021
penta	2,2',3,3',6	84	326.4	2520	126	0.44	0.023
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	1960	98	0.34	0.018
penta	2,2',4,4',5	99	326.4	1410	70.5	0.24	0.013
penta	2,3',4,4',6	119	326.4	590	29.5	0.10	0.005
penta	2,2',3,3',5	83	326.4	740	37	0.13	0.007
penta	2,2',3',4,5	97	326.4	360	18	0.06	0.003
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.016

11.0327

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				24-28 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	330	16.5	0.06	0.003
hexa	2,2',3,3',6,6'	136	360.9	750	37.5	0.12	0.006
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	9020	451	1.60	0.083
penta	2,2',3,3',4	82	326.4	94	5	0.02	0.001
hexa	2,2',3,5,5',6	151	360.9	1060	53	0.17	0.009
hexa	2,2',3,3',5,6'	135	360.9	840	42	0.13	0.007
penta	2,3,3',4',5	107	326.4	230	11.5	0.04	0.002
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	2200	110	0.37	0.019
penta	**2,3',4,4',5**	118	326.4	800	40	0.14	0.007
hexa	2,2',3,3',5,6	134	360.9	440	22	0.07	0.004
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.016
hexa	2,2',3,4',5,5'	146	360.9	700	35	0.11	0.006
hexa	2,2',4,4',5,5'	153	360.9	1140	57	0.18	0.009
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.015
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.014
hepta	2,2',3,3',5,6,6'	179	395.3	490	24.5	0.07	0.004
hexa	2,2',3,4,4',5	137	360.9	51	5	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	240	12	0.04	0.002
hexa	2,2',3,4,4',5'	138	360.9	1630	81.5	0.26	0.013
hexa	2,3,3',4,4',6	158	360.9	130	6.5	0.02	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.014
hepta	2,2',3,3',5,5',6	178	395.3	390	19.5	0.06	0.003
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	48	5	0.01	0.001
hepta	2,2',3,4',5,5,6	187	395.3	860	43	0.12	0.006
hepta	2,2',3,4,4',5',6	183	395.3	210	10.5	0.03	0.002
hexa	2,2',3,3',4,4'	128	360.9	200	10	0.03	0.002
hexa	2,3',4,4',5,5'	167	360.9	56	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	35	5	0.01	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	300	15	0.04	0.002
hepta	2,2',3,3',4',5,6	177	395.3	420	21	0.06	0.003
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	280	14	0.04	0.002
hexa	2,3,3',4,4',5	156	360.9	73	5	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	160	8	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	80	5	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	11	5	0.00	0.001
hepta	2,2',3,4,4',5,5'	180	395.3	560	28	0.08	0.004
hepta	2,3,3',4',5,5',6	193	395.3	54	5	0.01	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.013
octa	2,2',3,3',4,5,6,6'	199	429.8	33	5	0.00	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	820	41	0.12	0.006
octa	2,2',3,3',4,5,5',6'	201	429.8	330	16.5	0.04	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	320	16	0.04	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	21	5	0.00	0.001
octa	2,2',3,3',4,4',5,6	195	429.8	190	9.5	0.02	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	240	12	0.03	0.002
nona	2,2',3,3',4,4',5,5',6	206	464.2	300	15	0.04	0.002
deca	deca	209	498.7	0	5	0.00	0.010
				442126	23883.5	100.00	5.91

11.0328

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				28-32 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	28700	2870	9.37	0.950
mono	3	2	188.7	0	10	0.00	0.058
mono	**4**	3	188.7	5880	588	1.92	0.195
di	**2,2' / 2,6**	4, 10	223.1	29600	1480	8.18	0.430
di	**2,4 / 2,5**	7, 9	223.1	1710	85.5	0.47	0.025
di	**2,3'**	6	223.1	27900	1395	7.71	0.405
di	**2,3 / 2,4'**	5, 8	223.1	61400	3070	16.96	0.891
di	3,5	14	223.1	0	5	0.00	0.025
tri	**2,2',6**	19	257.5	15500	775	3.71	0.195
di	3,4	12	223.1	1700	85	0.47	0.025
tri	**2,2',5**	18	257.5	5390	269.5	1.29	0.068
di, tri	**4,4' / 2,2',4**	15, 17	242.7	45800	2290	11.63	0.611
tri	**2,3,6 / 2,3',6**	24, 27	257.5	19000	950	4.55	0.239
tri	**2,2',3 / 2,4',6**	16, 32	257.5	25400	1270	6.08	0.319
tri	2,4,5	29	257.5	470	23.5	0.11	0.006
tri	**2,3',5**	26	257.5	13700	685	3.28	0.172
tri	**2,3',4**	25	257.5	1770	88.5	0.42	0.022
tri	**2,4',5**	31	257.5	17000	850	4.07	0.214
tri	**2,4,4'**	28	257.5	5960	298	1.43	0.075
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	6940	347	1.63	0.085
tetra	2,2',4,6'	51	292.0	5020	251	1.06	0.056
tri	**2,3,4'**	22	257.5	1600	80	0.38	0.020
tetra	2,2',3,6	45	292.0	2600	130	0.55	0.029
tetra	2,2',3,6'	46	292.0	630	31.5	0.13	0.007
tri	3,4',5	39	257.5	240	12	0.06	0.003
tetra	**2,2',5,5'**	52	292.0	10300	515	2.17	0.114
tetra	**2,2',4,5'**	49	292.0	10600	530	2.24	0.118
tetra	**2,2',4,4'**	47	292.0	10700	535	2.26	0.119
tetra	2,2',4,5	48	292.0	0	5	0.00	0.019
tetra	2,3,5,6	65	292.0	0	5	0.00	0.019
tetra	**2,2',3,5'**	44	292.0	880	44	0.19	0.010
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	4170	208.5	0.90	0.047
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	5150	257.5	1.09	0.057
tetra	2,2',3,3'	40	292.0	1250	62.5	0.26	0.014
tetra	2,3',4,5	67	292.0	380	19	0.08	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	350	17.5	0.07	0.004
tetra	**2,4,4',5**	74	292.0	476	23.8	0.10	0.005
tetra	**2,3',4',5**	70	292.0	550	27.5	0.12	0.006
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	4600	230	0.90	0.047
penta	2,2',3,4',6	91	326.4	1640	82	0.31	0.016
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	300	15	0.06	0.003
penta	2,2',3,5,5'	92	326.4	1400	70	0.26	0.014
penta	2,2',3,3',6	84	326.4	1560	78	0.29	0.015
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	710	35.5	0.13	0.007
penta	2,2',4,4',5	99	326.4	380	19	0.07	0.004
penta	2,3',4,4',6	119	326.4	360	18	0.07	0.004
penta	2,2',3,3',5	83	326.4	260	13	0.05	0.003
penta	2,2',3',4,5	97	326.4	85	5	0.02	0.001
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.017

11.0329

Hudson River Core Data
Milepoint 188.5
Collected 19 July 1983
NYS Dept of Health Analyses

				28-32 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	160	8	0.03	0.002
hexa	2,2',3,3',6,6'	136	360.9	770	38.5	0.13	0.007
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	4070	203.5	0.79	0.041
penta	2,2',3,3',4	82	326.4	33	5	0.01	0.001
hexa	2,2',3,5,5',6	151	360.9	1460	73	0.25	0.013
hexa	2,2',3,3',5,6'	135	360.9	710	35.5	0.12	0.006
penta	2,3,3',4',5	107	326.4	120	6	0.02	0.001
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	630	31.5	0.12	0.006
penta	**2,3',4,4',5**	118	326.4	380	19	0.07	0.004
hexa	2,2',3,3',5,6	134	360.9	390	19.5	0.07	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.017
hexa	2,2',3,4',5,5'	146	360.9	450	22.5	0.08	0.004
hexa	2,2',4,4',5,5'	153	360.9	540	27	0.09	0.005
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.016
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.015
hepta	2,2',3,3',5,6,6'	179	395.3	420	21	0.07	0.003
hexa	2,2',3,4,4',5	137	360.9	21	5	0.00	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	150	7.5	0.02	0.001
hexa	2,2',3,4,4',5'	138	360.9	1500	75	0.26	0.013
hexa	2,3,3',4,4',6	158	360.9	81	5	0.01	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.015
hepta	2,2',3,3',5,5',6	178	395.3	590	29.5	0.09	0.005
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	39	5	0.01	0.001
hepta	2,2',3,4',5,5,6	187	395.3	650	32.5	0.10	0.005
hepta	2,2',3,4,4',5',6	183	395.3	160	8	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	92	5	0.02	0.001
hexa	2,3',4,4',5,5'	167	360.9	38	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	29	5	0.00	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	170	8.5	0.03	0.001
hepta	2,2',3,3',4',5,6	177	395.3	310	15.5	0.05	0.003
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	260	13	0.04	0.002
hexa	2,3,3',4,4',5	156	360.9	29	5	0.00	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	110	5.5	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	72	5	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	10	5	0.00	0.001
hepta	2,2',3,4,4',5,5'	180	395.3	440	22	0.07	0.004
hepta	2,3,3',4',5,5',6	193	395.3	56	5	0.01	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.014
octa	2,2',3,3',4,5,6,6'	199	429.8	37	5	0.01	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	590	29.5	0.09	0.005
octa	2,2',3,3',4,5,5',6'	201	429.8	320	16	0.05	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	330	16.5	0.05	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	23	5	0.00	0.001
octa	2,2',3,3',4,4',5,6	195	429.8	190	9.5	0.03	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	280	14	0.04	0.002
nona	2,2',3,3',4,4',5,5',6	206	464.2	320	16	0.04	0.002
deca	deca	209	498.7	0	5	0.00	0.011
				397041	21678.8	100.00	6.04

11.0330

Hudson River Core Data
Milepoint 188.6
July 1991
NYS Dept of Health Analyses

				0-2 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	2800	280	11.11	1.123
mono	3	2	188.7	0	5	0.00	0.330
mono	4	3	188.7	0	5	0.00	0.330
di	**2,2' / 2,6**	4, 10	223.1	3840	192	12.88	0.672
di	**2,4 / 2,5**	7, 9	223.1	130	6.5	0.44	0.023
di	**2,3'**	6	223.1	660	33	2.21	0.116
di	**2,3 / 2,4'**	5, 8	223.1	1740	87	5.84	0.305
di	3,5	14	223.1	0	5	0.00	0.279
tri	**2,2',6**	19	257.5	1450	72.5	4.21	0.220
di	3,4	12	223.1	110	5.5	0.37	0.019
tri	**2,2',5**	18	257.5	780	39	2.27	0.118
di, tri	**4,4' / 2,2',4**	15, 17	242.7	1600	80	4.93	0.257
tri	**2,3,6 / 2,3',6**	24, 27	257.5	1300	65	3.78	0.197
tri	**2,2',3 / 2,4',6**	16, 32	257.5	950	47.5	2.76	0.144
tri	2,4,5	29	257.5	36	5	0.10	0.015
tri	**2,3',5**	26	257.5	840	42	2.44	0.127
tri	**2,3',4**	25	257.5	370	18.5	1.08	0.056
tri	**2,4',5**	31	257.5	1670	83.5	4.85	0.253
tri	**2,4,4'**	28	257.5	1500	75	4.36	0.227
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	980	49	2.79	0.145
tetra	2,2',4,6'	51	292.0	190	9.5	0.49	0.025
tri	**2,3,4'**	22	257.5	460	23	1.34	0.070
tetra	2,2',3,6	45	292.0	290	14.5	0.74	0.039
tetra	2,2',3,6'	46	292.0	80	5	0.21	0.013
tri	3,4',5	39	257.5	0	5	0.00	0.242
tetra	**2,2',5,5'**	52	292.0	1100	55	2.82	0.147
tetra	**2,2',4,5'**	49	292.0	1000	50	2.56	0.134
tetra	**2,2',4,4'**	47	292.0	1040	52	2.67	0.139
tetra	2,2',4,5	48	292.0	0	5	0.00	0.213
tetra	2,3,5,6	65	292.0	0	5	0.00	0.213
tetra	**2,2',3,5'**	44	292.0	570	28.5	1.46	0.076
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	1320	66	3.46	0.180
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	690	34.5	1.77	0.092
tetra	2,2',3,3'	40	292.0	160	8	0.41	0.021
tetra	2,3',4,5	67	292.0	47	5	0.12	0.013
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.207
tetra	**2,4,4',5**	74	292.0	480	24	1.23	0.064
tetra	**2,3',4',5**	70	292.0	710	35.5	1.82	0.095
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	1050	52.5	2.50	0.131
penta	2,2',3,4',6	91	326.4	190	9.5	0.44	0.023
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	540	27	1.38	0.072
penta	2,2',3,5,5'	92	326.4	200	10	0.46	0.024
penta	2,2',3,3',6	84	326.4	180	9	0.41	0.022
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	300	15	0.69	0.036
penta	2,2',4,4',5	99	326.4	210	10.5	0.48	0.025
penta	2,3',4,4',6	119	326.4	17	5	0.04	0.011
penta	2,2',3,3',5	83	326.4	45	5	0.10	0.012
penta	2,2',3',4,5	97	326.4	130	6.5	0.30	0.016
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	190	9.5	0.44	0.023

11.0331

Hudson River Core Data
Milepoint 188.6
July 1991
NYS Dept of Health Analyses

				0-2 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	120	6	0.28	0.014
hexa	2,2',3,3',6,6'	136	360.9	39	5	0.08	0.010
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	570	28.5	1.34	0.070
penta	2,2',3,3',4	82	326.4	65	5	0.15	0.012
hexa	2,2',3,5,5',6	151	360.9	66	5	0.14	0.011
hexa	2,2',3,3',5,6'	135	360.9	49	5	0.10	0.010
penta	2,3,3',4',5	107	326.4	37	5	0.08	0.012
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	140	7	0.31	0.016
penta	**2,3',4,4',5**	118	326.4	280	14	0.64	0.033
hexa	2,2',3,3',5,6	134	360.9	19	5	0.04	0.010
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.191
hexa	2,2',3,4',5,5'	146	360.9	33	5	0.07	0.010
hexa	2,2',4,4',5,5'	153	360.9	100	5	0.21	0.011
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	290	14.5	0.62	0.032
hexa	2,2',3,4,5,5'	141	360.9	22	5	0.05	0.010
hepta	2,2',3,3',5,6,6'	179	395.3	20	5	0.04	0.009
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.172
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	14	5	0.03	0.010
hexa	2,2',3,4,4',5'	138	360.9	190	9.5	0.39	0.021
hexa	2,3,3',4,4',6	158	360.9	19	5	0.04	0.010
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.172
hepta	2,2',3,3',5,5',6	178	395.3	17	5	0.03	0.009
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.160
hepta	2,2',3,4',5,5,6	187	395.3	48	5	0.09	0.010
hepta	2,2',3,4,4',5',6	183	395.3	19	5	0.04	0.009
hexa	2,2',3,3',4,4'	128	360.9	29	5	0.06	0.010
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.172
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.157
hepta	2,2',3,3',4,5,6'	174	395.3	25	5	0.05	0.009
hepta	2,2',3,3',4',5,6	177	395.3	22	5	0.04	0.009
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	0	5	0.00	0.156
hexa	2,3,3',4,4',5	156	360.9	10	5	0.02	0.010
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.159
hepta	2,2',3,3',4,5,5'	172	395.3	0	5	0.00	0.157
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.145
hepta	2,2',3,4,4',5,5'	180	395.3	48	5	0.09	0.010
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.157
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.157
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.145
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	64	5	0.12	0.010
octa	2,2',3,3',4,5,5',6'	201	429.8	16	5	0.03	0.009
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	22	5	0.04	0.009
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.157
octa	2,2',3,3',4,4',5,6	195	429.8	0	5	0.00	0.145
octa	2,2',3,3',4,4',5,5'	194	429.8	17	5	0.03	0.009
nona	2,2',3,3',4,4',5,5',6	206	464.2	12	5	0.02	0.008
deca	deca	209	498.7	0	5	0.00	0.125
				34367	2070.5	100.00	10.30

11.0332

Hudson River Core Data
Milepoint 188.6
Collected July 1991
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				2-4 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	1960	196	12.62	1.278
mono	3	2	188.7	0	10	0.00	0.977
mono	**4**	3	188.7	0	10	0.00	0.977
di	**2,2' / 2,6**	4, 10	223.1	2300	115	12.52	0.658
di	**2,4 / 2,5**	7, 9	223.1	87	5	0.47	0.028
di	**2,3'**	6	223.1	480	24	2.61	0.137
di	**2,3 / 2,4'**	5, 8	223.1	1250	62.5	6.80	0.357
di	3,5	14	223.1	0	5	0.00	0.413
tri	**2,2',6**	19	257.5	740	37	3.49	0.183
di	3,4	12	223.1	67	5	0.36	0.028
tri	**2,2',5**	18	257.5	560	28	2.64	0.139
di, tri	**4,4' / 2,2',4**	15, 17	242.7	1140	57	5.70	0.300
tri	**2,3,6 / 2,3',6**	24, 27	257.5	680	34	3.21	0.168
tri	**2,2',3 / 2,4',6**	16, 32	257.5	600	30	2.83	0.149
tri	2,4,5	29	257.5	17	5	0.08	0.024
tri	**2,3',5**	26	257.5	490	24.5	2.31	0.121
tri	**2,3',4**	25	257.5	250	12.5	1.18	0.062
tri	**2,4',5**	31	257.5	1010	50.5	4.76	0.250
tri	**2,4,4'**	28	257.5	1030	51.5	4.86	0.255
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	630	31.5	2.91	0.153
tetra	2,2',4,6'	51	292.0	100	5	0.42	0.022
tri	**2,3,4'**	22	257.5	300	15	1.41	0.074
tetra	2,2',3,6	45	292.0	160	8	0.67	0.035
tetra	2,2',3,6'	46	292.0	45	5	0.19	0.021
tri	3,4',5	39	257.5	0	5	0.00	0.358
tetra	**2,2',5,5'**	52	292.0	610	30.5	2.54	0.133
tetra	**2,2',4,5'**	49	292.0	530	26.5	2.20	0.116
tetra	**2,2',4,4'**	47	292.0	570	28.5	2.37	0.125
tetra	2,2',4,5	48	292.0	0	5	0.00	0.315
tetra	2,3,5,6	65	292.0	0	5	0.00	0.315
tetra	**2,2',3,5'**	44	292.0	340	17	1.41	0.074
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	890	44.5	3.79	0.199
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	370	18.5	1.54	0.081
tetra	2,2',3,3'	40	292.0	97	5	0.40	0.022
tetra	2,3',4,5	67	292.0	24	5	0.10	0.021
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.307
tetra	**2,4,4',5**	74	292.0	280	14	1.16	0.061
tetra	**2,3',4',5**	70	292.0	430	21.5	1.79	0.094
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	580	29	2.24	0.118
penta	2,2',3,4',6	91	326.4	60	5	0.22	0.019
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	320	16	1.33	0.070
penta	2,2',3,5,5'	92	326.4	110	5.5	0.41	0.022
penta	2,2',3,3',6	84	326.4	97	5	0.36	0.019
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	180	9	0.67	0.035
penta	2,2',4,4',5	99	326.4	140	7	0.52	0.027
penta	2,3',4,4',6	119	326.4	0	5	0.00	0.282
penta	2,2',3,3',5	83	326.4	22	5	0.08	0.019
penta	2,2',3',4,5	97	326.4	72	5	0.27	0.019
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	110	5.5	0.41	0.022

11.0333

Hudson River Core Data
Milepoint 188.6
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				2-4 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	66	5	0.25	0.019
hexa	2,2',3,3',6,6'	136	360.9	19	5	0.06	0.017
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	330	16.5	1.26	0.066
penta	2,2',3,3',4	82	326.4	38	5	0.14	0.019
hexa	2,2',3,5,5',6	151	360.9	31	5	0.10	0.017
hexa	2,2',3,3',5,6'	135	360.9	24	5	0.08	0.017
penta	2,3,3',4',5	107	326.4	25	5	0.09	0.019
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	69	5	0.25	0.019
penta	**2,3',4,4',5**	118	326.4	160	8	0.60	0.031
hexa	2,2',3,3',5,6	134	360.9	0	5	0.00	0.255
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.282
hexa	2,2',3,4',5,5'	146	360.9	17	5	0.06	0.017
hexa	2,2',4,4',5,5'	153	360.9	53	5	0.18	0.017
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	160	8	0.55	0.029
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.255
hepta	2,2',3,3',5,6,6'	179	395.3	0	5	0.00	0.233
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.255
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	0	5	0.00	0.241
hexa	2,2',3,4,4',5'	138	360.9	87	5	0.29	0.017
hexa	2,3,3',4,4',6	158	360.9	0	5	0.00	0.255
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.255
hepta	2,2',3,3',5,5',6	178	395.3	0	5	0.00	0.233
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.236
hepta	2,2',3,4',5,5,6	187	395.3	23	5	0.07	0.015
hepta	2,2',3,4,4',5',6	183	395.3	0	5	0.00	0.233
hexa	2,2',3,3',4,4'	128	360.9	14	5	0.05	0.017
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.255
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.233
hepta	2,2',3,3',4,5,6'	174	395.3	12	5	0.04	0.015
hepta	2,2',3,3',4',5,6	177	395.3	0	5	0.00	0.233
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	0	5	0.00	0.230
hexa	2,3,3',4,4',5	156	360.9	0	5	0.00	0.255
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.235
hepta	2,2',3,3',4,5,5'	172	395.3	0	5	0.00	0.233
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.214
hepta	2,2',3,4,4',5,5'	180	395.3	22	5	0.07	0.015
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.233
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.233
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.214
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	0	5	0.00	0.233
octa	2,2',3,3',4,5,5',6'	201	429.8	0	5	0.00	0.214
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	0	5	0.00	0.214
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.233
octa	2,2',3,3',4,4',5,6	195	429.8	0	5	0.00	0.214
octa	2,2',3,3',4,4',5,5'	194	429.8	0	5	0.00	0.214
nona	2,2',3,3',4,4',5,5',6	206	464.2	0	5	0.00	0.198
deca	deca	209	498.7	0	5	0.00	0.185
				20878	1407.5	100.00	17.06

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				4-6 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	1830	183	8.02	0.810
mono	3	2	188.7	0	10	0.00	0.735
mono	**4**	3	188.7	0	10	0.00	0.735
di	**2,2' / 2,6**	4, 10	223.1	2550	127.5	9.45	0.491
di	**2,4 / 2,5**	7, 9	223.1	100	5	0.37	0.019
di	**2,3'**	6	223.1	520	26	1.93	0.100
di	**2,3 / 2,4'**	5, 8	223.1	1330	66.5	4.93	0.256
di	3,5	14	223.1	0	5	0.00	0.311
tri	**2,2',6**	19	223.1	960	48	3.56	0.185
di	3,4	12	223.1	96	5	0.36	0.019
tri	**2,2',5**	18	223.1	700	35	2.59	0.135
di, tri	**4,4' / 2,2',4**	15, 17	242.7	1430	71.5	4.87	0.253
tri	**2,3,6 / 2,3',6**	24, 27	257.5	880	44	2.82	0.147
tri	**2,2',3 / 2,4',6**	16, 32	257.5	740	37	2.37	0.123
tri	2,4,5	29	257.5	32	5	0.10	0.016
tri	**2,3',5**	26	257.5	640	32	2.05	0.107
tri	**2,3',4**	25	257.5	280	14	0.90	0.047
tri	**2,4',5**	31	257.5	1320	66	4.24	0.220
tri	**2,4,4'**	28	257.5	1320	66	4.24	0.220
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	790	39.5	2.48	0.129
tetra	2,2',4,6'	51	292.0	150	7.5	0.42	0.022
tri	**2,3,4'**	22	257.5	360	18	1.16	0.060
tetra	2,2',3,6	45	292.0	210	10.5	0.59	0.031
tetra	2,2',3,6'	46	292.0	59	5	0.17	0.014
tri	3,4',5	39	257.5	0	5	0.00	0.269
tetra	**2,2',5,5'**	52	292.0	840	42	2.38	0.124
tetra	**2,2',4,5'**	49	292.0	750	37.5	2.12	0.110
tetra	**2,2',4,4'**	47	292.0	550	27.5	1.56	0.081
tetra	2,2',4,5	48	292.0	320	16	0.91	0.047
tetra	2,3,5,6	65	292.0	0	5	0.00	0.237
tetra	**2,2',3,5'**	44	292.0	450	22.5	1.27	0.066
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	1010	50.5	2.92	0.152
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	500	25	1.42	0.074
tetra	2,2',3,3'	40	292.0	190	9.5	0.54	0.028
tetra	2,3',4,5	67	292.0	36	5	0.10	0.014
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.231
tetra	**2,4,4',5**	74	292.0	400	20	1.13	0.059
tetra	**2,3',4',5**	70	292.0	5900	295	16.70	0.868
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	840	42	2.21	0.115
penta	2,2',3,4',6	91	326.4	150	7.5	0.38	0.020
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	420	21	1.19	0.062
penta	2,2',3,5,5'	92	326.4	160	8	0.41	0.021
penta	2,2',3,3',6	84	326.4	140	7	0.35	0.018
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	270	13.5	0.68	0.036
penta	2,2',4,4',5	99	326.4	200	10	0.51	0.026
penta	2,3',4,4',6	119	326.4	15	5	0.04	0.013
penta	2,2',3,3',5	83	326.4	34	5	0.09	0.013
penta	2,2',3',4,5	97	326.4	100	5	0.25	0.013
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	150	7.5	0.38	0.020

11.0335

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				4-6 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	94	5	0.24	0.013
hexa	2,2',3,3',6,6'	136	360.9	31	5	0.07	0.011
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	480	24	1.25	0.065
penta	2,2',3,3',4	82	326.4	56	5	0.14	0.013
hexa	2,2',3,5,5',6	151	360.9	55	5	0.13	0.012
hexa	2,2',3,3',5,6'	135	360.9	41	5	0.09	0.012
penta	2,3,3',4',5	107	326.4	43	5	0.11	0.013
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	120	6	0.30	0.015
penta	**2,3',4,4',5**	118	326.4	240	12	0.61	0.032
hexa	2,2',3,3',5,6	134	360.9	13	5	0.03	0.011
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.212
hexa	2,2',3,4',5,5'	146	360.9	30	5	0.07	0.011
hexa	2,2',4,4',5,5'	153	360.9	90	5	0.21	0.012
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	240	12	0.57	0.029
hexa	2,2',3,4,5,5'	141	360.9	18	5	0.04	0.011
hepta	2,2',3,3',5,6,6'	179	395.3	16	5	0.03	0.010
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.192
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	0	5	0.00	0.181
hexa	2,2',3,4,4',5'	138	360.9	180	9	0.41	0.021
hexa	2,3,3',4,4',6	158	360.9	19	5	0.04	0.011
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.192
hepta	2,2',3,3',5,5',6	178	395.3	0	5	0.00	0.175
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.178
hepta	2,2',3,4',5,5,6	187	395.3	39	5	0.08	0.011
hepta	2,2',3,4,4',5',6	183	395.3	15	5	0.03	0.010
hexa	2,2',3,3',4,4'	128	360.9	26	5	0.06	0.011
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.192
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.175
hepta	2,2',3,3',4,5,6'	174	395.3	21	5	0.04	0.010
hepta	2,2',3,3',4',5,6	177	395.3	20	5	0.04	0.010
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	0	5	0.00	0.173
hexa	2,3,3',4,4',5	156	360.9	0	5	0.00	0.192
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.177
hepta	2,2',3,3',4,5,5'	172	395.3	0	5	0.00	0.175
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.161
hepta	2,2',3,4,4',5,5'	180	395.3	39	5	0.08	0.011
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.175
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.175
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.161
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	53	5	0.11	0.011
octa	2,2',3,3',4,5,5',6'	201	429.8	13	5	0.02	0.010
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	16	5	0.03	0.010
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.175
octa	2,2',3,3',4,4',5,6	195	429.8	0	5	0.00	0.161
octa	2,2',3,3',4,4',5,5'	194	429.8	15	5	0.03	0.010
nona	2,2',3,3',4,4',5,5',6	206	464.2	0	5	0.00	0.149
deca	deca	209	498.7	0	5	0.00	0.139
				31745	1907	100.00	11.82

11.0336

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Milepoint 188.6
Collected July 1991
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				6-8 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	**2**	1	188.7	2290	229	10.45	1.056
mono	3	2	188.7	0	10	0.00	0.749
mono	**4**	3	188.7	0	10	0.00	0.749
di	**2,2' / 2,6**	4, 10	223.1	3410	170.5	13.16	0.685
di	**2,4 / 2,5**	7, 9	223.1	140	7	0.54	0.028
di	**2,3'**	6	223.1	660	33	2.55	0.133
di	**2,3 / 2,4'**	5, 8	223.1	1750	87.5	6.75	0.352
di	3,5	14	223.1	0	5	0.00	0.317
tri	**2,2',6**	19	257.5	1220	61	4.08	0.212
di	3,4	12	223.1	120	6	0.46	0.024
tri	**2,2',5**	18	257.5	650	32.5	2.17	0.113
di, tri	**4,4' / 2,2',4**	15, 17	242.7	1670	83.5	5.92	0.308
tri	**2,3,6 / 2,3',6**	24, 27	257.5	1180	59	3.94	0.205
tri	**2,2',3 / 2,4',6**	16, 32	257.5	860	43	2.87	0.150
tri	2,4,5	29	257.5	30	5	0.10	0.017
tri	**2,3',5**	26	257.5	890	44.5	2.97	0.155
tri	**2,3',4**	25	257.5	360	18	1.20	0.063
tri	**2,4',5**	31	257.5	1670	83.5	5.58	0.291
tri	**2,4,4'**	28	257.5	1180	59	3.94	0.205
tri, tri, tetra	**2,3,3' / 2',3,4 / 2,2'5,6'**	20,33,53	263.1	720	36	2.36	0.123
tetra	2,2',4,6'	51	292.0	190	9.5	0.56	0.029
tri	**2,3,4'**	22	257.5	310	15.5	1.04	0.054
tetra	2,2',3,6	45	292.0	200	10	0.59	0.031
tetra	2,2',3,6'	46	292.0	55	5	0.16	0.015
tri	3,4',5	39	257.5	0	5	0.00	0.274
tetra	**2,2',5,5'**	52	292.0	950	47.5	2.80	0.146
tetra	**2,2',4,5'**	49	292.0	870	43.5	2.56	0.134
tetra	**2,2',4,4'**	47	292.0	680	34	2.00	0.104
tetra	2,2',4,5	48	292.0	370	18.5	1.09	0.057
tetra	2,3,5,6	65	292.0	0	5	0.00	0.242
tetra	**2,2',3,5'**	44	292.0	360	18	1.06	0.055
tri, tri, tetra	**3,4,4' / 2,2',3,4' / 2,3,3',6**	37,42,59	285.5	970	48.5	2.92	0.152
tetra	**2,2',3,4 / 2,3,4',6**	41, 64	292.0	500	25	1.47	0.077
tetra	2,2',3,3'	40	292.0	160	8	0.47	0.025
tetra	2,3',4,5	67	292.0	36	5	0.11	0.015
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.236
tetra	**2,4,4',5**	74	292.0	350	17.5	1.03	0.054
tetra	**2,3',4',5**	70	292.0	480	24	1.41	0.074
tetra, penta	**2,3',4,4' / 2,2',3,5',6**	66, 95	313.8	780	39	2.14	0.111
penta	2,2',3,4',6	91	326.4	170	8.5	0.45	0.023
tetra	**2,3,3',4' / 2,3,4,4'**	56, 60	292.0	310	15.5	0.91	0.048
penta	2,2',3,5,5'	92	326.4	190	9.5	0.50	0.026
penta	2,2',3,3',6	84	326.4	140	7	0.37	0.019
penta	**2,2',3,4',5 / 2,2',4,5,5'**	90, 101	326.4	240	12	0.63	0.033
penta	2,2',4,4',5	99	326.4	170	8.5	0.45	0.023
penta	2,3',4,4',6	119	326.4	18	5	0.05	0.013
penta	2,2',3,3',5	83	326.4	37	5	0.10	0.013
penta	2,2',3',4,5	97	326.4	87	5	0.23	0.014
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	130	6.5	0.34	0.018

11.0337

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				6-8 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	86	5	0.23	0.014
hexa	2,2',3,3',6,6'	136	360.9	39	5	0.09	0.012
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	500	25	1.35	0.070
penta	2,2',3,3',4	82	326.4	44	5	0.12	0.013
hexa	2,2',3,5,5',6	151	360.9	71	5	0.17	0.012
hexa	2,2',3,3',5,6'	135	360.9	49	5	0.12	0.012
penta	2,3,3',4',5	107	326.4	35	5	0.09	0.013
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	140	7	0.36	0.019
penta	**2,3',4,4',5**	118	326.4	230	11.5	0.61	0.032
hexa	2,2',3,3',5,6	134	360.9	20	5	0.05	0.012
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.216
hexa	2,2',3,4',5,5'	146	360.9	38	5	0.09	0.012
hexa	2,2',4,4',5,5'	153	360.9	100	5	0.24	0.012
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	200	10	0.49	0.026
hexa	2,2',3,4,5,5'	141	360.9	17	5	0.04	0.012
hepta	2,2',3,3',5,6,6'	179	395.3	24	5	0.05	0.011
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.196
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	0	5	0.00	0.185
hexa	2,2',3,4,4',5'	138	360.9	220	11	0.52	0.027
hexa	2,3,3',4,4',6	158	360.9	25	5	0.06	0.012
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.196
hepta	2,2',3,3',5,5',6	178	395.3	27	5	0.06	0.011
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.181
hepta	2,2',3,4',5,5,6	187	395.3	57	5	0.12	0.011
hepta	2,2',3,4,4',5',6	183	395.3	18	5	0.04	0.011
hexa	2,2',3,3',4,4'	128	360.9	27	5	0.06	0.012
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.196
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.179
hepta	2,2',3,3',4,5,6'	174	395.3	26	5	0.06	0.011
hepta	2,2',3,3',4',5,6	177	395.3	29	5	0.06	0.011
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	0	5	0.00	0.177
hexa	2,3,3',4,4',5	156	360.9	0	5	0.00	0.196
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.180
hepta	2,2',3,3',4,5,5'	172	395.3	0	5	0.00	0.179
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.164
hepta	2,2',3,4,4',5,5'	180	395.3	48	5	0.10	0.011
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.179
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.179
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.164
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	67	5	0.15	0.011
octa	2,2',3,3',4,5,5',6'	201	429.8	20	5	0.04	0.010
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	22	5	0.04	0.010
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.179
octa	2,2',3,3',4,4',5,6	195	429.8	0	5	0.00	0.164
octa	2,2',3,3',4,4',5,5'	194	429.8	22	5	0.04	0.010
nona	2,2',3,3',4,4',5,5',6	206	464.2	14	5	0.03	0.009
deca	deca	209	498.7	0	5	0.00	0.142
				29768	1823.5	100.00	11.75

11.0338

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				8-12 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	6140	614	15.17	1.543
mono	3	2	188.7	0	10	0.00	0.406
mono	4	3	188.7	490	49	1.21	0.123
di	2,2' / 2,6	4, 10	223.1	7380	369	15.42	0.823
di	2,4 / 2,5	7, 9	223.1	330	16.5	0.69	0.037
di	2,3'	6	223.1	1260	63	2.63	0.141
di	2,3 / 2,4'	5, 8	223.1	3340	167	6.98	0.372
di	3,5	14	223.1	0	5	0.00	0.172
tri	2,2',6	19	223.1	2470	123.5	5.16	0.275
di	3,4	12	223.1	260	13	0.54	0.029
tri	2,2',5	18	223.1	1130	56.5	2.36	0.126
di, tri	4,4' / 2,2',4	15, 17	242.7	2950	147.5	5.66	0.302
tri	2,3,6 / 2,3',6	24, 27	257.5	2270	113.5	4.11	0.219
tri	2,2',3 / 2,4',6	16, 32	257.5	1660	83	3.00	0.160
tri	2,4,5	29	257.5	51	5	0.09	0.009
tri	2,3',5	26	257.5	1690	84.5	3.06	0.163
tri	2,3',4	25	257.5	630	31.5	1.14	0.061
tri	2,4',5	31	257.5	3180	159	5.76	0.307
tri	2,4,4'	28	257.5	1460	73	2.64	0.141
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	1130	56.5	2.00	0.107
tetra	2,2',4,6'	51	292.0	350	17.5	0.56	0.030
tri	2,3,4'	22	257.5	450	22.5	0.81	0.043
tetra	2,2',3,6	45	292.0	340	17	0.54	0.029
tetra	2,2',3,6'	46	292.0	90	5	0.14	0.008
tri	3,4',5	39	257.5	0	5	0.00	0.149
tetra	2,2',5,5'	52	292.0	1510	75.5	2.41	0.129
tetra	2,2',4,5'	49	292.0	1370	68.5	2.19	0.117
tetra	2,2',4,4'	47	292.0	1130	56.5	1.80	0.096
tetra	2,2',4,5	48	292.0	390	19.5	0.62	0.033
tetra	2,3,5,6	65	292.0	0	5	0.00	0.131
tetra	2,2',3,5'	44	292.0	410	20.5	0.65	0.035
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	1430	71.5	2.33	0.125
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	740	37	1.18	0.063
tetra	2,2',3,3'	40	292.0	190	9.5	0.30	0.016
tetra	2,3',4,5	67	292.0	47	5	0.08	0.008
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.128
tetra	2,4,4',5	74	292.0	400	20	0.64	0.034
tetra	2,3',4',5	70	292.0	440	22	0.70	0.037
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	910	45.5	1.35	0.072
penta	2,2',3,4',6	91	326.4	260	13	0.37	0.020
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	310	15.5	0.49	0.026
penta	2,2',3,5,5'	92	326.4	250	12.5	0.36	0.019
penta	2,2',3,3',6	84	326.4	200	10	0.29	0.015
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	270	13.5	0.39	0.021
penta	2,2',4,4',5	99	326.4	200	10	0.29	0.015
penta	2,3',4,4',6	119	326.4	27	5	0.04	0.007
penta	2,2',3,3',5	83	326.4	50	5	0.07	0.007
penta	2,2',3',4,5	97	326.4	83	5	0.12	0.007
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	140	7	0.20	0.011

11.0339

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				8-12 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	88	5	0.13	0.008
hexa	2,2',3,3',6,6'	136	360.9	53	5	0.07	0.007
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	590	29.5	0.86	0.046
penta	2,2',3,3',4	82	326.4	44	5	0.06	0.007
hexa	2,2',3,5,5',6	151	360.9	96	5	0.12	0.007
hexa	2,2',3,3',5,6'	135	360.9	64	5	0.08	0.007
penta	2,3,3',4',5	107	326.4	29	5	0.04	0.007
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	180	9	0.25	0.013
penta	2,3',4,4',5	118	326.4	240	12	0.34	0.018
hexa	2,2',3,3',5,6	134	360.9	28	5	0.04	0.006
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.117
hexa	2,2',3,4',5,5'	146	360.9	48	5	0.06	0.007
hexa	2,2',4,4',5,5'	153	360.9	110	5.5	0.14	0.008
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	200	10	0.27	0.014
hexa	2,2',3,4,5,5'	141	360.9	17	5	0.02	0.006
hepta	2,2',3,3',5,6,6'	179	395.3	31	5	0.04	0.006
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.106
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	18	5	0.02	0.006
hexa	2,2',3,4,4',5'	138	360.9	220	11	0.28	0.015
hexa	2,3,3',4,4',6	158	360.9	19	5	0.02	0.006
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.106
hepta	2,2',3,3',5,5',6	178	395.3	34	5	0.04	0.006
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.098
hepta	2,2',3,4',5,5,6	187	395.3	72	5	0.08	0.006
hepta	2,2',3,4,4',5',6	183	395.3	22	5	0.03	0.006
hexa	2,2',3,3',4,4'	128	360.9	31	5	0.04	0.007
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.106
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.097
hepta	2,2',3,3',4,5,6'	174	395.3	31	5	0.04	0.006
hepta	2,2',3,3',4',5,6	177	395.3	34	5	0.04	0.006
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	20	5	0.02	0.006
hexa	2,3,3',4,4',5	156	360.9	12	5	0.02	0.006
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.098
hepta	2,2',3,3',4,5,5'	172	395.3	0	5	0.00	0.097
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.089
hepta	2,2',3,4,4',5,5'	180	395.3	59	5	0.07	0.006
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.097
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.097
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.089
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	81	5	0.10	0.006
octa	2,2',3,3',4,5,5',6'	201	429.8	24	5	0.03	0.005
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	28	5	0.03	0.005
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.097
octa	2,2',3,3',4,4',5,6	195	429.8	0	5	0.00	0.089
octa	2,2',3,3',4,4',5,5'	194	429.8	28	5	0.03	0.005
nona	2,2',3,3',4,4',5,5',6	206	464.2	17	5	0.02	0.005
deca	deca	209	498.7	0	5	0.00	0.077
				52376	3146.5	100.00	8.69

11.0340

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				12-16 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	10800	1080	15.86	1.618
mono	3	2	188.7	0	10	0.00	0.244
mono	4	3	188.7	1240	124	1.82	0.186
di	2,2' / 2,6	4, 10	223.1	14500	725	18.01	0.970
di	2,4 / 2,5	7, 9	223.1	770	38.5	0.96	0.052
di	2,3'	6	223.1	1980	99	2.46	0.133
di	2,3 / 2,4'	5, 8	223.1	5300	265	6.58	0.355
di	3,5	14	223.1	0	5	0.00	0.103
tri	2,2',6	19	257.5	6220	311	6.69	0.361
di	3,4	12	223.1	600	30	0.75	0.040
tri	2,2',5	18	257.5	2000	100	2.15	0.116
di, tri	4,4' / 2,2',4	15, 17	242.7	3130	156.5	3.57	0.193
tri	2,3,6 / 2,3',6	24, 27	257.5	6560	328	7.06	0.380
tri	2,2',3 / 2,4',6	16, 32	257.5	2100	105	2.26	0.122
tri	2,4,5	29	257.5	150	7.5	0.16	0.009
tri	2,3',5	26	257.5	3260	163	3.51	0.189
tri	2,3',4	25	257.5	920	46	0.99	0.053
tri	2,4',5	31	257.5	7400	370	7.96	0.429
tri	2,4,4'	28	257.5	0	5	0.00	0.089
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	2210	110.5	2.33	0.125
tetra	2,2',4,6'	51	292.0	550	27.5	0.52	0.028
tri	2,3,4'	22	257.5	480	24	0.52	0.028
tetra	2,2',3,6	45	292.0	500	25	0.47	0.026
tetra	2,2',3,6'	46	292.0	82	5	0.08	0.005
tri	3,4',5	39	257.5	0	5	0.00	0.089
tetra	2,2',5,5'	52	292.0	2820	141	2.68	0.144
tetra	2,2',4,5'	49	292.0	1900	95	1.80	0.097
tetra	2,2',4,4'	47	292.0	2100	105	1.99	0.107
tetra	2,2',4,5	48	292.0	0	5	0.00	0.079
tetra	2,3,5,6	65	292.0	98	5	0.09	0.005
tetra	2,2',3,5'	44	292.0	240	12	0.23	0.012
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	1530	76.5	1.48	0.080
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	650	32.5	0.62	0.033
tetra	2,2',3,3'	40	292.0	130	6.5	0.12	0.007
tetra	2,3',4,5	67	292.0	71	5	0.07	0.005
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.077
tetra	2,4,4',5	74	292.0	300	15	0.28	0.015
tetra	2,3',4',5	70	292.0	230	11.5	0.22	0.012
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	940	47	0.83	0.045
penta	2,2',3,4',6	91	326.4	400	20	0.34	0.018
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	150	7.5	0.14	0.008
penta	2,2',3,5,5'	92	326.4	410	20.5	0.35	0.019
penta	2,2',3,3',6	84	326.4	270	13.5	0.23	0.012
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	300	15	0.25	0.014
penta	2,2',4,4',5	99	326.4	190	9.5	0.16	0.009
penta	2,3',4,4',6	119	326.4	52	5	0.04	0.004
penta	2,2',3,3',5	83	326.4	70	5	0.06	0.004
penta	2,2',3',4,5	97	326.4	48	5	0.04	0.004
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.071

11.0341

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				12-16 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	69	5	0.06	0.004
hexa	2,2',3,3',6,6'	136	360.9	100	5	0.08	0.004
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	840	42	0.73	0.039
penta	2,2',3,3',4	82	326.4	21	5	0.02	0.004
hexa	2,2',3,5,5',6	151	360.9	240	12	0.18	0.010
hexa	2,2',3,3',5,6'	135	360.9	140	7	0.11	0.006
penta	2,3,3',4',5	107	326.4	77	5	0.07	0.004
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	360	18	0.30	0.016
penta	**2,3',4,4',5**	118	326.4	190	9.5	0.16	0.009
hexa	2,2',3,3',5,6	134	360.9	77	5	0.06	0.004
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.071
hexa	2,2',3,4',5,5'	146	360.9	96	5	0.07	0.004
hexa	2,2',4,4',5,5'	153	360.9	150	7.5	0.12	0.006
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	110	5.5	0.09	0.005
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.064
hepta	2,2',3,3',5,6,6'	179	395.3	105	5.25	0.07	0.004
hexa	2,2',3,4,4',5	137	360.9	12	5	0.01	0.004
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	41	5	0.03	0.004
hexa	2,2',3,4,4',5'	138	360.9	370	18.5	0.28	0.015
hexa	2,3,3',4,4',6	158	360.9	24	5	0.02	0.004
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.064
hepta	2,2',3,3',5,5',6	178	395.3	84	5	0.06	0.004
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.059
hepta	2,2',3,4',5,5,6	187	395.3	190	9.5	0.13	0.007
hepta	2,2',3,4,4',5',6	183	395.3	40	5	0.03	0.004
hexa	2,2',3,3',4,4'	128	360.9	35	5	0.03	0.004
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.064
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.058
hepta	2,2',3,3',4,5,6'	174	395.3	60	5	0.04	0.004
hepta	2,2',3,3',4',5,6	177	395.3	84	5	0.06	0.004
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	54	5	0.04	0.004
hexa	2,3,3',4,4',5	156	360.9	15	5	0.01	0.004
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	32	5	0.02	0.004
hepta	2,2',3,3',4,5,5'	172	395.3	15	5	0.01	0.004
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.054
hepta	2,2',3,4,4',5,5'	180	395.3	110	5.5	0.08	0.004
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.058
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.058
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.054
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	170	8.5	0.12	0.006
octa	2,2',3,3',4,5,5',6'	201	429.8	67	5	0.04	0.003
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	66	5	0.04	0.003
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.058
octa	2,2',3,3',4,4',5,6	195	429.8	34	5	0.02	0.003
octa	2,2',3,3',4,4',5,5'	194	429.8	58	5	0.04	0.003
nona	2,2',3,3',4,4',5,5',6	206	464.2	54	5	0.03	0.003
deca	deca	209	498.7	0	5	0.00	0.046
				87841	5157.25	100.00	7.744

11.0342

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				16-20 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	27600	2760	23.21	2.400
mono	3	2	188.7	0	10	0.00	0.132
mono	4	3	188.7	3160	316	2.66	0.275
di	2,2' / 2,6	4, 10	223.1	27400	1370	19.48	1.101
di	2,4 / 2,5	7, 9	223.1	1400	70	1.00	0.056
di	2,3'	6	223.1	3300	165	2.35	0.133
di	2,3 / 2,4'	5, 8	223.1	9290	464.5	6.60	0.373
di	3,5	14	223.1	0	5	0.00	0.056
tri	2,2',6	19	257.5	8900	445	5.48	0.310
di	3,4	12	223.1	1100	55	0.78	0.044
tri	2,2',5	18	257.5	2050	102.5	1.26	0.071
di, tri	4,4' / 2,2',4	15, 17	242.7	4180	209	2.73	0.154
tri	2,3,6 / 2,3',6	24, 27	257.5	9700	485	5.97	0.338
tri	2,2',3 / 2,4',6	16, 32	257.5	3660	183	2.25	0.127
tri	2,4,5	29	257.5	164	8.2	0.10	0.006
tri	2,3',5	26	257.5	4880	244	3.01	0.170
tri	2,3',4	25	257.5	1390	69.5	0.86	0.048
tri	2,4',5	31	257.5	12800	640	7.88	0.446
tri	2,4,4'	28	257.5	0	5	0.00	0.048
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	3120	156	1.88	0.106
tetra	2,2',4,6'	51	292.0	660	33	0.36	0.020
tri	2,3,4'	22	257.5	610	30.5	0.38	0.021
tetra	2,2',3,6	45	292.0	910	45.5	0.49	0.028
tetra	2,2',3,6'	46	292.0	120	6	0.07	0.004
tri	3,4',5	39	257.5	0	5	0.00	0.048
tetra	2,2',5,5'	52	292.0	3900	195	2.12	0.120
tetra	2,2',4,5'	49	292.0	3660	183	1.99	0.112
tetra	2,2',4,4'	47	292.0	3350	167.5	1.82	0.103
tetra	2,2',4,5	48	292.0	0	5	0.00	0.043
tetra	2,3,5,6	65	292.0	0	5	0.00	0.043
tetra	2,2',3,5'	44	292.0	170	8.5	0.09	0.005
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	1830	91.5	1.02	0.057
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	1750	87.5	0.95	0.054
tetra	2,2',3,3'	40	292.0	80	5	0.04	0.003
tetra	2,3',4,5	67	292.0	82	5	0.04	0.003
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.041
tetra	2,4,4',5	74	292.0	280	14	0.15	0.009
tetra	2,3',4',5	70	292.0	130	6.5	0.07	0.004
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	1230	61.5	0.62	0.035
penta	2,2',3,4',6	91	326.4	610	30.5	0.30	0.017
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	83	5	0.05	0.003
penta	2,2',3,5,5'	92	326.4	430	21.5	0.21	0.012
penta	2,2',3,3',6	84	326.4	360	18	0.17	0.010
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	270	13.5	0.13	0.007
penta	2,2',4,4',5	99	326.4	210	10.5	0.10	0.006
penta	2,3',4,4',6	119	326.4	41	5	0.02	0.002
penta	2,2',3,3',5	83	326.4	63	5	0.03	0.003
penta	2,2',3',4,5	97	326.4	30	5	0.01	0.002
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.038

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				16-20 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	56	5	0.03	0.003
hexa	2,2',3,3',6,6'	136	360.9	85	5	0.04	0.002
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	530	26.5	0.26	0.015
penta	2,2',3,3',4	82	326.4	13	5	0.01	0.002
hexa	2,2',3,5,5',6	151	360.9	150	7.5	0.07	0.004
hexa	2,2',3,3',5,6'	135	360.9	90	5	0.04	0.002
penta	2,3,3',4',5	107	326.4	59	5	0.03	0.003
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	270	13.5	0.13	0.007
penta	**2,3',4,4',5**	118	326.4	110	5.5	0.05	0.003
hexa	2,2',3,3',5,6	134	360.9	50	5	0.02	0.002
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.038
hexa	2,2',3,4',5,5'	146	360.9	67	5	0.03	0.002
hexa	2,2',4,4',5,5'	153	360.9	120	6	0.05	0.003
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	77	5	0.03	0.002
hexa	2,2',3,4,5,5'	141	360.9	18	5	0.01	0.002
hepta	2,2',3,3',5,6,6'	179	395.3	49	5	0.02	0.002
hexa	2,2',3,4,4',5	137	360.9	14	5	0.01	0.002
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	28	5	0.01	0.002
hexa	2,2',3,4,4',5'	138	360.9	270	13.5	0.12	0.007
hexa	2,3,3',4,4',6	158	360.9	20	5	0.01	0.002
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.034
hepta	2,2',3,3',5,5',6	178	395.3	44	5	0.02	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	5	0.00	0.032
hepta	2,2',3,4',5,5,6	187	395.3	110	5.5	0.04	0.002
hepta	2,2',3,4,4',5',6	183	395.3	33	5	0.01	0.002
hexa	2,2',3,3',4,4'	128	360.9	34	5	0.01	0.002
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.034
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.031
hepta	2,2',3,3',4,5,6'	174	395.3	46	5	0.02	0.002
hepta	2,2',3,3',4',5,6	177	395.3	48	5	0.02	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	31	5	0.01	0.002
hexa	2,3,3',4,4',5	156	360.9	13	5	0.01	0.002
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	0	5	0.00	0.032
hepta	2,2',3,3',4,5,5'	172	395.3	11	5	0.00	0.002
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.029
hepta	2,2',3,4,4',5,5'	180	395.3	82	5	0.03	0.002
hepta	2,3,3',4',5,5',6	193	395.3	0	5	0.00	0.031
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.031
octa	2,2',3,3',4,5,6,6'	199	429.8	0	5	0.00	0.029
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	130	6.5	0.05	0.003
octa	2,2',3,3',4,5,5',6'	201	429.8	43	5	0.02	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	44	5	0.02	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.031
octa	2,2',3,3',4,4',5,6	195	429.8	21	5	0.01	0.002
octa	2,2',3,3',4,4',5,5'	194	429.8	37	5	0.01	0.002
nona	2,2',3,3',4,4',5,5',6	206	464.2	31	5	0.01	0.002
deca	deca	209	498.7	0	5	0.00	0.025
				147787	9121.2	100.00	7.73

11.0344

Hudson River Core Data
Milepoint 188.6
Collected July 1991
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				20-24 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	27400	2740	17.38	1.775
mono	3	2	188.7	0	10	0.00	0.105
mono	4	3	188.7	4190	419	2.66	0.271
di	2,2' / 2,6	4, 10	223.1	27700	1385	14.86	0.805
di	2,4 / 2,5	7, 9	223.1	1660	83	0.89	0.048
di	2,3'	6	223.1	9040	452	4.85	0.263
di	2,3 / 2,4'	5, 8	223.1	16400	820	8.80	0.477
di	3,5	14	223.1	0	5	0.00	0.044
tri	2,2',6	19	257.5	10700	535	4.97	0.269
di	3,4	12	223.1	1900	95	1.02	0.055
tri	2,2',5	18	257.5	1950	97.5	0.91	0.049
di, tri	4,4' / 2,2',4	15, 17	242.7	7600	380	3.75	0.203
tri	2,3,6 / 2,3',6	24, 27	257.5	13600	680	6.32	0.342
tri	2,2',3 / 2,4',6	16, 32	257.5	6500	325	3.02	0.164
tri	2,4,5	29	257.5	220	11	0.10	0.006
tri	2,3',5	26	257.5	1020	51	0.47	0.026
tri	2,3',4	25	257.5	3650	182.5	1.70	0.092
tri	2,4',5	31	257.5	17400	870	8.08	0.438
tri	2,4,4'	28	257.5	0	5	0.00	0.038
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	4300	215	1.96	0.106
tetra	2,2',4,6'	51	292.0	1100	55	0.45	0.024
tri	2,3,4'	22	257.5	1480	74	0.69	0.037
tetra	2,2',3,6	45	292.0	1420	71	0.58	0.032
tetra	2,2',3,6'	46	292.0	200	10	0.08	0.004
tri	3,4',5	39	257.5	0	5	0.00	0.038
tetra	2,2',5,5'	52	292.0	5000	250	2.05	0.111
tetra	2,2',4,5'	49	292.0	6230	311.5	2.55	0.138
tetra	2,2',4,4'	47	292.0	5400	270	2.21	0.120
tetra	2,2',4,5	48	292.0	0	5	0.00	0.034
tetra	2,3,5,6	65	292.0	200	10	0.08	0.004
tetra	2,2',3,5'	44	292.0	440	22	0.18	0.010
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	3300	165	1.38	0.075
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	3400	170	1.39	0.075
tetra	2,2',3,3'	40	292.0	140	7	0.06	0.003
tetra	2,3',4,5	67	292.0	180	9	0.07	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.033
tetra	2,4,4',5	74	292.0	660	33	0.27	0.015
tetra	2,3',4',5	70	292.0	510	25.5	0.21	0.011
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	2440	122	0.93	0.050
penta	2,2',3,4',6	91	326.4	1340	67	0.49	0.027
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	290	14.5	0.12	0.006
penta	2,2',3,5,5'	92	326.4	1480	74	0.54	0.029
penta	2,2',3,3',6	84	326.4	960	48	0.35	0.019
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	960	48	0.35	0.019
penta	2,2',4,4',5	99	326.4	710	35.5	0.26	0.014
penta	2,3',4,4',6	119	326.4	130	6.5	0.05	0.003
penta	2,2',3,3',5	83	326.4	310	15.5	0.11	0.006
penta	2,2',3',4,5	97	326.4	150	7.5	0.05	0.003
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.030

11.0345

Hudson River Core Data
Milepoint 188.6
Collected July 1991
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				20-24 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	190	9.5	0.07	0.004
hexa	2,2',3,3',6,6'	136	360.9	250	12.5	0.08	0.004
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	1790	89.5	0.67	0.036
penta	2,2',3,3',4	82	326.4	60	5	0.02	0.002
hexa	2,2',3,5,5',6	151	360.9	380	19	0.13	0.007
hexa	2,2',3,3',5,6'	135	360.9	260	13	0.09	0.005
penta	2,3,3',4',5	107	326.4	120	6	0.04	0.002
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	750	37.5	0.27	0.015
penta	**2,3',4,4',5**	118	326.4	530	26.5	0.19	0.011
hexa	2,2',3,3',5,6	134	360.9	150	7.5	0.05	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.030
hexa	2,2',3,4',5,5'	146	360.9	200	10	0.07	0.004
hexa	2,2',4,4',5,5'	153	360.9	400	20	0.13	0.007
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.028
hexa	2,2',3,4,5,5'	141	360.9	47	5	0.02	0.002
hepta	2,2',3,3',5,6,6'	179	395.3	120	6	0.04	0.002
hexa	2,2',3,4,4',5	137	360.9	38	5	0.01	0.002
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	99	5	0.03	0.002
hexa	2,2',3,4,4',5'	138	360.9	730	36.5	0.24	0.013
hexa	2,3,3',4,4',6	158	360.9	59	5	0.02	0.002
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.027
hepta	2,2',3,3',5,5',6	178	395.3	100	5	0.03	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	13	5	0.00	0.002
hepta	2,2',3,4',5,5,6	187	395.3	250	12.5	0.08	0.004
hepta	2,2',3,4,4',5',6	183	395.3	67	5	0.02	0.002
hexa	2,2',3,3',4,4'	128	360.9	120	6	0.04	0.002
hexa	2,3',4,4',5,5'	167	360.9	31	5	0.01	0.002
hepta	2,2',3,4,5,5',6	185	395.3	13	5	0.00	0.002
hepta	2,2',3,3',4,5,6'	174	395.3	110	5.5	0.03	0.002
hepta	2,2',3,3',4',5,6	177	395.3	120	6	0.04	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	77	5	0.02	0.002
hexa	2,3,3',4,4',5	156	360.9	52	5	0.02	0.002
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	63	5	0.02	0.002
hepta	2,2',3,3',4,5,5'	172	395.3	24	5	0.01	0.002
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.023
hepta	2,2',3,4,4',5,5'	180	395.3	200	10	0.06	0.003
hepta	2,3,3',4',5,5',6	193	395.3	17	5	0.01	0.002
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.025
octa	2,2',3,3',4,5,6,6'	199	429.8	12	5	0.00	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	310	15.5	0.09	0.005
octa	2,2',3,3',4,5,5',6'	201	429.8	97	5	0.03	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	95	5	0.03	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.025
octa	2,2',3,3',4,4',5,6	195	429.8	43	5	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	79	5	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	67	5	0.02	0.001
deca	deca	209	498.7	0	5	0.00	0.020
				201793	11791.5	100.00	6.90

11.0346

Hudson River Core Data
Milepoint 188.6
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				24-28 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	51400	5140	17.65	1.803
mono	3	2	188.7	0	10	0.00	0.058
mono	4	3	188.7	350	35	0.12	0.012
di	2,2' / 2,6	4, 10	223.1	41300	2065	11.99	0.650
di	2,4 / 2,5	7, 9	223.1	2150	107.5	0.62	0.034
di	2,3'	6	223.1	17400	870	5.05	0.274
di	2,3 / 2,4'	5, 8	223.1	41900	2095	12.16	0.659
di	3,5	14	223.1	0	5	0.00	0.025
tri	2,2',6	19	257.5	16500	825	4.15	0.225
di	3,4	12	223.1	2220	111	0.64	0.035
tri	2,2',5	18	257.5	3900	195	0.98	0.053
di, tri	4,4' / 2,2',4	15, 17	242.7	16000	800	4.27	0.231
tri	2,3,6 / 2,3',6	24, 27	257.5	24100	1205	6.06	0.328
tri	2,2',3 / 2,4',6	16, 32	257.5	17800	890	4.48	0.243
tri	2,4,5	29	257.5	320	16	0.08	0.004
tri	2,3',5	26	257.5	19200	960	4.83	0.262
tri	2,3',4	25	257.5	3620	181	0.91	0.049
tri	2,4',5	31	257.5	22500	1125	5.66	0.307
tri	2,4,4'	28	257.5	0	5	0.00	0.021
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	7200	360	1.77	0.096
tetra	2,2',4,6'	51	292.0	2760	138	0.61	0.033
tri	2,3,4'	22	257.5	1500	75	0.38	0.020
tetra	2,2',3,6	45	292.0	2860	143	0.63	0.034
tetra	2,2',3,6'	46	292.0	590	29.5	0.13	0.007
tri	3,4',5	39	257.5	400	20	0.10	0.005
tetra	2,2',5,5'	52	292.0	11000	550	2.44	0.132
tetra	2,2',4,5'	49	292.0	13300	665	2.95	0.160
tetra	2,2',4,4'	47	292.0	9800	490	2.17	0.118
tetra	2,2',4,5	48	292.0	0	5	0.00	0.019
tetra	2,3,5,6	65	292.0	350	17.5	0.08	0.004
tetra	2,2',3,5'	44	292.0	590	29.5	0.13	0.007
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	5500	275	1.25	0.068
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	7000	350	1.55	0.084
tetra	2,2',3,3'	40	292.0	190	9.5	0.04	0.002
tetra	2,3',4,5	67	292.0	340	17	0.08	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.018
tetra	2,4,4',5	74	292.0	640	32	0.14	0.008
tetra	2,3',4',5	70	292.0	290	14.5	0.06	0.003
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	4490	224.5	0.93	0.050
penta	2,2',3,4',6	91	326.4	2830	141.5	0.56	0.030
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	180	9	0.04	0.002
penta	2,2',3,5,5'	92	326.4	2750	137.5	0.55	0.030
penta	2,2',3,3',6	84	326.4	2200	110	0.44	0.024
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	1950	97.5	0.39	0.021
penta	2,2',4,4',5	99	326.4	1360	68	0.27	0.015
penta	2,3',4,4',6	119	326.4	230	11.5	0.05	0.002
penta	2,2',3,3',5	83	326.4	630	31.5	0.13	0.007
penta	2,2',3',4,5	97	326.4	300	15	0.06	0.003
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.017

11.0347

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				24-28 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	290	14.5	0.06	0.003
hexa	2,2',3,3',6,6'	136	360.9	490	24.5	0.09	0.005
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	2290	114.5	0.47	0.025
penta	2,2',3,3',4	82	326.4	72	5	0.01	0.001
hexa	2,2',3,5,5',6	151	360.9	690	34.5	0.12	0.007
hexa	2,2',3,3',5,6'	135	360.9	470	23.5	0.08	0.005
penta	2,3,3',4',5	107	326.4	280	14	0.06	0.003
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	1320	66	0.26	0.014
penta	2,3',4,4',5	118	326.4	800	40	0.16	0.009
hexa	2,2',3,3',5,6	134	360.9	300	15	0.05	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.017
hexa	2,2',3,4',5,5'	146	360.9	380	19	0.07	0.004
hexa	2,2',4,4',5,5'	153	360.9	780	39	0.14	0.008
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.016
hexa	2,2',3,4,5,5'	141	360.9	60	5	0.01	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	220	11	0.04	0.002
hexa	2,2',3,4,4',5	137	360.9	55	5	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	170	8.5	0.03	0.002
hexa	2,2',3,4,4',5'	138	360.9	1180	59	0.21	0.011
hexa	2,3,3',4,4',6	158	360.9	70	5	0.01	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.015
hepta	2,2',3,3',5,5',6	178	395.3	160	8	0.03	0.001
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	25	5	0.00	0.001
hepta	2,2',3,4',5,5,6	187	395.3	450	22.5	0.07	0.004
hepta	2,2',3,4,4',5',6	183	395.3	110	5.5	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	180	9	0.03	0.002
hexa	2,3',4,4',5,5'	167	360.9	51	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	23	5	0.00	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	200	10	0.03	0.002
hepta	2,2',3,3',4',5,6	177	395.3	210	10.5	0.03	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	140	7	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	70	5	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	104	5.2	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	45	5	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.013
hepta	2,2',3,4,4',5,5'	180	395.3	330	16.5	0.05	0.003
hepta	2,3,3',4',5,5',6	193	395.3	33	5	0.01	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.014
octa	2,2',3,3',4,5,6,6'	199	429.8	21	5	0.00	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	500	25	0.08	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	180	9	0.03	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	170	8.5	0.03	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.014
octa	2,2',3,3',4,4',5,6	195	429.8	85	5	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	140	7	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	130	6.5	0.02	0.001
deca	deca	209	498.7	0	5	0.00	0.011
				375164	21445	100.00	6.53

11.0348

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				28-32 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	80600	8060	21.77	2.242
mono	3	2	188.7	0	10	0.00	0.043
mono	4	3	188.7	10900	1090	2.94	0.303
di	2,2' / 2,6	4, 10	223.1	69600	3480	15.90	0.885
di	2,4 / 2,5	7, 9	223.1	2720	136	0.62	0.035
di	2,3'	6	223.1	13500	675	3.08	0.172
di	2,3 / 2,4'	5, 8	223.1	35600	1780	8.13	0.453
di	3,5	14	223.1	160	8	0.04	0.002
tri	2,2',6	19	223.1	25300	1265	5.78	0.322
di	3,4	12	223.1	1850	92.5	0.42	0.024
tri	2,2',5	18	223.1	4570	228.5	1.04	0.058
di, tri	4,4' / 2,2',4	15, 17	242.7	15400	770	3.23	0.180
tri	2,3,6 / 2,3',6	24, 27	257.5	33100	1655	6.55	0.365
tri	2,2',3 / 2,4',6	16, 32	257.5	16000	800	3.17	0.176
tri	2,4,5	29	257.5	570	28.5	0.11	0.006
tri	2,3',5	26	257.5	19300	965	3.82	0.213
tri	2,3',4	25	257.5	3260	163	0.64	0.036
tri	2,4',5	31	257.5	19600	980	3.88	0.216
tri	2,4,4'	28	257.5	0	5	0.00	0.016
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	9900	495	1.92	0.107
tetra	2,2',4,6'	51	292.0	2890	144.5	0.50	0.028
tri	2,3,4'	22	257.5	1170	58.5	0.23	0.013
tetra	2,2',3,6	45	292.0	3380	169	0.59	0.033
tetra	2,2',3,6'	46	292.0	510	25.5	0.09	0.005
tri	3,4',5	39	257.5	590	29.5	0.12	0.007
tetra	2,2',5,5'	52	292.0	13200	660	2.30	0.128
tetra	2,2',4,5'	49	292.0	15000	750	2.62	0.146
tetra	2,2',4,4'	47	292.0	10500	525	1.83	0.102
tetra	2,2',4,5	48	292.0	0	5	0.00	0.014
tetra	2,3,5,6	65	292.0	410	20.5	0.07	0.004
tetra	2,2',3,5'	44	292.0	530	26.5	0.09	0.005
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	5200	260	0.93	0.052
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	6040	302	1.05	0.059
tetra	2,2',3,3'	40	292.0	0	5	0.00	0.014
tetra	2,3',4,5	67	292.0	440	22	0.08	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	4920	246	0.84	0.047
tetra	2,4,4',5	74	292.0	720	36	0.13	0.007
tetra	2,3',4',5	70	292.0	250	12.5	0.04	0.002
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	4900	245	0.80	0.044
penta	2,2',3,4',6	91	326.4	3080	154	0.48	0.027
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	150	7.5	0.03	0.001
penta	2,2',3,5,5'	92	326.4	3670	183.5	0.57	0.032
penta	2,2',3,3',6	84	326.4	2330	116.5	0.36	0.020
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	2450	122.5	0.38	0.021
penta	2,2',4,4',5	99	326.4	1660	83	0.26	0.014
penta	2,3',4,4',6	119	326.4	305	15.25	0.05	0.003
penta	2,2',3,3',5	83	326.4	790	39.5	0.12	0.007
penta	2,2',3',4,5	97	326.4	340	17	0.05	0.003
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.012

11.0349

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				28-32 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	300	15	0.05	0.003
hexa	2,2',3,3',6,6'	136	360.9	680	34	0.10	0.005
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	2540	127	0.41	0.023
penta	2,2',3,3',4	82	326.4	55	5	0.01	0.001
hexa	2,2',3,5,5',6	151	360.9	1050	52.5	0.15	0.008
hexa	2,2',3,3',5,6'	135	360.9	680	34	0.10	0.005
penta	2,3,3',4',5	107	326.4	340	17	0.05	0.003
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	1650	82.5	0.25	0.014
penta	**2,3',4,4',5**	118	326.4	840	42	0.13	0.007
hexa	2,2',3,3',5,6	134	360.9	420	21	0.06	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.012
hexa	2,2',3,4',5,5'	146	360.9	580	29	0.08	0.005
hexa	2,2',4,4',5,5'	153	360.9	990	49.5	0.14	0.008
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.012
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.011
hepta	2,2',3,3',5,6,6'	179	395.3	390	19.5	0.05	0.003
hexa	2,2',3,4,4',5	137	360.9	39	5	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	210	10.5	0.03	0.002
hexa	2,2',3,4,4',5'	138	360.9	1340	67	0.19	0.011
hexa	2,3,3',4,4',6	158	360.9	50	5	0.01	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.011
hepta	2,2',3,3',5,5',6	178	395.3	240	12	0.03	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	21	5	0.00	0.001
hepta	2,2',3,4',5,5,6	187	395.3	680	34	0.09	0.005
hepta	2,2',3,4,4',5',6	183	395.3	130	6.5	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	140	7	0.02	0.001
hexa	2,3',4,4',5,5'	167	360.9	48	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	26	5	0.00	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	270	13.5	0.03	0.002
hepta	2,2',3,3',4',5,6	177	395.3	310	15.5	0.04	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	180	9	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	44	5	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	120	6	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	63	5	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	11	5	0.00	0.001
hepta	2,2',3,4,4',5,5'	180	395.3	380	19	0.05	0.003
hepta	2,3,3',4',5,5',6	193	395.3	50	5	0.01	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.010
octa	2,2',3,3',4,5,6,6'	199	429.8	30	5	0.00	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	540	27	0.07	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	270	13.5	0.03	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	230	11.5	0.03	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.010
octa	2,2',3,3',4,4',5,6	195	429.8	120	6	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	190	9.5	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	170	8.5	0.02	0.001
deca	deca	209	498.7	0	5	0.00	0.008
				463772	27861.75	100.00	6.92

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				32-36 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	134000	13400	20.84	2.143
mono	3	2	188.7	0	10	0.00	0.025
mono	4	3	188.7	18500	1850	2.88	0.296
di	2,2' / 2,6	4, 10	223.1	117000	5850	15.39	0.853
di	2,4 / 2,5	7, 9	223.1	5090	254.5	0.67	0.037
di	2,3'	6	223.1	15800	790	2.08	0.115
di	2,3 / 2,4'	5, 8	223.1	86900	4345	11.43	0.634
di	3,5	14	223.1	240	12	0.03	0.002
tri	2,2',6	19	257.5	41900	2095	4.77	0.265
di	3,4	12	223.1	2400	120	0.32	0.018
tri	2,2',5	18	257.5	5230	261.5	0.60	0.033
di, tri	4,4' / 2,2',4	15, 17	242.7	50500	2525	6.10	0.338
tri	2,3,6 / 2,3',6	24, 27	257.5	51700	2585	5.89	0.327
tri	2,2',3 / 2,4',6	16, 32	257.5	39800	1990	4.53	0.251
tri	2,4,5	29	257.5	1090	54.5	0.12	0.007
tri	2,3',5	26	257.5	25900	1295	2.95	0.164
tri	2,3',4	25	257.5	3160	158	0.36	0.020
tri	2,4',5	31	257.5	30900	1545	3.52	0.195
tri	2,4,4'	28	257.5	0	5	0.00	0.009
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	15100	755	1.68	0.093
tetra	2,2',4,6'	51	292.0	7840	392	0.79	0.044
tri	2,3,4'	22	257.5	2140	107	0.24	0.014
tetra	2,2',3,6	45	292.0	6060	303	0.61	0.034
tetra	2,2',3,6'	46	292.0	430	21.5	0.04	0.002
tri	3,4',5	39	257.5	930	46.5	0.11	0.006
tetra	2,2',5,5'	52	292.0	14000	700	1.41	0.078
tetra	2,2',4,5'	49	292.0	21500	1075	2.16	0.120
tetra	2,2',4,4'	47	292.0	19100	955	1.92	0.106
tetra	2,2',4,5	48	292.0	0	5	0.00	0.008
tetra	2,3,5,6	65	292.0	550	27.5	0.06	0.003
tetra	2,2',3,5'	44	292.0	1520	76	0.15	0.008
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	8830	441.5	0.91	0.050
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	9950	497.5	1.00	0.055
tetra	2,2',3,3'	40	292.0	0	5	0.00	0.008
tetra	2,3',4,5	67	292.0	790	39.5	0.08	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	8690	434.5	0.85	0.047
tetra	2,4,4',5	74	292.0	1670	83.5	0.17	0.009
tetra	2,3',4',5	70	292.0	460	23	0.05	0.003
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	8250	412.5	0.77	0.043
penta	2,2',3,4',6	91	326.4	4380	219	0.39	0.022
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	240	12	0.02	0.001
penta	2,2',3,5,5'	92	326.4	5100	255	0.46	0.025
penta	2,2',3,3',6	84	326.4	2900	145	0.26	0.014
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	4290	214.5	0.39	0.021
penta	2,2',4,4',5	99	326.4	3270	163.5	0.29	0.016
penta	2,3',4,4',6	119	326.4	570	28.5	0.05	0.003
penta	2,2',3,3',5	83	326.4	1620	81	0.15	0.008
penta	2,2',3',4,5	97	326.4	860	43	0.08	0.004
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.007

11.0351

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				32-36 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	690	34.5	0.06	0.003
hexa	2,2',3,3',6,6'	136	360.9	850	42.5	0.07	0.004
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	5100	255	0.47	0.026
penta	2,2',3,3',4	82	326.4	190	9.5	0.02	0.001
hexa	2,2',3,5,5',6	151	360.9	1500	75	0.12	0.007
hexa	2,2',3,3',5,6'	135	360.9	1090	54.5	0.09	0.005
penta	2,3,3',4',5	107	326.4	1110	55.5	0.10	0.006
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	2650	132.5	0.23	0.013
penta	2,3',4,4',5	118	326.4	2000	100	0.18	0.010
hexa	2,2',3,3',5,6	134	360.9	580	29	0.05	0.003
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.007
hexa	2,2',3,4',5,5'	146	360.9	980	49	0.08	0.004
hexa	2,2',4,4',5,5'	153	360.9	1830	91.5	0.15	0.008
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.007
hexa	2,2',3,4,5,5'	141	360.9	130	6.5	0.01	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	540	27	0.04	0.002
hexa	2,2',3,4,4',5	137	360.9	92	5	0.01	0.000
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	430	21.5	0.03	0.002
hexa	2,2',3,4,4',5'	138	360.9	2360	118	0.19	0.011
hexa	2,3,3',4,4',6	158	360.9	160	8	0.01	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.007
hepta	2,2',3,3',5,5',6	178	395.3	430	21.5	0.03	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	54	5	0.00	0.000
hepta	2,2',3,4',5,5,6	187	395.3	1030	51.5	0.08	0.004
hepta	2,2',3,4,4',5',6	183	395.3	240	12	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	320	16	0.03	0.001
hexa	2,3',4,4',5,5'	167	360.9	92	5	0.01	0.000
hepta	2,2',3,4,5,5',6	185	395.3	52	5	0.00	0.000
hepta	2,2',3,3',4,5,6'	174	395.3	470	23.5	0.03	0.002
hepta	2,2',3,3',4',5,6	177	395.3	520	26	0.04	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	300	15	0.02	0.001
hexa	2,3,3',4,4',5	156	360.9	120	6	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	230	11.5	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	110	5.5	0.01	0.000
octa	2,2',3,3',4,4',6,6'	197	429.8	19	5	0.00	0.000
hepta	2,2',3,4,4',5,5'	180	395.3	700	35	0.05	0.003
hepta	2,3,3',4',5,5',6	193	395.3	89	5	0.01	0.000
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.006
octa	2,2',3,3',4,5,6,6'	199	429.8	47	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	1020	51	0.08	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	370	18.5	0.03	0.001
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	340	17	0.02	0.001
hepta	2,3,3',4,4',5,5'	189	395.3	24	5	0.00	0.000
octa	2,2',3,3',4,4',5,6	195	429.8	150	7.5	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	300	15	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	200	10	0.01	0.001
deca	deca	209	498.7	0	5	0.00	0.005
				810659	48230	100.00	6.76

11.0352

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				36-40 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	134000	13400	26.73	2.784
mono	3	2	188.7		10	0.00	0.031
mono	4	3	188.7	17700	1770	3.53	0.368
di	2,2' / 2,6	4, 10	223.1	103000	5150	17.37	1.006
di	2,4 / 2,5	7, 9	223.1	5240	262	0.88	0.051
di	2,3'	6	223.1	11200	560	1.89	0.109
di	2,3 / 2,4'	5, 8	223.1	45600	2280	7.69	0.445
di	3,5	14	223.1	180	9	0.03	0.002
tri	2,2',6	19	257.5	33500	1675	4.90	0.283
di	3,4	12	223.1	2400	120	0.40	0.023
tri	2,2',5	18	257.5	5620	281	0.82	0.048
di, tri	4,4' / 2,2',4	15, 17	242.7	23200	1160	3.60	0.208
tri	2,3,6 / 2,3',6	24, 27	257.5	42300	2115	6.18	0.358
tri	2,2',3 / 2,4',6	16, 32	257.5	22400	1120	3.27	0.189
tri	2,4,5	29	257.5	800	40	0.12	0.007
tri	2,3',5	26	257.5	240	12	0.04	0.002
tri	2,3',4	25	257.5	230	11.5	0.03	0.002
tri	2,4',5	31	257.5	30100	1505	4.40	0.255
tri	2,4,4'	28	257.5	0	5	0.00	0.011
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	12400	620	1.77	0.103
tetra	2,2',4,6'	51	292.0	4580	229	0.59	0.034
tri	2,3,4'	22	257.5	1520	76	0.22	0.013
tetra	2,2',3,6	45	292.0	4700	235	0.61	0.035
tetra	2,2',3,6'	46	292.0	500	25	0.06	0.004
tri	3,4',5	39	257.5	830	41.5	0.12	0.007
tetra	2,2',5,5'	52	292.0	13900	695	1.79	0.104
tetra	2,2',4,5'	49	292.0	17900	895	2.31	0.134
tetra	2,2',4,4'	47	292.0	14800	740	1.91	0.110
tetra	2,2',4,5	48	292.0	0	5	0.00	0.010
tetra	2,3,5,6	65	292.0	440	22	0.06	0.003
tetra	2,2',3,5'	44	292.0	690	34.5	0.09	0.005
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	6800	340	0.90	0.052
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	8180	409	1.05	0.061
tetra	2,2',3,3'	40	292.0	0	5	0.00	0.010
tetra	2,3',4,5	67	292.0	530	26.5	0.07	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	5600	280	0.70	0.041
tetra	2,4,4',5	74	292.0	820	41	0.11	0.006
tetra	2,3',4',5	70	292.0	300	15	0.04	0.002
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	6190	309.5	0.74	0.043
penta	2,2',3,4',6	91	326.4	3050	152.5	0.35	0.020
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	170	8.5	0.02	0.001
penta	2,2',3,5,5'	92	326.4	4320	216	0.50	0.029
penta	2,2',3,3',6	84	326.4	2550	127.5	0.29	0.017
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	3240	162	0.37	0.022
penta	2,2',4,4',5	99	326.4	2360	118	0.27	0.016
penta	2,3',4,4',6	119	326.4	520	26	0.06	0.003
penta	2,2',3,3',5	83	326.4	1170	58.5	0.13	0.008
penta	2,2',3',4,5	97	326.4	470	23.5	0.05	0.003
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.009

11.0353

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				36-40 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	470	23.5	0.05	0.003
hexa	2,2',3,3',6,6'	136	360.9	860	43	0.09	0.005
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	5570	278.5	0.66	0.038
penta	2,2',3,3',4	82	326.4	94	5	0.01	0.001
hexa	2,2',3,5,5',6	151	360.9	1470	73.5	0.15	0.009
hexa	2,2',3,3',5,6'	135	360.9	980	49	0.10	0.006
penta	2,3,3',4',5	107	326.4	510	25.5	0.06	0.003
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	2520	126	0.28	0.016
penta	2,3',4,4',5	118	326.4	1150	57.5	0.13	0.008
hexa	2,2',3,3',5,6	134	360.9	590	29.5	0.06	0.004
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.009
hexa	2,2',3,4',5,5'	146	360.9	850	42.5	0.09	0.005
hexa	2,2',4,4',5,5'	153	360.9	1670	83.5	0.17	0.010
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.008
hexa	2,2',3,4,5,5'	141	360.9	140	7	0.01	0.001
hepta	2,2',3,3',5,6,6'	179	395.3	540	27	0.05	0.003
hexa	2,2',3,4,4',5	137	360.9	100	5	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	370	18.5	0.04	0.002
hexa	2,2',3,4,4',5'	138	360.9	2160	108	0.23	0.013
hexa	2,3,3',4,4',6	158	360.9	150	7.5	0.02	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.008
hepta	2,2',3,3',5,5',6	178	395.3	420	21	0.04	0.002
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	55	5	0.01	0.001
hepta	2,2',3,4',5,5,6	187	395.3	1000	50	0.10	0.006
hepta	2,2',3,4,4',5',6	183	395.3	260	13	0.02	0.001
hexa	2,2',3,3',4,4'	128	360.9	280	14	0.03	0.002
hexa	2,3',4,4',5,5'	167	360.9	89	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	56	5	0.01	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	510	25.5	0.05	0.003
hepta	2,2',3,3',4',5,6	177	395.3	520	26	0.05	0.003
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	300	15	0.03	0.002
hexa	2,3,3',4,4',5	156	360.9	110	5.5	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	210	10.5	0.02	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	120	6	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	18	5	0.00	0.000
hepta	2,2',3,4,4',5,5'	180	395.3	760	38	0.07	0.004
hepta	2,3,3',4',5,5',6	193	395.3	89	5	0.01	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.007
octa	2,2',3,3',4,5,6,6'	199	429.8	45	5	0.00	0.000
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	1140	57	0.11	0.006
octa	2,2',3,3',4,5,5',6'	201	429.8	350	17.5	0.03	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	340	17	0.03	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	28	5	0.00	0.000
octa	2,2',3,3',4,4',5,6	195	429.8	160	8	0.01	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	280	14	0.02	0.001
nona	2,2',3,3',4,4',5,5',6	206	464.2	200	10	0.02	0.001
deca	deca	209	498.7	0	5	0.00	0.006
				623774	38845	100.00	7.30

11.0354

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				40-44 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	56500	5650	20.46	2.102
mono	3	2	188.7	0	10	0.00	0.058
mono	4	3	188.7	9210	921	3.34	0.343
di	2,2' / 2,6	4, 10	223.1	48800	2440	14.95	0.825
di	2,4 / 2,5	7, 9	223.1	2320	116	0.71	0.039
di	2,3'	6	223.1	5720	286	1.75	0.097
di	2,3 / 2,4'	5, 8	223.1	32600	1630	9.98	0.551
di	3,5	14	223.1	0	5	0.00	0.025
tri	2,2',6	19	257.5	18300	915	4.86	0.268
di	3,4	12	223.1	1570	78.5	0.48	0.027
tri	2,2',5	18	257.5	5040	252	1.34	0.074
di, tri	4,4' / 2,2',4	15, 17	242.7	12800	640	3.60	0.199
tri	2,3,6 / 2,3',6	24, 27	257.5	22500	1125	5.97	0.329
tri	2,2',3 / 2,4',6	16, 32	257.5	12900	645	3.42	0.189
tri	2,4,5	29	257.5	400	20	0.11	0.006
tri	2,3',5	26	257.5	12500	625	3.32	0.183
tri	2,3',4	25	257.5	2130	106.5	0.57	0.031
tri	2,4',5	31	257.5	15300	765	4.06	0.224
tri	2,4,4'	28	257.5	3840	192	1.02	0.056
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	7780	389	2.02	0.112
tetra	2,2',4,6'	51	292.0	2190	109.5	0.51	0.028
tri	2,3,4'	22	257.5	1100	55	0.29	0.016
tetra	2,2',3,6	45	292.0	2640	132	0.62	0.034
tetra	2,2',3,6'	46	292.0	370	18.5	0.09	0.005
tri	3,4',5	39	257.5	400	20	0.11	0.006
tetra	2,2',5,5'	52	292.0	9790	489.5	2.29	0.126
tetra	2,2',4,5'	49	292.0	9540	477	2.23	0.123
tetra	2,2',4,4'	47	292.0	8390	419.5	1.96	0.108
tetra	2,2',4,5	48	292.0	0	5	0.00	0.019
tetra	2,3,5,6	65	292.0	270	13.5	0.06	0.003
tetra	2,2',3,5'	44	292.0	540	27	0.13	0.007
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	4560	228	1.09	0.060
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	4880	244	1.14	0.063
tetra	2,2',3,3'	40	292.0	180	9	0.04	0.002
tetra	2,3',4,5	67	292.0	310	15.5	0.07	0.004
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	1980	99	0.45	0.025
tetra	2,4,4',5	74	292.0	630	31.5	0.15	0.008
tetra	2,3',4',5	70	292.0	370	18.5	0.09	0.005
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	3600	180	0.78	0.043
penta	2,2',3,4',6	91	326.4	2200	110	0.46	0.025
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	260	13	0.06	0.003
penta	2,2',3,5,5'	92	326.4	2510	125.5	0.53	0.029
penta	2,2',3,3',6	84	326.4	1620	81	0.34	0.019
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	1750	87.5	0.37	0.020
penta	2,2',4,4',5	99	326.4	1190	59.5	0.25	0.014
penta	2,3',4,4',6	119	326.4	340	17	0.07	0.004
penta	2,2',3,3',5	83	326.4	540	27	0.11	0.006
penta	2,2',3',4,5	97	326.4	200	10	0.04	0.002
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.017

11.0355

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				40-44 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	250	12.5	0.05	0.003
hexa	2,2',3,3',6,6'	136	360.9	650	32.5	0.12	0.007
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	4470	223.5	0.96	0.053
penta	2,2',3,3',4	82	326.4	53	5	0.01	0.001
hexa	2,2',3,5,5',6	151	360.9	1070	53.5	0.20	0.011
hexa	2,2',3,3',5,6'	135	360.9	720	36	0.14	0.008
penta	2,3,3',4',5	107	326.4	200	10	0.04	0.002
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	1780	89	0.36	0.020
penta	2,3',4,4',5	118	326.4	580	29	0.12	0.007
hexa	2,2',3,3',5,6	134	360.9	400	20	0.08	0.004
penta	2',3,3',4,5	122	326.4	120	6	0.03	0.001
hexa	2,2',3,4',5,5'	146	360.9	610	30.5	0.12	0.006
hexa	2,2',4,4',5,5'	153	360.9	1000	50	0.19	0.010
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.016
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.015
hepta	2,2',3,3',5,6,6'	179	395.3	450	22.5	0.08	0.004
hexa	2,2',3,4,4',5	137	360.9	51	5	0.01	0.001
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	200	10	0.04	0.002
hexa	2,2',3,4,4',5'	138	360.9	1420	71	0.27	0.015
hexa	2,3,3',4,4',6	158	360.9	98	5	0.02	0.001
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.015
hepta	2,2',3,3',5,5',6	178	395.3	350	17.5	0.06	0.003
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	37	5	0.01	0.001
hepta	2,2',3,4',5,5,6	187	395.3	780	39	0.13	0.007
hepta	2,2',3,4,4',5',6	183	395.3	150	7.5	0.03	0.001
hexa	2,2',3,3',4,4'	128	360.9	140	7	0.03	0.001
hexa	2,3',4,4',5,5'	167	360.9	47	5	0.01	0.001
hepta	2,2',3,4,5,5',6	185	395.3	29	5	0.01	0.001
hepta	2,2',3,3',4,5,6'	174	395.3	280	14	0.05	0.003
hepta	2,2',3,3',4',5,6	177	395.3	390	19.5	0.07	0.004
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	240	12	0.04	0.002
hexa	2,3,3',4,4',5	156	360.9	61	5	0.01	0.001
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	150	7.5	0.03	0.001
hepta	2,2',3,3',4,5,5'	172	395.3	76	5	0.01	0.001
octa	2,2',3,3',4,4',6,6'	197	429.8	10	5	0.00	0.001
hepta	2,2',3,4,4',5,5'	180	395.3	460	23	0.08	0.004
hepta	2,3,3',4',5,5',6	193	395.3	54	5	0.01	0.001
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.014
octa	2,2',3,3',4,5,6,6'	199	429.8	30	5	0.00	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	730	36.5	0.13	0.007
octa	2,2',3,3',4,5,5',6'	201	429.8	290	14.5	0.05	0.003
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	260	13	0.04	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	19	5	0.00	0.001
octa	2,2',3,3',4,4',5,6	195	429.8	160	8	0.03	0.001
octa	2,2',3,3',4,4',5,5'	194	429.8	220	11	0.03	0.002
nona	2,2',3,3',4,4',5,5',6	206	464.2	260	13	0.04	0.002
deca	deca	209	498.7	0	5	0.00	0.011
				351905	20963	100.00	6.85

11.0356

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				44-48 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	21000	2100	13.17	1.338
mono	3	2	188.7	0	10	0.00	0.108
mono	4	3	188.7	3750	375	2.35	0.239
di	2,2' / 2,6	4, 10	223.1	24400	1220	12.94	0.688
di	2,4 / 2,5	7, 9	223.1	970	48.5	0.51	0.027
di	2,3'	6	223.1	10700	535	5.67	0.302
di	2,3 / 2,4'	5, 8	223.1	28600	1430	15.16	0.806
di	3,5	14	223.1	0	5	0.00	0.046
tri	2,2',6	19	257.5	11100	555	5.10	0.271
di	3,4	12	223.1	1000	50	0.53	0.028
tri	2,2',5	18	257.5	3130	156.5	1.44	0.076
di, tri	4,4' / 2,2',4	15, 17	242.7	9110	455.5	4.44	0.236
tri	2,3,6 / 2,3',6	24, 27	257.5	13200	660	6.06	0.322
tri	2,2',3 / 2,4',6	16, 32	257.5	11900	595	5.47	0.291
tri	2,4,5	29	257.5	440	22	0.20	0.011
tri	2,3',5	26	257.5	7470	373.5	3.43	0.182
tri	2,3',4	25	257.5	980	49	0.45	0.024
tri	2,4',5	31	257.5	9150	457.5	4.20	0.224
tri	2,4,4'	28	257.5	3190	159.5	1.47	0.078
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	5970	298.5	2.68	0.143
tetra	2,2',4,6'	51	292.0	1630	81.5	0.66	0.035
tri	2,3,4'	22	257.5	650	32.5	0.30	0.016
tetra	2,2',3,6	45	292.0	760	38	0.31	0.016
tetra	2,2',3,6'	46	292.0	160	8	0.06	0.003
tri	3,4',5	39	257.5	0	5	0.00	0.039
tetra	2,2',5,5'	52	292.0	6240	312	2.53	0.134
tetra	2,2',4,5'	49	292.0	4620	231	1.87	0.100
tetra	2,2',4,4'	47	292.0	5000	250	2.03	0.108
tetra	2,2',4,5	48	292.0	0	5	0.00	0.035
tetra	2,3,5,6	65	292.0	170	8.5	0.07	0.004
tetra	2,2',3,5'	44	292.0	300	15	0.12	0.006
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	1720	86	0.71	0.038
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	1610	80.5	0.65	0.035
tetra	2,2',3,3'	40	292.0	500	25	0.20	0.011
tetra	2,3',4,5	67	292.0	230	11.5	0.09	0.005
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	0	5	0.00	0.034
tetra	2,4,4',5	74	292.0	220	11	0.09	0.005
tetra	2,3',4',5	70	292.0	280	14	0.11	0.006
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	2430	121.5	0.92	0.049
penta	2,2',3,4',6	91	326.4	720	36	0.26	0.014
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	160	8	0.06	0.003
penta	2,2',3,5,5'	92	326.4	840	42	0.30	0.016
penta	2,2',3,3',6	84	326.4	620	31	0.22	0.012
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	340	17	0.12	0.007
penta	2,2',4,4',5	99	326.4	170	8.5	0.06	0.003
penta	2,3',4,4',6	119	326.4	160	8	0.06	0.003
penta	2,2',3,3',5	83	326.4	120	6	0.04	0.002
penta	2,2',3',4,5	97	326.4	37	5	0.01	0.002
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	0	5	0.00	0.031

11.0357

Hudson River Core Data
Milepoint 188.6
Collected July 1991
NYS Dept of Health Analyses

				44-48 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	77	5	0.03	0.002
hexa	2,2',3,3',6,6'	136	360.9	400	20	0.13	0.007
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	1880	94	0.70	0.037
penta	2,2',3,3',4	82	326.4	0	5	0.00	0.031
hexa	2,2',3,5,5',6	151	360.9	940	47	0.31	0.016
hexa	2,2',3,3',5,6'	135	360.9	350	17.5	0.11	0.006
penta	2,3,3',4',5	107	326.4	56	5	0.02	0.002
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	300	15	0.11	0.006
penta	**2,3',4,4',5**	118	326.4	180	9	0.07	0.003
hexa	2,2',3,3',5,6	134	360.9	210	10.5	0.07	0.004
penta	2',3,3',4,5	122	326.4	0	5	0.00	0.031
hexa	2,2',3,4',5,5'	146	360.9	240	12	0.08	0.004
hexa	2,2',4,4',5,5'	153	360.9	240	12	0.08	0.004
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	0	5	0.00	0.029
hexa	2,2',3,4,5,5'	141	360.9	0	5	0.00	0.028
hepta	2,2',3,3',5,6,6'	179	395.3	220	11	0.07	0.004
hexa	2,2',3,4,4',5	137	360.9	0	5	0.00	0.028
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	61	5	0.02	0.002
hexa	2,2',3,4,4',5'	138	360.9	1090	54.5	0.36	0.019
hexa	2,3,3',4,4',6	158	360.9	0	5	0.00	0.028
hexa	2,2',3,3',4,5	129	360.9	0	5	0.00	0.028
hepta	2,2',3,3',5,5',6	178	395.3	420	21	0.13	0.007
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	0	0	0.00	0.000
hepta	2,2',3,4',5,5,6	187	395.3	300	15	0.09	0.005
hepta	2,2',3,4,4',5',6	183	395.3	47	5	0.01	0.002
hexa	2,2',3,3',4,4'	128	360.9	25	5	0.01	0.002
hexa	2,3',4,4',5,5'	167	360.9	0	5	0.00	0.028
hepta	2,2',3,4,5,5',6	185	395.3	0	5	0.00	0.026
hepta	2,2',3,3',4,5,6'	174	395.3	70	5	0.02	0.002
hepta	2,2',3,3',4',5,6	177	395.3	150	7.5	0.04	0.002
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	140	7	0.04	0.002
hexa	2,3,3',4,4',5	156	360.9	0	5	0.00	0.028
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	60	5	0.02	0.002
hepta	2,2',3,3',4,5,5'	172	395.3	31	5	0.01	0.002
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.024
hepta	2,2',3,4,4',5,5'	180	395.3	150	7.5	0.04	0.002
hepta	2,3,3',4',5,5',6	193	395.3	25	5	0.01	0.002
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.026
octa	2,2',3,3',4,5,6,6'	199	429.8	17	5	0.00	0.001
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	240	12	0.07	0.004
octa	2,2',3,3',4,5,5',6'	201	429.8	170	8.5	0.05	0.002
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	150	7.5	0.04	0.002
hepta	2,3,3',4,4',5,5'	189	395.3	0	5	0.00	0.026
octa	2,2',3,3',4,4',5,6	195	429.8	110	5.5	0.03	0.002
octa	2,2',3,3',4,4',5,5'	194	429.8	150	7.5	0.04	0.002
nona	2,2',3,3',4,4',5,5',6	206	464.2	200	10	0.05	0.003
deca	deca	209	498.7	0	5	0.00	0.020
				204446	11595	100.00	6.75

11.0358

Core 91.8

11.0359

Hudson River Core Data
Milepoint 91.8
Collected 15 July 1977
NYS Dept of Health Analyses

				2-4 cm depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	24	10	0.35	0.146
mono	3	2	188.7	0	10	0.00	2.003
mono	4	3	188.7	23	10	0.34	0.146
di	2,2' / 2,6	4, 10	223.1	68	5	0.84	0.062
di	2,4 / 2,5	7, 9	223.1	16	5	0.20	0.062
di	2,3'	6	223.1	130	6.5	1.60	0.082
di	2,3 / 2,4'	5, 8	223.1	180	9	2.22	0.113
di	3,5	14	223.1	11	5	0.14	0.062
tri	2,2',6	19	257.5	69	5	0.74	0.054
di	3,4	12	223.1	71	5	0.88	0.062
tri	2,2',5	18	257.5	340	17	3.63	0.185
di, tri	4,4' / 2,2',4	15, 17	242.7	610	30.5	6.92	0.353
tri	2,3,6 / 2,3',6	24, 27	257.5	110	5.5	1.18	0.060
tri	2,2',3 / 2,4',6	16, 32	257.5	330	16.5	3.53	0.180
tri	2,4,5	29	257.5	4.7	5	0.05	0.053
tri	2,3',5	26	257.5	300	15	3.21	0.164
tri	2,3',4	25	257.5	160	8	1.71	0.087
tri	2,4',5	31	257.5	660	33	7.05	0.360
tri	2,4,4'	28	257.5	690	34.5	7.37	0.376
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	260	13	2.72	0.139
tetra	2,2',4,6'	51	292.0	61	5	0.58	0.047
tri	2,3,4'	22	257.5	150	7.5	1.60	0.082
tetra	2,2',3,6	45	292.0	77	5	0.73	0.048
tetra	2,2',3,6'	46	292.0	55	5	0.52	0.047
tri	3,4',5	39	257.5	8.2	5	0.09	0.053
tetra	2,2',5,5'	52	292.0	400	20	3.77	0.192
tetra	2,2',4,5'	49	292.0	360	18	3.39	0.173
tetra	2,2',4,4'	47	292.0	260	13	2.45	0.125
tetra	2,2',4,5	48	292.0		5	0.00	0.647
tetra	2,3,5,6	65	292.0	0	5	0.00	0.647
tetra	2,2',3,5'	44	292.0	240	12	2.26	0.115
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	680	34	6.56	0.335
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	190	9.5	1.79	0.091
tetra	2,2',3,3'	40	292.0	110	5.5	1.04	0.053
tetra	2,3',4,5	67	292.0	23	5	0.22	0.047
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	43	5	0.39	0.046
tetra	2,4,4',5	74	292.0	220	11	2.07	0.106
tetra	2,3',4',5	70	292.0	260	13	2.45	0.125
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	430	21.5	3.77	0.192
penta	2,2',3,4',6	91	326.4	58	5	0.49	0.042
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	250	12.5	2.36	0.120
penta	2,2',3,5,5'	92	326.4	46	5	0.39	0.042
penta	2,2',3,3',6	84	326.4	81	5	0.68	0.043
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	100	5	0.84	0.043
penta	2,2',4,4',5	99	326.4	94	5	0.79	0.043
penta	2,3',4,4',6	119	326.4	12	5	0.10	0.042
penta	2,2',3,3',5	83	326.4	18	5	0.15	0.042
penta	2,2',3',4,5	97	326.4	61	5	0.51	0.042
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	62	5	0.52	0.042

11.0360

Hudson River Core Data
Milepoint 91.8
Collected 15 July 1977
NYS Dept of Health Analyses

				2-4 cm depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	71	5	0.60	0.043
hexa	2,2',3,3',6,6'	136	360.9	17	5	0.13	0.038
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	350	17.5	3.02	0.154
penta	2,2',3,3',4	82	326.4	27	5	0.23	0.042
hexa	2,2',3,5,5',6	151	360.9	18	5	0.14	0.038
hexa	2,2',3,3',5,6'	135	360.9	20	5	0.15	0.038
penta	2,3,3',4',5	107	326.4	31	5	0.26	0.042
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	78	5	0.64	0.042
penta	**2,3',4,4',5**	118	326.4	220	11	1.86	0.095
hexa	2,2',3,3',5,6	134	360.9	8.9	5	0.07	0.038
penta	2',3,3',4,5	122	326.4	6.8	5	0.06	0.042
hexa	2,2',3,4',5,5'	146	360.9	15	5	0.11	0.038
hexa	2,2',4,4',5,5'	153	360.9	63	5	0.48	0.038
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	410	20.5	3.22	0.164
hexa	2,2',3,4,5,5'	141	360.9	18	5	0.14	0.038
hepta	2,2',3,3',5,6,6'	179	395.3	6.9	5	0.05	0.035
hexa	2,2',3,4,4',5	137	360.9	7	5	0.05	0.038
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	8.9	5	0.06	0.036
hexa	2,2',3,4,4',5'	138	360.9	120	6	0.92	0.047
hexa	2,3,3',4,4',6	158	360.9	12	5	0.09	0.038
hexa	2,2',3,3',4,5	129	360.9	6.4	5	0.05	0.038
hepta	2,2',3,3',5,5',6	178	395.3	5.8	5	0.04	0.035
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	3.1	5	0.02	0.035
hepta	2,2',3,4',5,5,6	187	395.3	20	5	0.14	0.035
hepta	2,2',3,4,4',5',6	183	395.3	11	5	0.08	0.035
hexa	2,2',3,3',4,4'	128	360.9	27	5	0.21	0.038
hexa	2,3',4,4',5,5'	167	360.9	9.5	5	0.07	0.038
hepta	2,2',3,4,5,5',6	185	395.3	2	5	0.01	0.035
hepta	2,2',3,3',4,5,6'	174	395.3	18	5	0.13	0.035
hepta	2,2',3,3',4',5,6	177	395.3	9.5	5	0.07	0.035
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	8.5	5	0.06	0.034
hexa	2,3,3',4,4',5	156	360.9	26	5	0.20	0.038
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	15	5	0.11	0.035
hepta	2,2',3,3',4,5,5'	172	395.3	4.2	5	0.03	0.035
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.440
hepta	2,2',3,4,4',5,5'	180	395.3	43	5	0.30	0.035
hepta	2,3,3',4',5,5',6	193	395.3	2.7	5	0.02	0.035
hepta	2,3,3',4,4',5',6	191	395.3	1	5	0.01	0.035
octa	2,2',3,3',4,5,6,6'	199	429.8	1	5	0.01	0.032
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	71	5	0.49	0.035
octa	2,2',3,3',4,5,5',6'	201	429.8	12	5	0.08	0.032
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	17	5	0.11	0.032
hepta	2,3,3',4,4',5,5'	189	395.3	2.4	5	0.02	0.035
octa	2,2',3,3',4,4',5,6	195	429.8	9.7	5	0.06	0.032
octa	2,2',3,3',4,4',5,5'	194	429.8	17	5	0.11	0.032
nona	2,2',3,3',4,4',5,5',6	206	464.2	24	5	0.14	0.030
deca	deca	209	498.7	0	5	0.00	0.379
				10281.2	781	100.00	11.20

11.0361

Hudson River Core Data
Milepoint 91.8
Collected 15 July 1977
NYS Dept of Health Analyses

				4-8 cm depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	19	10	0.16	0.084
mono	3	2	188.7	0	10	0.00	1.381
mono	4	3	188.7	42	10	0.35	0.084
di	2,2' / 2,6	4, 10	223.1	99	5	0.71	0.036
di	2,4 / 2,5	7, 9	223.1	24	5	0.17	0.036
di	2,3'	6	223.1	320	16	2.28	0.116
di	2,3 / 2,4'	5, 8	223.1	300	15	2.14	0.109
di	3,5	14	223.1	9.4	5	0.07	0.036
tri	2,2',6	19	257.5	110	5.5	0.68	0.035
di	3,4	12	223.1	150	7.5	1.07	0.055
tri	2,2',5	18	257.5	780	39	4.82	0.246
di, tri	4,4' / 2,2',4	15, 17	242.7	1210	60.5	7.93	0.404
tri	2,3,6 / 2,3',6	24, 27	257.5	190	9.5	1.17	0.060
tri	2,2',3 / 2,4',6	16, 32	257.5	650	32.5	4.01	0.205
tri	2,4,5	29	257.5	6.6	5	0.04	0.031
tri	2,3',5	26	257.5	670	33.5	4.14	0.211
tri	2,3',4	25	257.5	310	15.5	1.91	0.098
tri	2,4',5	31	257.5	1350	67.5	8.33	0.425
tri	2,4,4'	28	257.5	1040	52	6.42	0.327
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	240	12	1.45	0.074
tetra	2,2',4,6'	51	292.0	110	5.5	0.60	0.031
tri	2,3,4'	22	257.5	220	11	1.36	0.069
tetra	2,2',3,6	45	292.0	140	7	0.76	0.039
tetra	2,2',3,6'	46	292.0	110	5.5	0.60	0.031
tri	3,4',5	39	257.5	18	5	0.11	0.031
tetra	2,2',5,5'	52	292.0	760	38	4.14	0.211
tetra	2,2',4,5'	49	292.0	700	35	3.81	0.194
tetra	2,2',4,4'	47	292.0	450	22.5	2.45	0.125
tetra	2,2',4,5	48	292.0		5	0.00	0.446
tetra	2,3,5,6	65	292.0	0	5	0.00	0.446
tetra	2,2',3,5'	44	292.0	270	13.5	1.47	0.075
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	1110	55.5	6.18	0.315
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	270	13.5	1.47	0.075
tetra	2,2',3,3'	40	292.0	200	10	1.09	0.056
tetra	2,3',4,5	67	292.0	39	5	0.21	0.027
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0		5	0.00	0.434
tetra	2,4,4',5	74	292.0	380	19	2.07	0.105
tetra	2,3',4',5	70	292.0	350	17.5	1.91	0.097
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	670	33.5	3.39	0.173
penta	2,2',3,4',6	91	326.4	110	5.5	0.54	0.027
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	380	19	2.07	0.105
penta	2,2',3,5,5'	92	326.4	84	5	0.41	0.025
penta	2,2',3,3',6	84	326.4	160	8	0.78	0.040
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	150	7.5	0.73	0.037
penta	2,2',4,4',5	99	326.4	160	8	0.78	0.040
penta	2,3',4,4',6	119	326.4	22	5	0.11	0.024
penta	2,2',3,3',5	83	326.4	32	5	0.16	0.024
penta	2,2',3',4,5	97	326.4	90	5	0.44	0.025
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	83	5	0.40	0.025

11.0362

Hudson River Core Data
Milepoint 91.8
Collected 15 July 1977
NYS Dept of Health Analyses

				4-8 cm depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	96	5	0.47	0.025
hexa	2,2',3,3',6,6'	136	360.9	34	5	0.15	0.022
tetra, penta	3,3',4,4' / 2,3,3',4',6	77, 110	318.6	600	30	2.99	0.153
penta	2,2',3,3',4	82	326.4	34	5	0.17	0.024
hexa	2,2',3,5,5',6	151	360.9	32	5	0.14	0.022
hexa	2,2',3,3',5,6'	135	360.9	36	5	0.16	0.022
penta	2,3,3',4',5	107	326.4	55	5	0.27	0.024
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	140	7	0.66	0.034
penta	2,3',4,4',5	118	326.4	340	17	1.66	0.084
hexa	2,2',3,3',5,6	134	360.9	17	5	0.07	0.022
penta	2',3,3',4,5	122	326.4	11	5	0.05	0.024
hexa	2,2',3,4',5,5'	146	360.9	28	5	0.12	0.022
hexa	2,2',4,4',5,5'	153	360.9	110	5.5	0.48	0.025
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	590	29.5	2.67	0.136
hexa	2,2',3,4,5,5'	141	360.9	28	5	0.12	0.022
hepta	2,2',3,3',5,6,6'	179	395.3	14	5	0.06	0.020
hexa	2,2',3,4,4',5	137	360.9	12	5	0.05	0.022
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	16	5	0.07	0.021
hexa	2,2',3,4,4',5'	138	360.9	210	10.5	0.93	0.047
hexa	2,3,3',4,4',6	158	360.9	19	5	0.08	0.022
hexa	2,2',3,3',4,5	129	360.9	9.9	5	0.04	0.022
hepta	2,2',3,3',5,5',6	178	395.3	12	5	0.05	0.020
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	8.5	5	0.03	0.020
hepta	2,2',3,4',5,5,6	187	395.3	39	5	0.16	0.020
hepta	2,2',3,4,4',5',6	183	395.3	18	5	0.07	0.020
hexa	2,2',3,3',4,4'	128	360.9	43	5	0.19	0.022
hexa	2,3',4,4',5,5'	167	360.9	16	5	0.07	0.022
hepta	2,2',3,4,5,5',6	185	395.3	3.5	5	0.01	0.020
hepta	2,2',3,3',4,5,6'	174	395.3	30	5	0.12	0.020
hepta	2,2',3,3',4',5,6	177	395.3	17	5	0.07	0.020
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	17	5	0.07	0.020
hexa	2,3,3',4,4',5	156	360.9	45	5	0.20	0.022
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	44	5	0.18	0.020
hepta	2,2',3,3',4,5,5'	172	395.3	8.5	5	0.03	0.020
octa	2,2',3,3',4,4',6,6'	197	429.8	1	5	0.00	0.018
hepta	2,2',3,4,4',5,5'	180	395.3	76	5	0.31	0.020
hepta	2,3,3',4',5,5',6	193	395.3	5.6	5	0.02	0.020
hepta	2,3,3',4,4',5',6	191	395.3	2.8	5	0.01	0.020
octa	2,2',3,3',4,5,6,6'	199	429.8	3.8	5	0.01	0.018
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	130	6.5	0.52	0.027
octa	2,2',3,3',4,5,5',6'	201	429.8	22	5	0.08	0.019
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	28	5	0.10	0.019
hepta	2,3,3',4,4',5,5'	189	395.3	4.7	5	0.02	0.020
octa	2,2',3,3',4,4',5,6	195	429.8	18	5	0.07	0.019
octa	2,2',3,3',4,4',5,5'	194	429.8	32	5	0.12	0.019
nona	2,2',3,3',4,4',5,5',6	206	464.2	52	5	0.18	0.017
deca	deca	209	498.7	0	5	0.00	0.261
				17697.3	1107	100.00	8.99

11.0363

Hudson River Core Data
Milepoint 91.8
Collected 15 July 1977
NYS Dept of Health Analyses

				24-28 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	5	10	0.07	0.144
mono	3	2	188.7	0	10	0.00	2.008
mono	4	3	188.7	8.1	10	0.12	0.144
di	2,2' / 2,6	4, 10	223.1	15	5	0.18	0.061
di	2,4 / 2,5	7, 9	223.1	5.6	5	0.07	0.061
di	2,3'	6	223.1	50	5	0.61	0.061
di	2,3 / 2,4'	5, 8	223.1	64	5	0.78	0.061
di	3,5	14	223.1	12	5	0.15	0.061
tri	2,2',6	19	257.5	28	5	0.30	0.053
di	3,4	12	223.1	19	5	0.23	0.061
tri	2,2',5	18	257.5	280	14	2.95	0.150
di, tri	4,4' / 2,2',4	15, 17	242.7	310	15.5	3.47	0.177
tri	2,3,6 / 2,3',6	24, 27	257.5	45	5	0.47	0.053
tri	2,2',3 / 2,4',6	16, 32	257.5	220	11	2.32	0.118
tri	2,4,5	29	257.5	3.3	5	0.03	0.053
tri	2,3',5	26	257.5	180	9	1.90	0.097
tri	2,3',4	25	257.5	110	5.5	1.16	0.059
tri	2,4',5	31	257.5	420	21	4.43	0.225
tri	2,4,4'	28	257.5	650	32.5	6.85	0.349
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	260	13	2.68	0.137
tetra	2,2',4,6'	51	292.0	33	5	0.31	0.047
tri	2,3,4'	22	257.5	160	8	1.69	0.086
tetra	2,2',3,6	45	292.0	72	5	0.67	0.047
tetra	2,2',3,6'	46	292.0	45	5	0.42	0.047
tri	3,4',5	39	257.5	5.9	5	0.06	0.053
tetra	2,2',5,5'	52	292.0	330	16.5	3.07	0.156
tetra	2,2',4,5'	49	292.0	270	13.5	2.51	0.128
tetra	2,2',4,4'	47	292.0	180	9	1.67	0.085
tetra	2,2',4,5	48	292.0		5	0.00	0.649
tetra	2,3,5,6	65	292.0	0	5	0.00	0.649
tetra	2,2',3,5'	44	292.0	290	14.5	2.70	0.137
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	700	35	6.65	0.339
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	220	11	2.05	0.104
tetra	2,2',3,3'	40	292.0	100	5	0.93	0.047
tetra	2,3',4,5	67	292.0	29	5	0.27	0.047
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0	29	5	0.26	0.045
tetra	2,4,4',5	74	292.0	230	11.5	2.14	0.109
tetra	2,3',4',5	70	292.0	350	17.5	3.25	0.166
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	620	31	5.36	0.273
penta	2,2',3,4',6	91	326.4	56	5	0.47	0.042
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	360	18	3.35	0.170
penta	2,2',3,5,5'	92	326.4	71	5	0.59	0.042
penta	2,2',3,3',6	84	326.4	96	5	0.80	0.042
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	180	9	1.50	0.076
penta	2,2',4,4',5	99	326.4	150	7.5	1.25	0.064
penta	2,3',4,4',6	119	326.4	19	5	0.16	0.042
penta	2,2',3,3',5	83	326.4	28	5	0.23	0.042
penta	2,2',3',4,5	97	326.4	110	5.5	0.91	0.047
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	100	5	0.83	0.042

11.0364

Hudson River Core Data
Milepoint 91.8
Collected 15 July 1977
NYS Dept of Health Analyses

				24-28 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	94	5	0.78	0.042
hexa	2,2',3,3',6,6'	136	360.9	41	5	0.31	0.038
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	630	31.5	5.37	0.273
penta	2,2',3,3',4	82	326.4	40	5	0.33	0.042
hexa	2,2',3,5,5',6	151	360.9	38	5	0.29	0.038
hexa	2,2',3,3',5,6'	135	360.9	46	5	0.35	0.038
penta	2,3,3',4',5	107	326.4	57	5	0.47	0.042
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	200	10	1.62	0.083
penta	**2,3',4,4',5**	118	326.4	370	18.5	3.08	0.157
hexa	2,2',3,3',5,6	134	360.9	19	5	0.14	0.038
penta	2',3,3',4,5	122	326.4	13	5	0.11	0.042
hexa	2,2',3,4',5,5'	146	360.9	38	5	0.29	0.038
hexa	2,2',4,4',5,5'	153	360.9	180	9	1.35	0.069
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	390	19.5	3.02	0.154
hexa	2,2',3,4,5,5'	141	360.9	49	5	0.37	0.038
hepta	2,2',3,3',5,6,6'	179	395.3	14	5	0.10	0.034
hexa	2,2',3,4,4',5	137	360.9	18	5	0.14	0.038
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	33	5	0.23	0.036
hexa	2,2',3,4,4',5'	138	360.9	370	18.5	2.78	0.142
hexa	2,3,3',4,4',6	158	360.9	30	5	0.23	0.038
hexa	2,2',3,3',4,5	129	360.9	17	5	0.13	0.038
hepta	2,2',3,3',5,5',6	178	395.3	11	5	0.08	0.034
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	4.9	5	0.03	0.035
hepta	2,2',3,4',5,5,6	187	395.3	40	5	0.27	0.034
hepta	2,2',3,4,4',5',6	183	395.3	24	5	0.16	0.034
hexa	2,2',3,3',4,4'	128	360.9	83	5	0.62	0.038
hexa	2,3',4,4',5,5'	167	360.9	23	5	0.17	0.038
hepta	2,2',3,4,5,5',6	185	395.3	4.9	5	0.03	0.034
hepta	2,2',3,3',4,5,6'	174	395.3	43	5	0.30	0.034
hepta	2,2',3,3',4',5,6	177	395.3	23	5	0.16	0.034
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	0	5	0.00	0.474
hexa	2,3,3',4,4',5	156	360.9	93	5	0.70	0.038
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	27	5	0.19	0.035
hepta	2,2',3,3',4,5,5'	172	395.3	10	5	0.07	0.034
octa	2,2',3,3',4,4',6,6'	197	429.8	1	5	0.01	0.032
hepta	2,2',3,4,4',5,5'	180	395.3	110	5.5	0.76	0.038
hepta	2,3,3',4',5,5',6	193	395.3	6.9	5	0.05	0.034
hepta	2,3,3',4,4',5',6	191	395.3	2.7	5	0.02	0.034
octa	2,2',3,3',4,5,6,6'	199	429.8	2.2	5	0.01	0.032
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	190	9.5	1.30	0.066
octa	2,2',3,3',4,5,5',6'	201	429.8	18	5	0.11	0.032
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	26	5	0.16	0.032
hepta	2,3,3',4,4',5,5'	189	395.3	5.8	5	0.04	0.034
octa	2,2',3,3',4,4',5,6	195	429.8	14	5	0.09	0.032
octa	2,2',3,3',4,4',5,5'	194	429.8	32	5	0.20	0.032
nona	2,2',3,3',4,4',5,5',6	206	464.2	24	5	0.14	0.029
deca	deca	209	498.7	0	5	0.00	0.380
				11025.3	796	100.00	11.11

11.0365

Core 88.6

Hudson River Core Data
Milepoint 88.6
Collected 21 July 1996
NYS Dept of Health Analyses

				16-20 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	MW *(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	37	10	0.66	0.178
mono	3	2	188.7	43	10	0.76	0.178
mono	4	3	188.7	37	10	0.66	0.178
di	2,2' / 2,6	4, 10	223.1	100	5	1.50	0.077
di	2,4 / 2,5	7, 9	223.1	21	5	0.32	0.075
di	2,3'	6	223.1	210	10.5	3.16	0.162
di	2,3 / 2,4'	5, 8	223.1	260	13	3.91	0.200
di	3,5	14	223.1	3.5	5	0.05	0.075
tri	2,2',6	19	257.5	9.6	5	0.12	0.065
di	3,4	12	223.1	93	5	1.40	0.077
tri	2,2',5	18	257.5	400	20	5.21	0.267
di, tri	4,4' / 2,2',4	15, 17	242.7	750	37.5	10.36	0.531
tri	2,3,6 / 2,3',6	24, 27	257.5	130	6.5	1.69	0.087
tri	2,2',3 / 2,4',6	16, 32	257.5	390	19.5	5.08	0.260
tri	2,4,5	29	257.5	4.6	5	0.06	0.065
tri	2,3',5	26	257.5	350	17.5	4.56	0.234
tri	2,3',4	25	257.5	130	6.5	1.69	0.087
tri	2,4',5	31	257.5	690	34.5	8.98	0.461
tri	2,4,4'	28	257.5	410	20.5	5.34	0.274
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	72	5	0.92	0.065
tetra	2,2',4,6'	51	292.0	75	5	0.86	0.058
tri	2,3,4'	22	257.5	72	5	0.94	0.066
tetra	2,2',3,6	45	292.0	60	5	0.69	0.058
tetra	2,2',3,6'	46	292.0	60	5	0.69	0.058
tri	3,4',5	39	257.5	100	5	1.30	0.067
tetra	2,2',5,5'	52	292.0	380	19	4.36	0.224
tetra	2,2',4,5'	49	292.0	340	17	3.90	0.200
tetra	2,2',4,4'	47	292.0	260	13	2.99	0.153
tetra	2,2',4,5	48	292.0	0	5	0.00	0.718
tetra	2,3,5,6	65	292.0		5	0.00	0.718
tetra	2,2',3,5'	44	292.0	120	6	1.38	0.071
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	360	18	4.23	0.217
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	56	5	0.64	0.058
tetra	2,2',3,3'	40	292.0	59	5	0.68	0.058
tetra	2,3',4,5	67	292.0	17	5	0.20	0.057
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0		5	0.00	0.699
tetra	2,4,4',5	74	292.0	120	6	1.38	0.071
tetra	2,3',4',5	70	292.0	140	7	1.61	0.082
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	260	13	2.78	0.142
penta	2,2',3,4',6	91	326.4	47	5	0.48	0.052
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	120	6	1.38	0.071
penta	2,2',3,5,5'	92	326.4	36	5	0.37	0.052
penta	2,2',3,3',6	84	326.4	66	5	0.68	0.052
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	66	5	0.68	0.052
penta	2,2',4,4',5	99	326.4	57	5	0.59	0.052
penta	2,3',4,4',6	119	326.4	9.2	5	0.09	0.051
penta	2,2',3,3',5	83	326.4	13	5	0.13	0.051
penta	2,2',3',4,5	97	326.4	30	5	0.31	0.051
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	32	5	0.33	0.051

11.0367

Hudson River Core Data
Milepoint 88.6
Collected 21 July 1996
NYS Dept of Health Analyses

				16-20 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	39	5	0.40	0.052
hexa	2,2',3,3',6,6'	136	360.9	25	5	0.23	0.047
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	200	10	2.10	0.108
penta	2,2',3,3',4	82	326.4	11	5	0.11	0.051
hexa	2,2',3,5,5',6	151	360.9	14	5	0.13	0.046
hexa	2,2',3,3',5,6'	135	360.9	14	5	0.13	0.046
penta	2,3,3',4',5	107	326.4	23	5	0.24	0.051
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	56	5	0.56	0.050
penta	**2,3',4,4',5**	118	326.4	120	6	1.23	0.063
hexa	2,2',3,3',5,6	134	360.9	6.4	5	0.06	0.046
penta	2',3,3',4,5	122	326.4	3.4	5	0.03	0.051
hexa	2,2',3,4',5,5'	146	360.9	11	5	0.10	0.046
hexa	2,2',4,4',5,5'	153	360.9	38	5	0.35	0.047
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	140	7	1.34	0.069
hexa	2,2',3,4,5,5'	141	360.9	8.4	5	0.08	0.046
hepta	2,2',3,3',5,6,6'	179	395.3	5.4	5	0.05	0.042
hexa	2,2',3,4,4',5	137	360.9	3.9	5	0.04	0.046
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	5.5	5	0.05	0.044
hexa	2,2',3,4,4',5'	138	360.9	72	5	0.67	0.047
hexa	2,3,3',4,4',6	158	360.9	5.9	5	0.05	0.046
hexa	2,2',3,3',4,5	129	360.9	3	5	0.03	0.046
hepta	2,2',3,3',5,5',6	178	395.3	4.3	5	0.04	0.042
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	1.4	5	0.01	0.043
hepta	2,2',3,4',5,5,6	187	395.3	16	5	0.14	0.042
hepta	2,2',3,4,4',5',6	183	395.3	6.5	5	0.06	0.042
hexa	2,2',3,3',4,4'	128	360.9	14	5	0.13	0.046
hexa	2,3',4,4',5,5'	167	360.9	4.8	5	0.04	0.046
hepta	2,2',3,4,5,5',6	185	395.3	1.2	5	0.01	0.042
hepta	2,2',3,3',4,5,6'	174	395.3	11	5	0.09	0.042
hepta	2,2',3,3',4',5,6	177	395.3	6.3	5	0.05	0.042
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	6.3	5	0.05	0.042
hexa	2,3,3',4,4',5	156	360.9	13	5	0.12	0.046
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	7.4	5	0.06	0.043
hepta	2,2',3,3',4,5,5'	172	395.3	3	5	0.03	0.042
octa	2,2',3,3',4,4',6,6'	197	429.8	0	5	0.00	0.488
hepta	2,2',3,4,4',5,5'	180	395.3	28	5	0.24	0.042
hepta	2,3,3',4',5,5',6	193	395.3	1.8	5	0.02	0.042
hepta	2,3,3',4,4',5',6	191	395.3	0	5	0.00	0.530
octa	2,2',3,3',4,5,6,6'	199	429.8	1	5	0.01	0.039
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	44	5	0.37	0.043
octa	2,2',3,3',4,5,5',6'	201	429.8	10	5	0.08	0.039
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	13	5	0.10	0.039
hepta	2,3,3',4,4',5,5'	189	395.3	1.2	5	0.01	0.042
octa	2,2',3,3',4,4',5,6	195	429.8	7.8	5	0.06	0.039
octa	2,2',3,3',4,4',5,5'	194	429.8	12	5	0.09	0.039
nona	2,2',3,3',4,4',5,5',6	206	464.2	20	5	0.14	0.036
deca	deca	209	498.7	0	5	0.00	0.420
				8134.8	699	100.00	11.4

11.0368

Hudson River Core Data
Milepoint 88.6
Collected 21 July 1986
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				20-24 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	45	10	0.48	0.107
mono	3	2	188.7	0	10	0.00	1.636
mono	4	3	188.7	47	10	0.50	0.107
di	2,2' / 2,6	4, 10	223.1	160	8	1.44	0.074
di	2,4 / 2,5	7, 9	223.1	28	5	0.25	0.045
di	2,3'	6	223.1	350	17.5	3.15	0.161
di	2,3 / 2,4'	5, 8	223.1	310	15.5	2.79	0.143
di	3,5	14	223.1	7.6	5	0.07	0.045
tri	2,2',6	19	257.5	140	7	1.09	0.056
di	3,4	12	223.1	150	7.5	1.35	0.069
tri	2,2',5	18	257.5	670	33.5	5.23	0.267
di, tri	4,4' / 2,2',4	15, 17	242.7	1170	58.5	9.69	0.495
tri	2,3,6 / 2,3',6	24, 27	257.5	190	9.5	1.48	0.076
tri	2,2',3 / 2,4',6	16, 32	257.5	610	30.5	4.76	0.243
tri	2,4,5	29	257.5	5.6	5	0.04	0.039
tri	2,3',5	26	257.5	640	32	5.00	0.255
tri	2,3',4	25	257.5	270	13.5	2.11	0.108
tri	2,4',5	31	257.5	1190	59.5	9.29	0.475
tri	2,4,4'	28	257.5	710	35.5	5.54	0.283
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	130	6.5	0.99	0.051
tetra	2,2',4,6'	51	292.0	110	5.5	0.76	0.039
tri	2,3,4'	22	257.5	130	6.5	1.01	0.052
tetra	2,2',3,6	45	292.0	100	5	0.69	0.035
tetra	2,2',3,6'	46	292.0	95	5	0.65	0.035
tri	3,4',5	39	257.5	17	5	0.13	0.039
tetra	2,2',5,5'	52	292.0	630	31.5	4.34	0.222
tetra	2,2',4,5'	49	292.0	570	28.5	3.93	0.201
tetra	2,2',4,4'	47	292.0	390	19.5	2.69	0.137
tetra	2,2',4,5	48	292.0		5	0.00	0.529
tetra	2,3,5,6	65	292.0	0	5	0.00	0.529
tetra	2,2',3,5'	44	292.0	160	8	1.10	0.056
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	670	33.5	4.72	0.241
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	130	6.5	0.90	0.046
tetra	2,2',3,3'	40	292.0	140	7	0.96	0.049
tetra	2,3',4,5	67	292.0	27	5	0.19	0.034
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0		5	0.00	0.514
tetra	2,4,4',5	74	292.0	230	11.5	1.58	0.081
tetra	2,3',4',5	70	292.0	220	11	1.51	0.077
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	450	22.5	2.88	0.147
penta	2,2',3,4',6	91	326.4	84	5	0.52	0.031
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	230	11.5	1.58	0.081
penta	2,2',3,5,5'	92	326.4	66	5	0.41	0.031
penta	2,2',3,3',6	84	326.4	120	6	0.74	0.038
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	110	5.5	0.68	0.035
penta	2,2',4,4',5	99	326.4	110	5.5	0.68	0.035
penta	2,3',4,4',6	119	326.4	17	5	0.10	0.031
penta	2,2',3,3',5	83	326.4	23	5	0.14	0.031
penta	2,2',3',4,5	97	326.4	55	5	0.34	0.031
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	51	5	0.31	0.031

11.0369

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				20-24 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	61	5	0.38	0.031
hexa	2,2',3,3',6,6'	136	360.9	29	5	0.16	0.028
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	400	20	2.52	0.129
penta	2,2',3,3',4	82	326.4	18	5	0.11	0.031
hexa	2,2',3,5,5',6	151	360.9	26	5	0.14	0.028
hexa	2,2',3,3',5,6'	135	360.9	27	5	0.15	0.028
penta	2,3,3',4',5	107	326.4	41	5	0.25	0.031
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	110	5.5	0.66	0.034
penta	**2,3',4,4',5**	118	326.4	210	10.5	1.29	0.066
hexa	2,2',3,3',5,6	134	360.9	13	5	0.07	0.028
penta	2',3,3',4,5	122	326.4	6.4	5	0.04	0.031
hexa	2,2',3,4',5,5'	146	360.9	23	5	0.13	0.028
hexa	2,2',4,4',5,5'	153	360.9	82	5	0.46	0.028
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	240	12	1.37	0.070
hexa	2,2',3,4,5,5'	141	360.9	17	5	0.09	0.028
hepta	2,2',3,3',5,6,6'	179	395.3	11	5	0.06	0.025
hexa	2,2',3,4,4',5	137	360.9	8.2	5	0.05	0.028
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0	12	5	0.06	0.026
hexa	2,2',3,4,4',5'	138	360.9	150	7.5	0.84	0.043
hexa	2,3,3',4,4',6	158	360.9	12	5	0.07	0.028
hexa	2,2',3,3',4,5	129	360.9	6.2	5	0.03	0.028
hepta	2,2',3,3',5,5',6	178	395.3	8.6	5	0.04	0.025
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	2.6	5	0.01	0.026
hepta	2,2',3,4',5,5,6	187	395.3	29	5	0.15	0.025
hepta	2,2',3,4,4',5',6	183	395.3	13	5	0.07	0.025
hexa	2,2',3,3',4,4'	128	360.9	31	5	0.17	0.028
hexa	2,3',4,4',5,5'	167	360.9	11	5	0.06	0.028
hepta	2,2',3,4,5,5',6	185	395.3	2.5	5	0.01	0.025
hepta	2,2',3,3',4,5,6'	174	395.3	22	5	0.11	0.025
hepta	2,2',3,3',4',5,6	177	395.3	12	5	0.06	0.025
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	11	5	0.06	0.025
hexa	2,3,3',4,4',5	156	360.9	26	5	0.14	0.028
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	15	5	0.08	0.026
hepta	2,2',3,3',4,5,5'	172	395.3	5.9	5	0.03	0.025
octa	2,2',3,3',4,4',6,6'	197	429.8	1	5	0.00	0.023
hepta	2,2',3,4,4',5,5'	180	395.3	53	5	0.27	0.026
hepta	2,3,3',4',5,5',6	193	395.3	3.8	5	0.02	0.025
hepta	2,3,3',4,4',5',6	191	395.3	1.1	5	0.01	0.025
octa	2,2',3,3',4,5,6,6'	199	429.8	1.7	5	0.01	0.023
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	88	5	0.45	0.026
octa	2,2',3,3',4,5,5',6'	201	429.8	17	5	0.08	0.023
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	22	5	0.10	0.023
hepta	2,3,3',4,4',5,5'	189	395.3	2.9	5	0.01	0.025
octa	2,2',3,3',4,4',5,6	195	429.8	13	5	0.06	0.023
octa	2,2',3,3',4,4',5,5'	194	429.8	21	5	0.10	0.023
nona	2,2',3,3',4,4',5,5',6	206	464.2	29	5	0.13	0.022
deca	deca	209	498.7	0	5	0.00	0.310
				13704.1	930	100.00	9.91

11.0370

Hudson River Core Data
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				32-36 cm Depth			
				Concentration			
homolog	*structure*	*BZ #*	*MW (g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
mono	2	1	188.7	55	10	0.54	0.099
mono	3	2	188.7	33	10	0.33	0.099
mono	4	3	188.7	60	10	0.59	0.099
di	2,2' / 2,6	4, 10	223.1	170	8.5	1.42	0.073
di	2,4 / 2,5	7, 9	223.1	32	5	0.27	0.042
di	2,3'	6	223.1	420	21	3.50	0.179
di	2,3 / 2,4'	5, 8	223.1	350	17.5	2.92	0.149
di	3,5	14	223.1	6.6	5	0.06	0.042
tri	2,2',6	19	257.5	150	7.5	1.08	0.055
di	3,4	12	223.1	190	9.5	1.58	0.081
tri	2,2',5	18	257.5	710	35.5	5.13	0.262
di, tri	4,4' / 2,2',4	15, 17	242.7	1350	67.5	10.35	0.529
tri	2,3,6 / 2,3',6	24, 27	257.5	220	11	1.59	0.081
tri	2,2',3 / 2,4',6	16, 32	257.5	690	34.5	4.99	0.255
tri	2,4,5	29	257.5	6.5	5	0.05	0.036
tri	2,3',5	26	257.5	760	38	5.49	0.281
tri	2,3',4	25	257.5	316	15.8	2.28	0.117
tri	2,4',5	31	257.5	1360	68	9.83	0.503
tri	2,4,4'	28	257.5	640	32	4.62	0.237
tri, tri, tetra	2,3,3' / 2',3,4 / 2,2'5,6'	20,33,53	263.1	330	16.5	2.33	0.119
tetra	2,2',4,6'	51	292.0	130	6.5	0.83	0.042
tri	2,3,4'	22	257.5	130	6.5	0.94	0.048
tetra	2,2',3,6	45	292.0	110	5.5	0.70	0.036
tetra	2,2',3,6'	46	292.0	110	5.5	0.70	0.036
tri	3,4',5	39	257.5	21	5	0.15	0.036
tetra	2,2',5,5'	52	292.0	680	34	4.33	0.222
tetra	2,2',4,5'	49	292.0	620	31	3.95	0.202
tetra	2,2',4,4'	47	292.0	410	20.5	2.61	0.134
tetra	2,2',4,5	48	292.0		5	0.00	0.499
tetra	2,3,5,6	65	292.0	0	5	0.00	0.499
tetra	2,2',3,5'	44	292.0	150	7.5	0.96	0.049
tri, tri, tetra	3,4,4' / 2,2',3,4' / 2,3,3',6	37,42,59	285.5	680	34	4.43	0.227
tetra	2,2',3,4 / 2,3,4',6	41, 64	292.0	110	5.5	0.70	0.036
tetra	2,2',3,3'	40	292.0	150	7.5	0.96	0.049
tetra	2,3',4,5	67	292.0	26	5	0.17	0.032
tetra, OCS	2,3,4',5 / OCS	63, OCS	300.0		5	0.00	0.486
tetra	2,4,4',5	74	292.0	210	10.5	1.34	0.068
tetra	2,3',4',5	70	292.0	190	9.5	1.21	0.062
tetra, penta	2,3',4,4' / 2,2',3,5',6	66, 95	313.8	410	20.5	2.43	0.124
penta	2,2',3,4',6	91	326.4	88	5	0.50	0.029
tetra	2,3,3',4' / 2,3,4,4'	56, 60	292.0	200	10	1.27	0.065
penta	2,2',3,5,5'	92	326.4	66	5	0.38	0.029
penta	2,2',3,3',6	84	326.4	130	6.5	0.74	0.038
penta	2,2',3,4',5 / 2,2',4,5,5'	90, 101	326.4	99	5	0.56	0.029
penta	2,2',4,4',5	99	326.4	100	5	0.57	0.029
penta	2,3',4,4',6	119	326.4	16	5	0.09	0.029
penta	2,2',3,3',5	83	326.4	23	5	0.13	0.029
penta	2,2',3',4,5	97	326.4	47	5	0.27	0.029
penta	2,2',3,4,5' / 2,3,4,4',6	87, 115	326.4	51	5	0.29	0.029

11.0371

Hudson River Core Data
Milepoint 88.6
Collected 21 July 1986
NYS Dept of Health Analyses

				32-36 cm Depth			
			MW	Concentration			
homolog	*structure*	*BZ #*	*(g/mol)*	*ng/g*	*± (ng/g)*	*% nmol/g*	*± (%)*
penta, DDE	2,2',3,4,4' / 4,4'-DDE	85, DDE	326.4	54	5	0.31	0.029
hexa	2,2',3,3',6,6'	136	360.9	27	5	0.14	0.026
tetra, penta	**3,3',4,4' / 2,3,3',4',6**	77, 110	318.6	390	19.5	2.28	0.116
penta	2,2',3,3',4	82	326.4	18	5	0.10	0.029
hexa	2,2',3,5,5',6	151	360.9	25	5	0.13	0.026
hexa	2,2',3,3',5,6'	135	360.9	26	5	0.13	0.026
penta	2,3,3',4',5	107	326.4	39	5	0.22	0.029
penta, hexa	2',3,4,4',5 / 2,2',3,4',5',6	123, 149	335.0	100	5	*0.56*	0.028
penta	**2,3',4,4',5**	118	326.4	200	10	1.14	0.058
hexa	2,2',3,3',5,6	134	360.9	13	5	0.07	0.026
penta	2',3,3',4,5	122	326.4	5.8	5	0.03	0.029
hexa	2,2',3,4',5,5'	146	360.9	21	5	0.11	0.026
hexa	2,2',4,4',5,5'	153	360.9	71	5	0.37	0.026
hexa, penta	2,2',3,3',4,6' / 2,3,3',4,4'	132, 105	351.0	230	11.5	1.22	0.062
hexa	2,2',3,4,5,5'	141	360.9	14	5	0.07	0.026
hepta	2,2',3,3',5,6,6'	179	395.3	10	5	0.05	0.024
hexa	2,2',3,4,4',5	137	360.9	7.3	5	0.04	0.026
hexa, hepta	2,2',3,3',4,5' / 2,2',3,3',4,6,6'	130, 176	382.0		5	0.00	0.382
hexa	2,2',3,4,4',5'	138	360.9	140	7	0.72	0.037
hexa	2,3,3',4,4',6	158	360.9	12	5	0.06	0.026
hexa	2,2',3,3',4,5	129	360.9	6	5	0.03	0.026
hepta	2,2',3,3',5,5',6	178	395.3	9.4	5	0.04	0.024
hexa, hepta	2,3,4,4',5,6 / 2,2',3,3',4,5',6	166, 175	390.0	4.9	5	0.02	0.024
hepta	2,2',3,4',5,5,6	187	395.3	29	5	0.14	0.024
hepta	2,2',3,4,4',5',6	183	395.3	12	5	0.06	0.024
hexa	2,2',3,3',4,4'	128	360.9	28	5	0.14	0.026
hexa	2,3',4,4',5,5'	167	360.9	10	5	0.05	0.026
hepta	2,2',3,4,5,5',6	185	395.3	2.2	5	0.01	0.024
hepta	2,2',3,3',4,5,6'	174	395.3	19	5	0.09	0.024
hepta	2,2',3,3',4',5,6	177	395.3	11	5	0.05	0.024
hepta, octa	2,2',3,3',4,4',6 / 2,2',3,3',5,5',6,6'	171, 202	400.0	12	5	0.06	0.023
hexa	2,3,3',4,4',5	156	360.9	26	5	0.13	0.026
hepta, hexa, octa	2,2',3,3',4,5,6 / 2,3,3',4,4',5 / 2,2',3,3',4,5',6,6'	173, 157, 200	392.0	24	5	0.11	0.024
hepta	2,2',3,3',4,5,5'	172	395.3	5.2	5	0.02	0.024
octa	2,2',3,3',4,4',6,6'	197	429.8	1	5	0.00	0.022
hepta	2,2',3,4,4',5,5'	180	395.3	47	5	0.22	0.024
hepta	2,3,3',4',5,5',6	193	395.3	3.3	5	0.02	0.024
hepta	2,3,3',4,4',5',6	191	395.3	1.1	5	0.01	0.024
octa	2,2',3,3',4,5,6,6'	199	429.8	1.6	5	0.01	0.022
hepta	2,2',3,3',4,4',5 / 2,3,3',4,4',5,6	170, 190	395.3	77	5	0.36	0.024
octa	2,2',3,3',4,5,5',6'	201	429.8	17	5	0.07	0.022
octa	2,2',3,4,4',5,5',6 / 2,2',3,3',4,4',5',6	203, 196	429.8	22	5	0.10	0.022
hepta	2,3,3',4,4',5,5'	189	395.3	2.9	5	0.01	0.024
octa	2,2',3,3',4,4',5,6	195	429.8	13	5	0.06	0.022
octa	2,2',3,3',4,4',5,5'	194	429.8	23	5	0.10	0.022
nona	2,2',3,3',4,4',5,5',6	206	464.2	38	5	0.15	0.020
deca	deca	209	498.7	0	5	0.00	0.292
				14654.8	976.8	100.00	8.51

11.0372

APPENDIX C
PCB DATA ANALYSIS

APPENDIX C-1
UPPER HUDSON RIVER

11.0374

HOMOLOG PLOTS

Homolog Group Distributions
Upper Hudson River - Thompson Island Pool

Homolog Group	Aroclor 1242	1960 Sediment 188.5 (28-32 cm)	error	1960 Sediment 188.6 (44-48 cm)	error	1963 Sediment 188.5 (24-28 cm)	error	1963 Sediment 188.6 (40-44 cm)	error	1968 Sediment 188.5 (20-24 cm)	error	1968 Sediment 188.6 (36-40 cm)	error
Mono	0.00	11.29	1.20	15.52	1.68	10.13	1.08	23.80	2.50	13.24	1.37	30.26	3.18
Di	18.36	37.78	2.01	36.34	1.98	32.64	1.72	29.11	1.63	37.24	1.97	29.51	1.71
Tri	38.10	34.82	1.83	33.71	1.83	35.93	1.87	29.67	1.64	31.14	1.65	24.41	1.42
Tetra	30.07	11.52	0.64	10.07	0.57	14.31	0.78	10.80	0.62	12.27	0.65	9.84	0.59
Penta	10.77	2.49	0.18	2.30	0.24	4.28	0.26	3.60	0.23	3.68	0.21	3.22	0.21
Others (1)	1.99	1.91	0.16	1.95	0.40	2.28	0.18	2.39	0.19	1.70	0.10	1.91	0.14

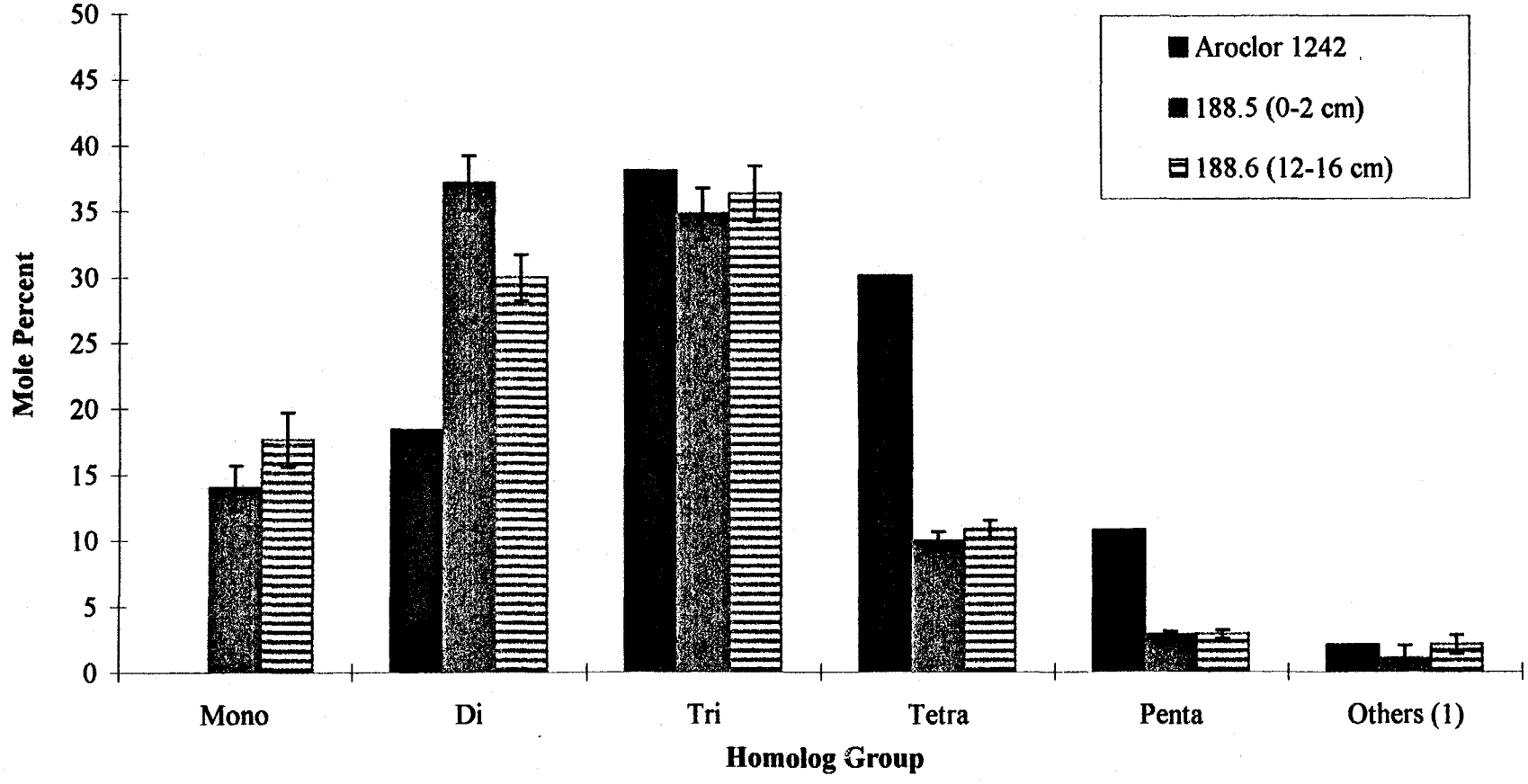
Homolog Group	Aroclor 1242	1973 Sediment 188.5 (16-20 cm)	error	1973 Sediment 188.6 (32-36 cm)	error	1975 Sediment 188.5 (12-16 cm)	error	1975 Sediment 188.6 (28-32 cm)	error	1976 Sediment 188.5 (8-12 cm)	error	1976 Sediment 188.6 (24-28 cm)	error
Mono	0.00	13.14	1.33	23.72	2.46	15.54	1.60	24.71	2.59	14.94	1.54	17.77	1.87
Di	18.36	39.65	2.09	32.01	1.77	38.31	2.03	29.30	1.63	37.81	2.00	31.94	1.76
Tri	38.10	31.43	1.66	28.98	1.62	30.34	1.62	29.56	1.66	30.66	1.63	32.53	1.78
Tetra	30.07	11.56	0.62	9.55	0.55	10.36	0.56	10.56	1.62	10.91	0.59	12.43	0.69
Penta	10.77	2.00	0.11	3.22	0.20	3.12	0.18	3.29	0.22	3.30	0.20	3.61	0.24
Others (1)	1.99	1.89	0.11	1.53	0.02	1.34	0.09	1.63	0.15	1.39	0.11	1.59	0.16

Homolog Group	Aroclor 1242	1979 Sediment 188.5 (4-8 cm)	error	1979 Sediment 188.6 (20-24 cm)	error	1980 Sediment 188.5 (2-4 cm)	error	1980 Sediment 188.6 (16-20 cm)	error	1982 Sediment 188.5 (0-2 cm)	error	1982 Sediment 188.6 (12-16 cm)	error
Mono	0.00	14.17	1.47	20.03	2.15	17.26	1.87	25.86	2.81	14.00	1.71	17.68	2.05
Di	18.36	35.95	1.91	31.70	1.76	36.64	2.01	31.15	1.82	37.20	2.10	29.98	1.72
Tri	38.10	32.15	1.71	31.04	1.76	32.01	1.71	31.09	1.85	34.84	1.95	36.34	2.14
Tetra	30.07	11.58	0.62	11.82	0.67	9.37	0.54	9.33	0.61	10.00	0.72	10.91	0.67
Penta	10.77	3.84	0.21	3.58	0.28	2.95	0.19	1.69	0.18	2.86	0.25	2.88	0.31
Others (1)	1.99	1.41	0.11	1.68	0.23	1.14	0.26	0.83	0.35	1.02	0.99	2.07	0.71

(1) Others refers to all homolog groups larger than penta

Relative Concentrations of Homolog Groups

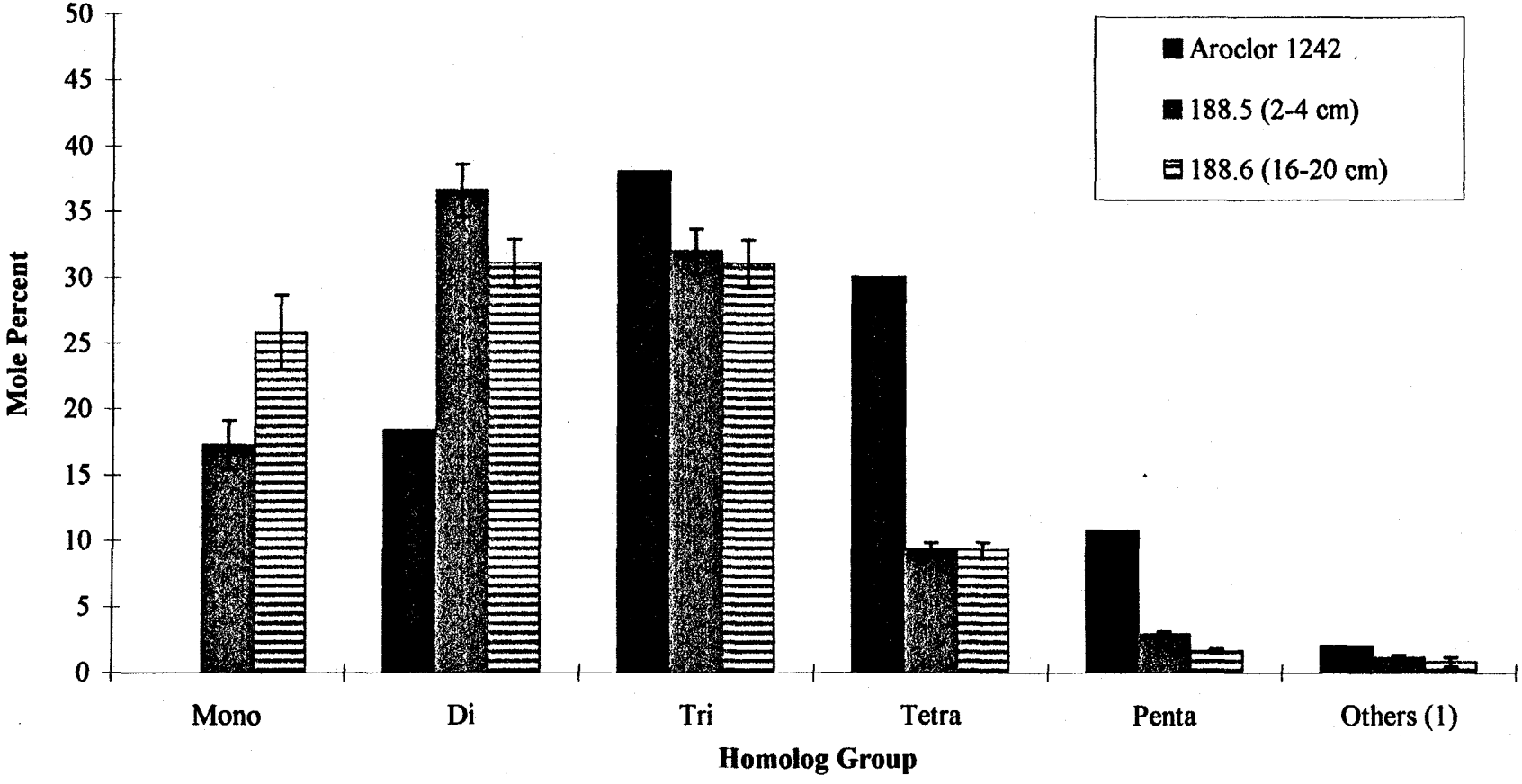
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1982



(1) Others refers to homolog groups larger than penta

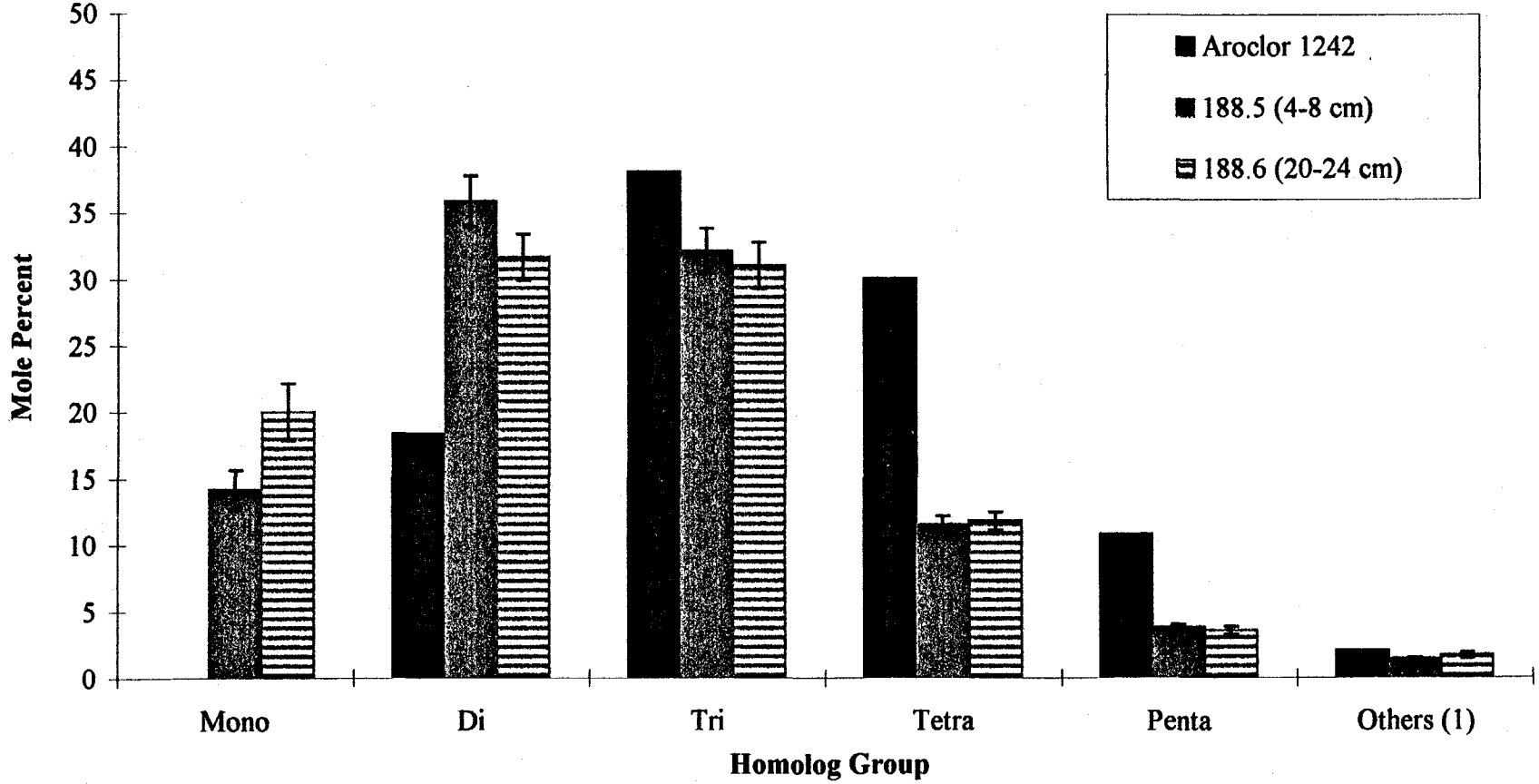
11.0377

Relative Concentrations of Homolog Groups
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1980



(1) Others refers to homolog groups larger than penta

Relative Concentrations of Homolog Groups
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1979

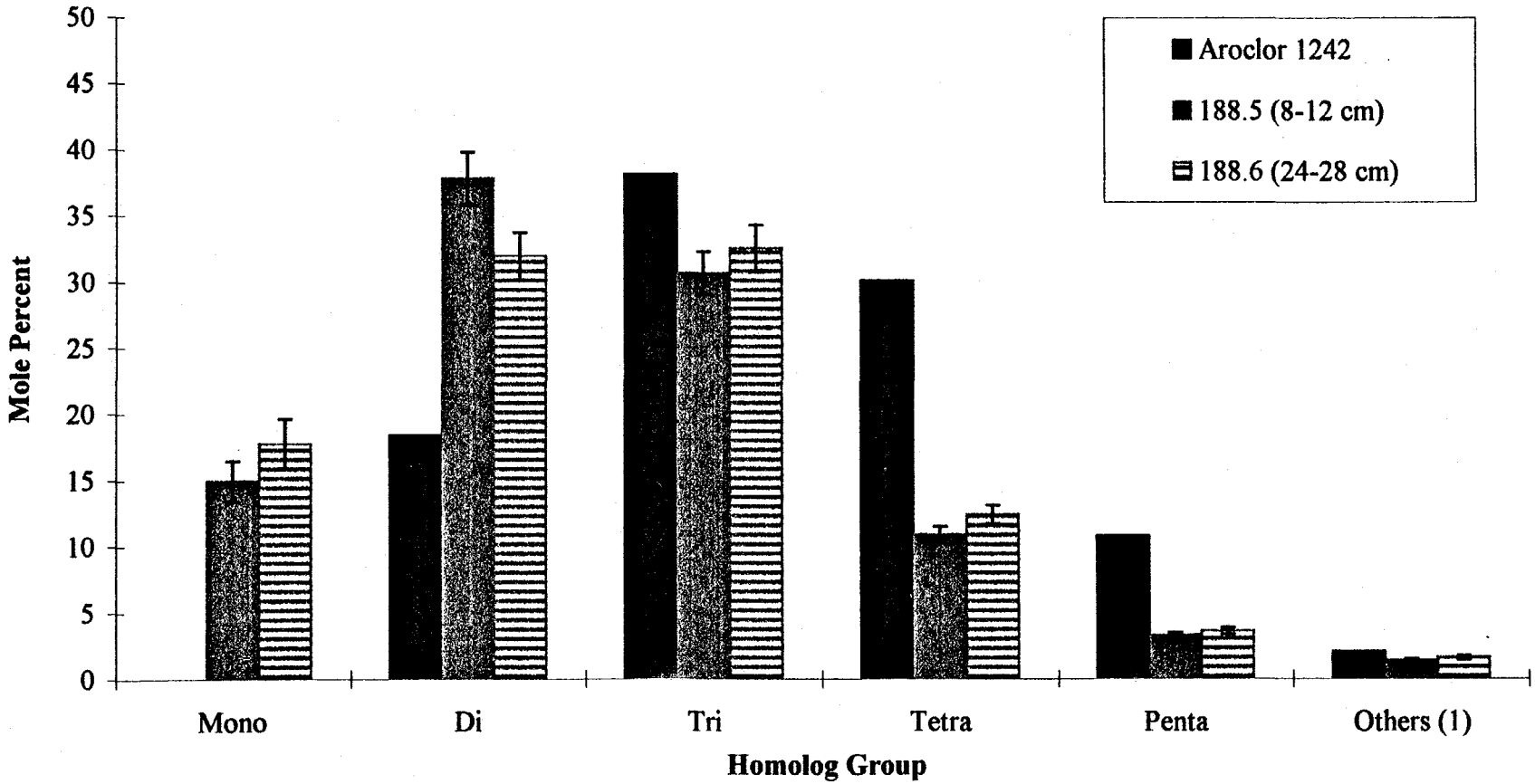


(1) Others refers to homolog groups larger than penta

11.0379

Relative Concentrations of Homolog Groups

Upper Hudson - Thompson Island Pool
Sediment Deposited ~1976



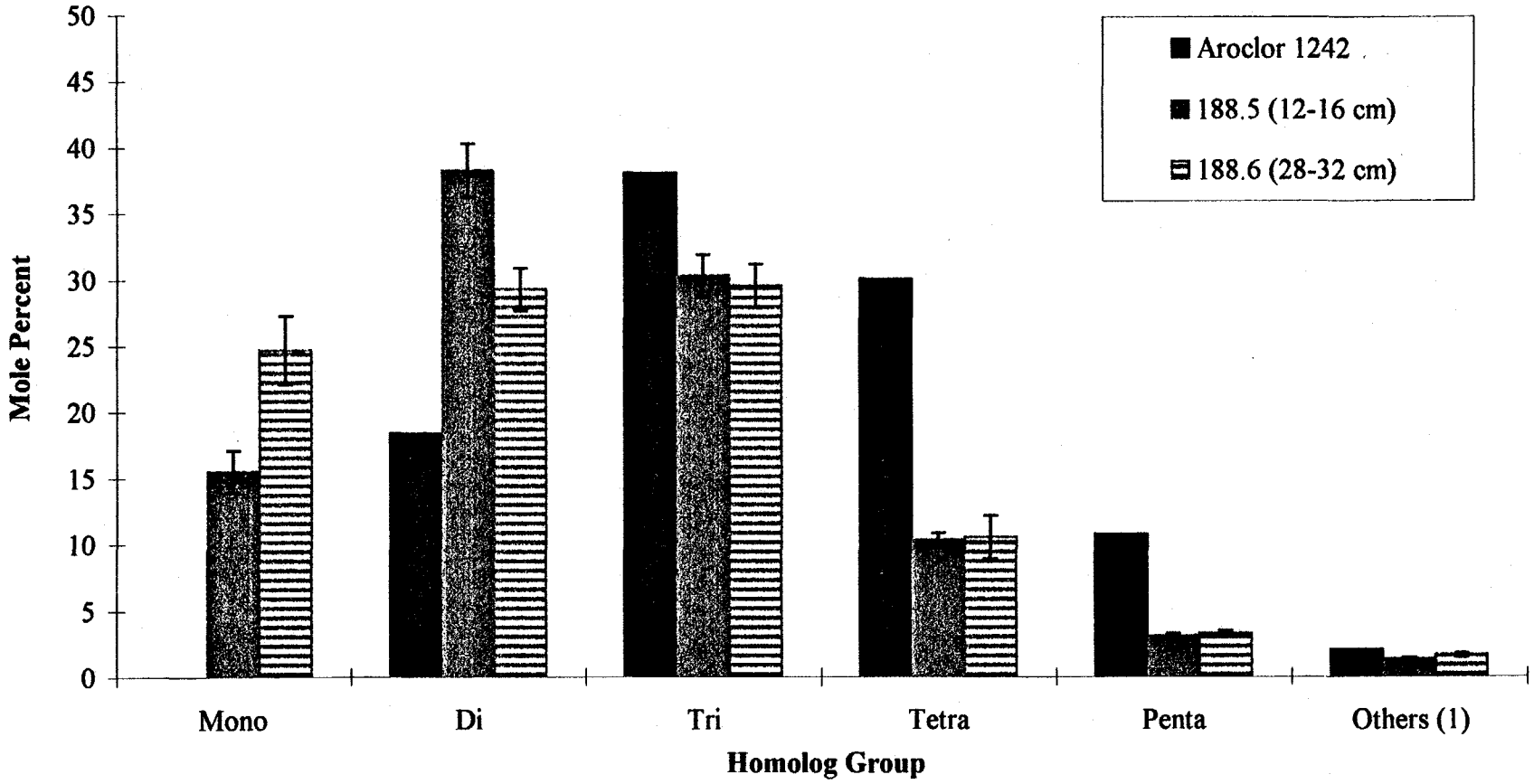
(1) Others refers to homolog groups larger than penta

11.0380

Relative Concentrations of Homolog Groups

Upper Hudson - Thompson Island Pool

Sediment Deposited ~1975

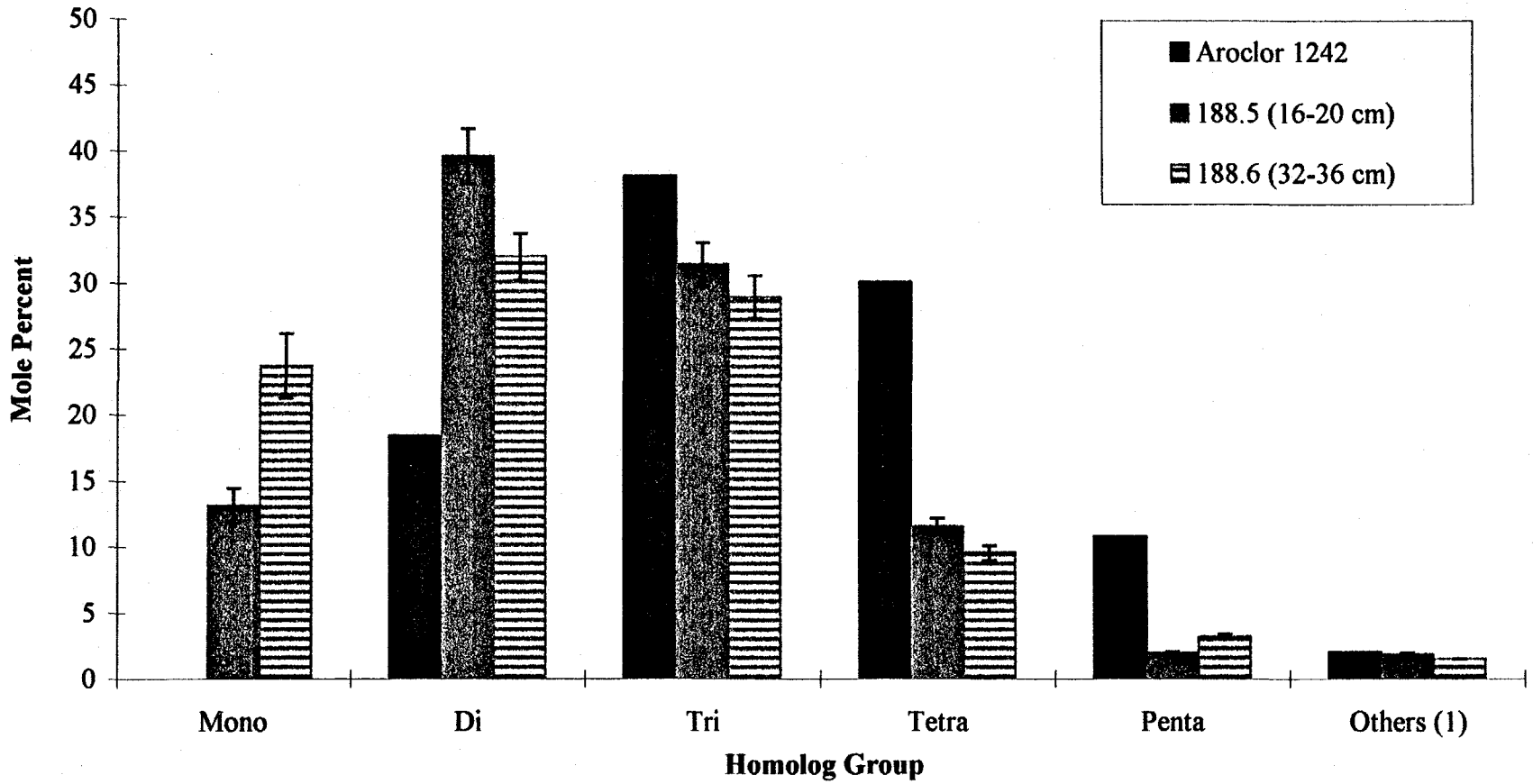


(1) Others refers to homolog groups larger than penta

11.0381

Relative Concentrations of Homolog Groups

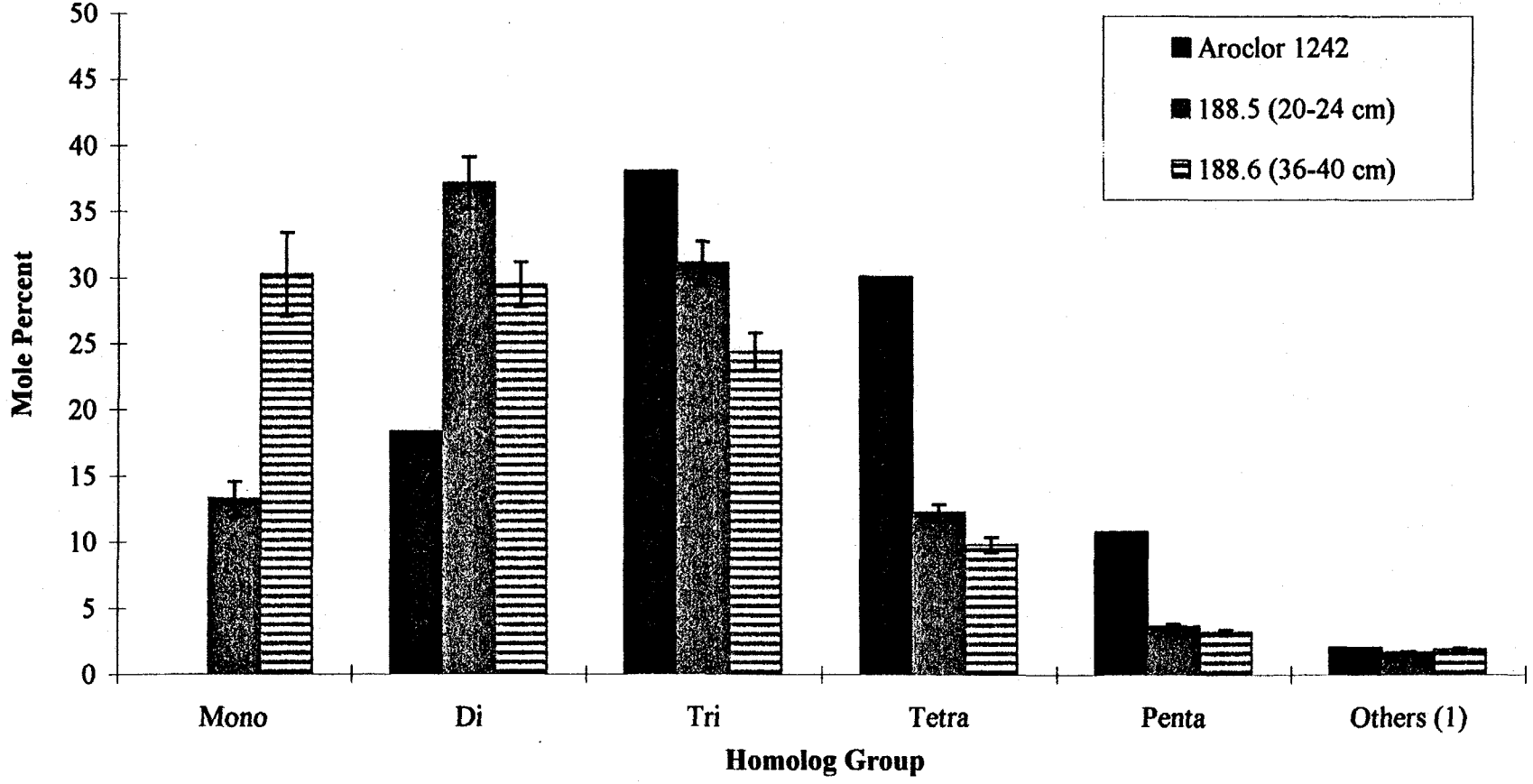
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1973



(1) Others refers to homolog groups larger than penta

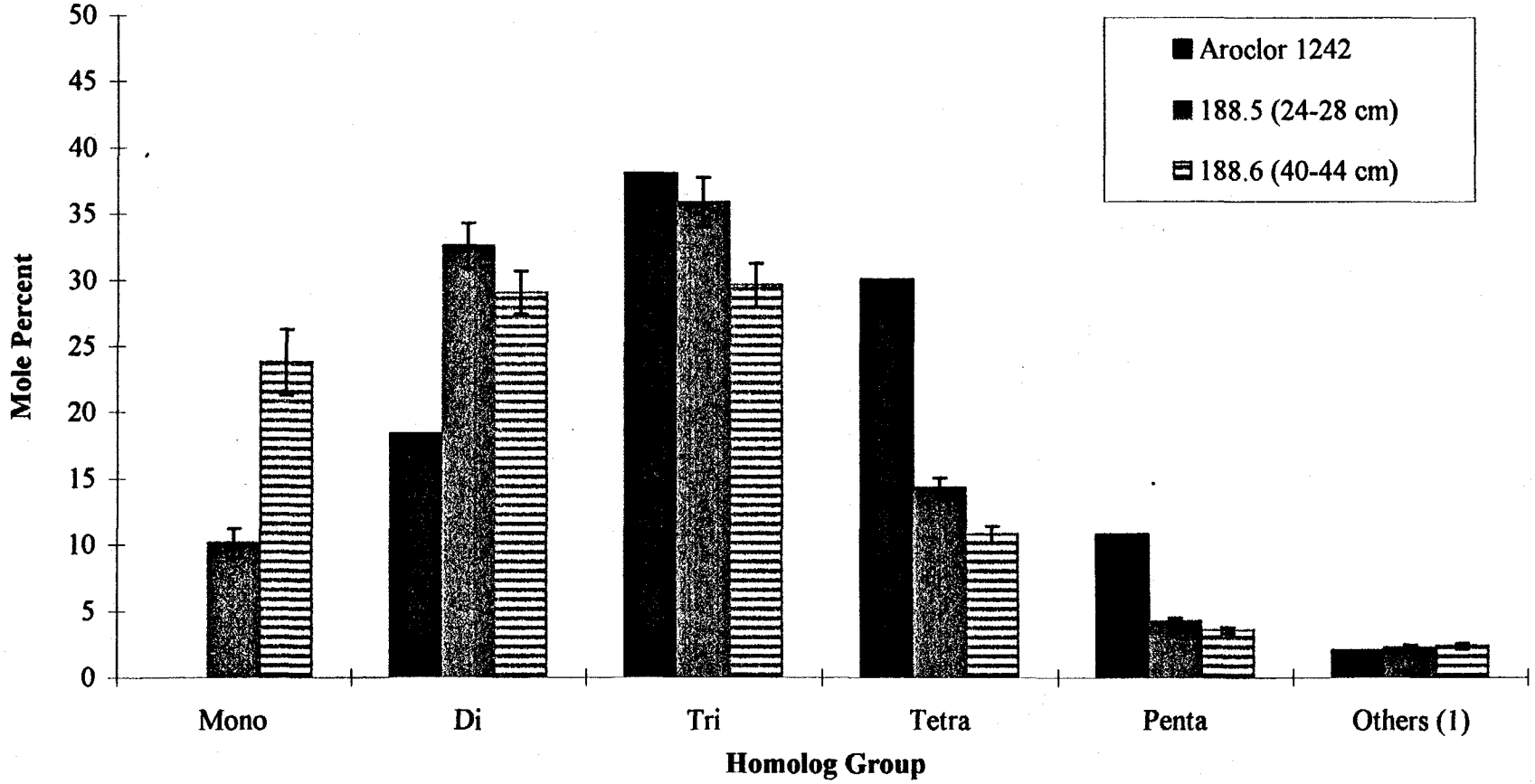
11.0382

Relative Concentrations of Homolog Groups
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1968



(1) Others refers to homolog groups larger than penta

Relative Concentrations of Homolog Groups
Upper Hudson - Thompson Island Pool
Sediment Deposited ~1963

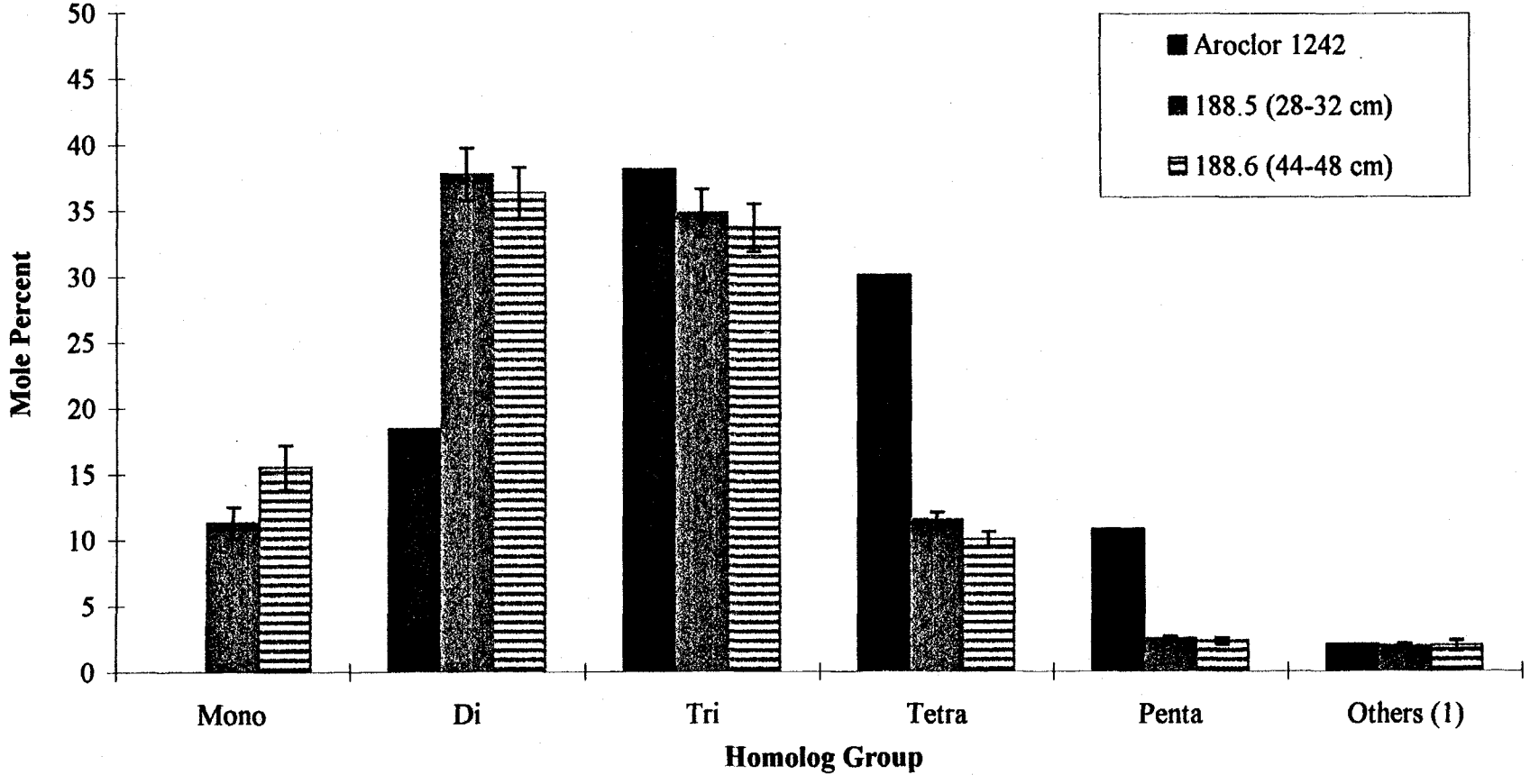


(1) Others refers to homolog groups larger than penta

11.0384

Relative Concentrations of Homolog Groups

Upper Hudson - Thompson Island Pool
Sediment Deposited ~1960

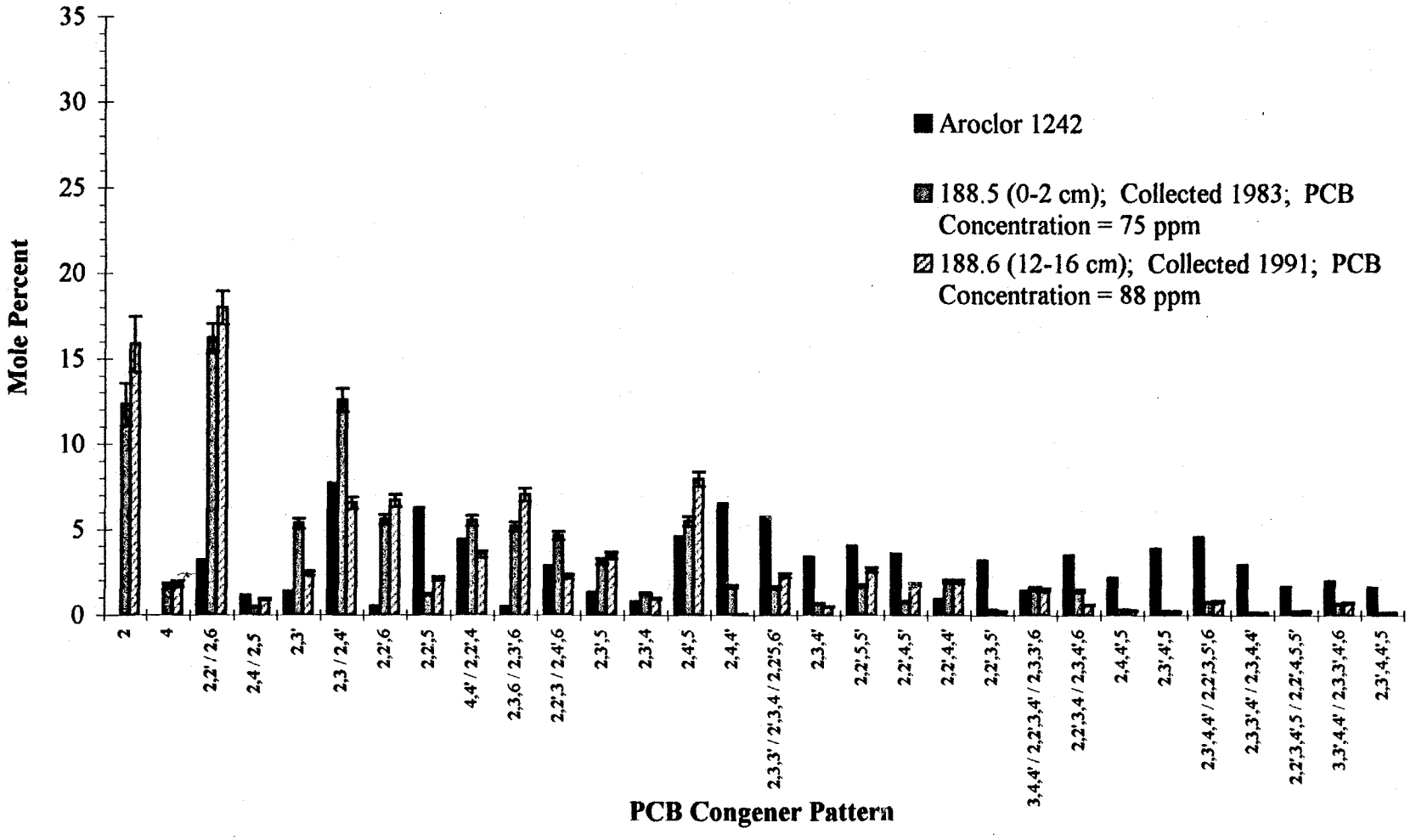


(1) Others refers to homolog groups larger than penta

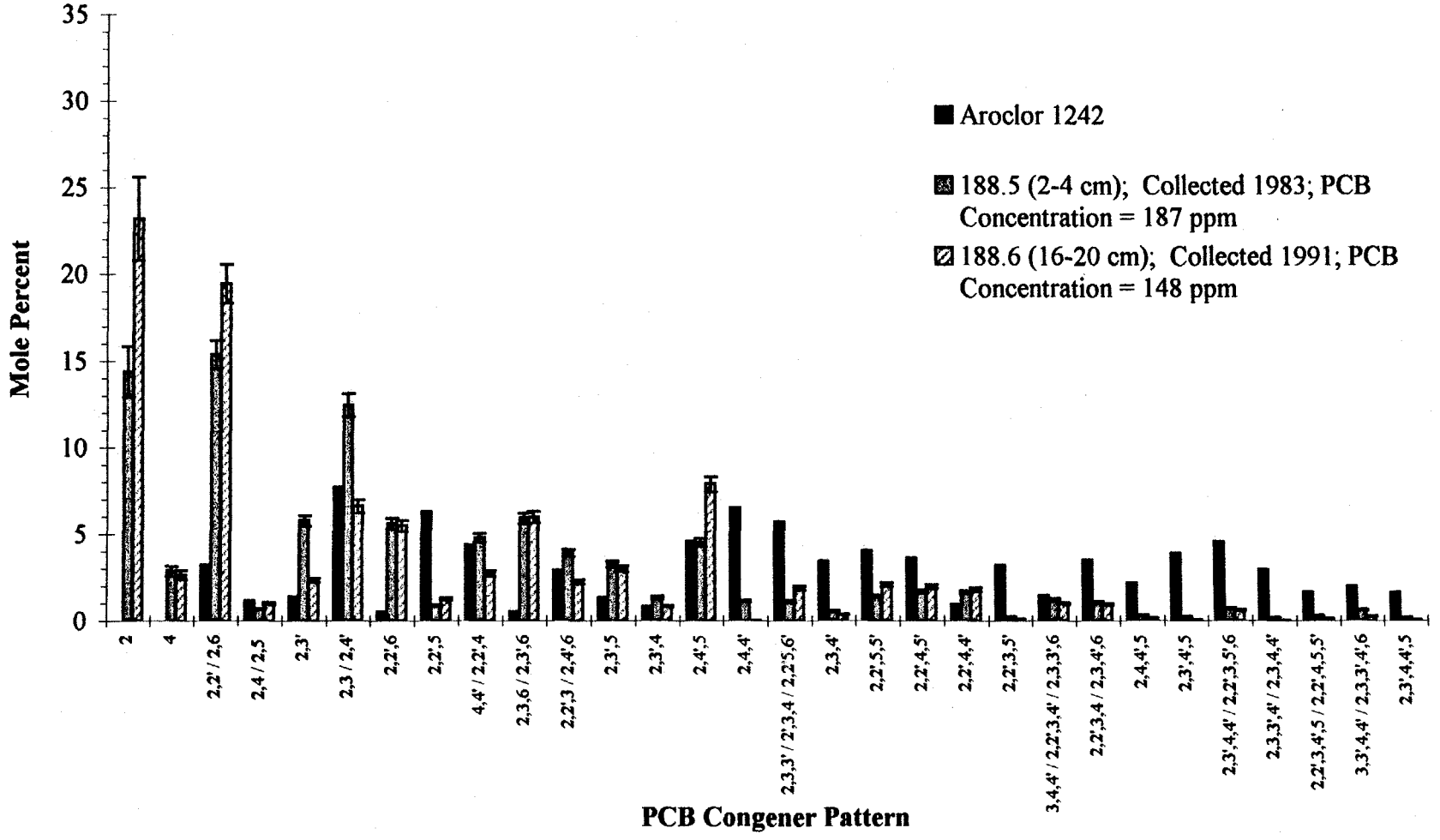
11.0385

30 PEAKS

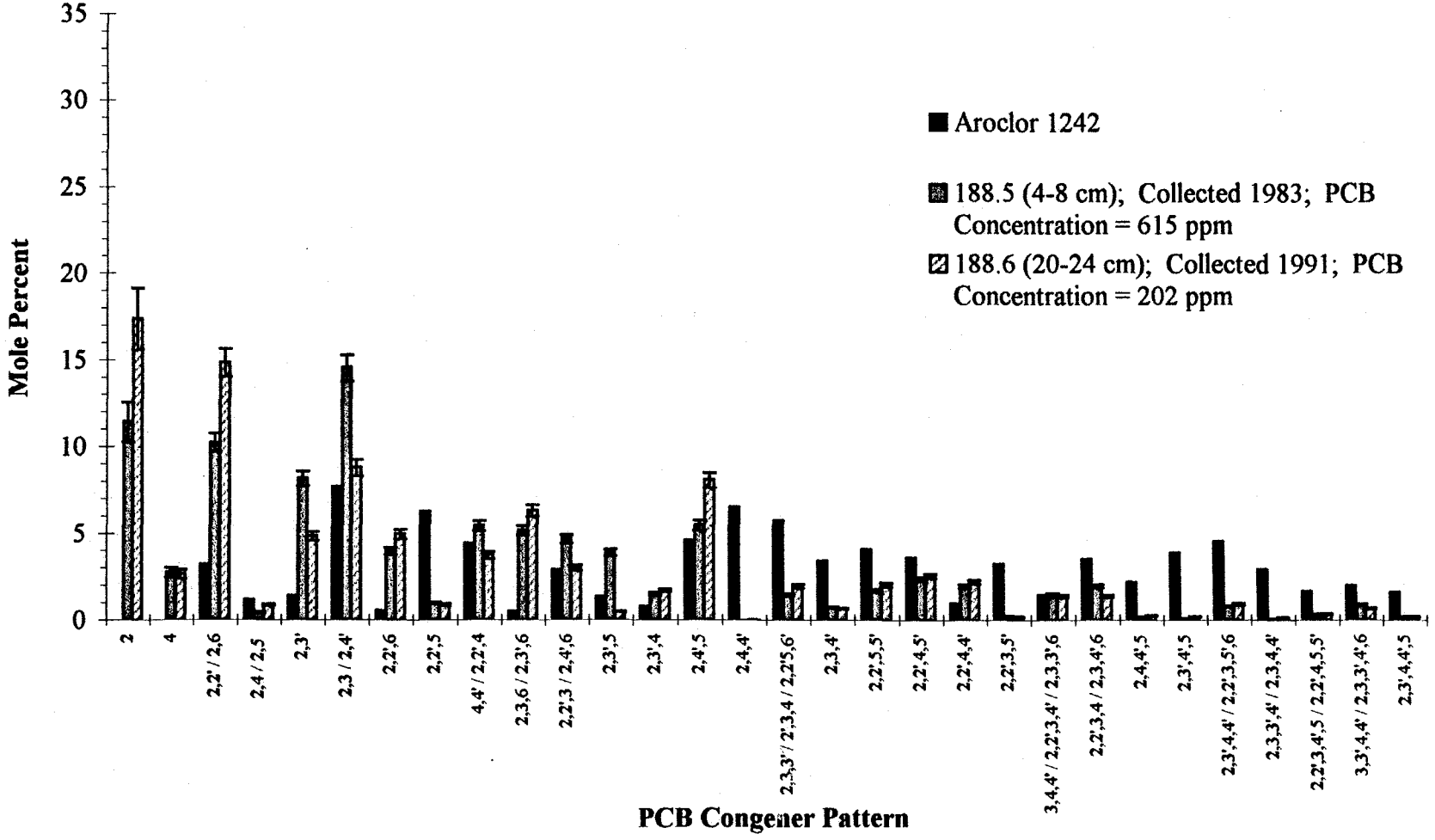
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1982



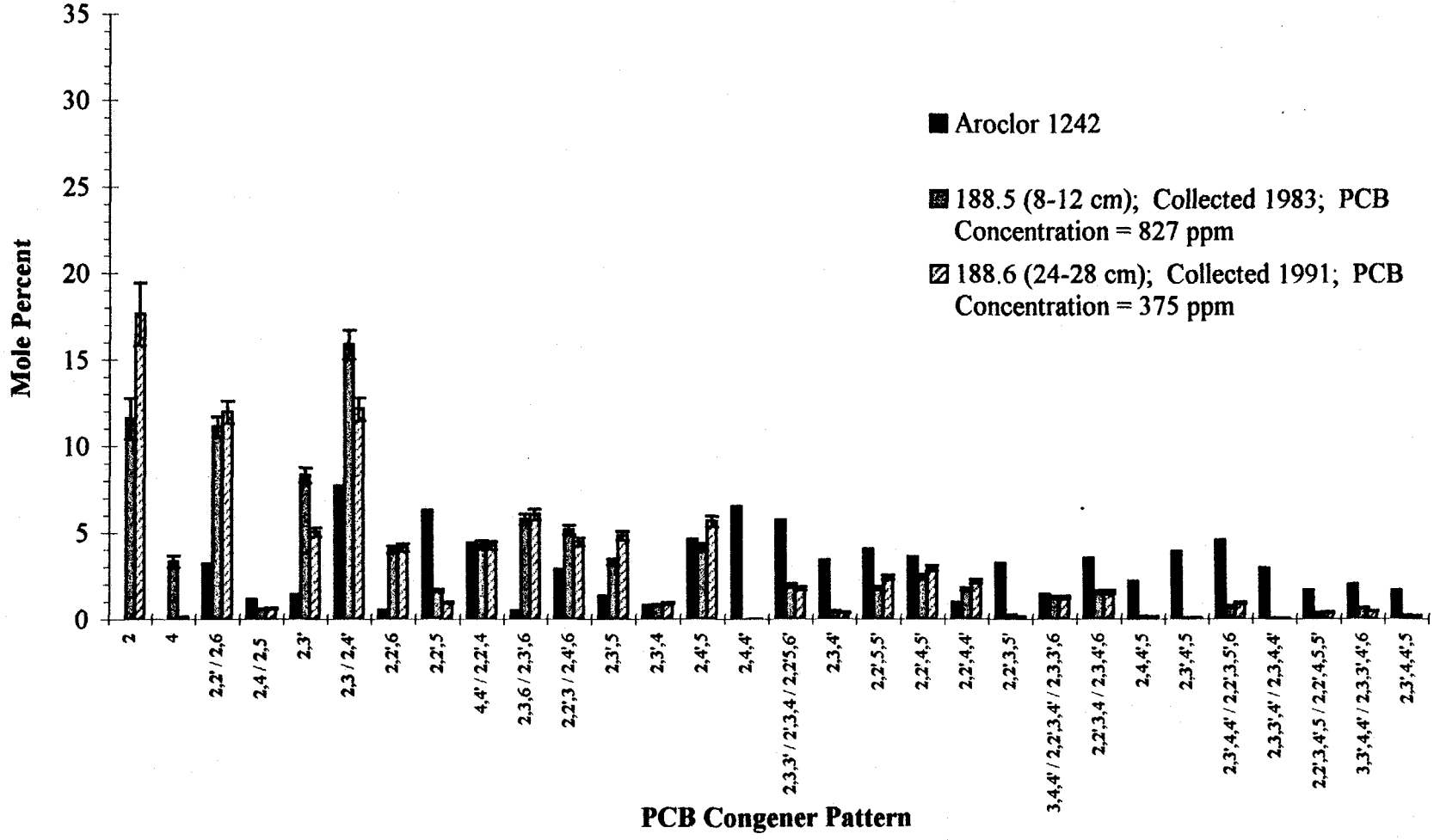
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1980



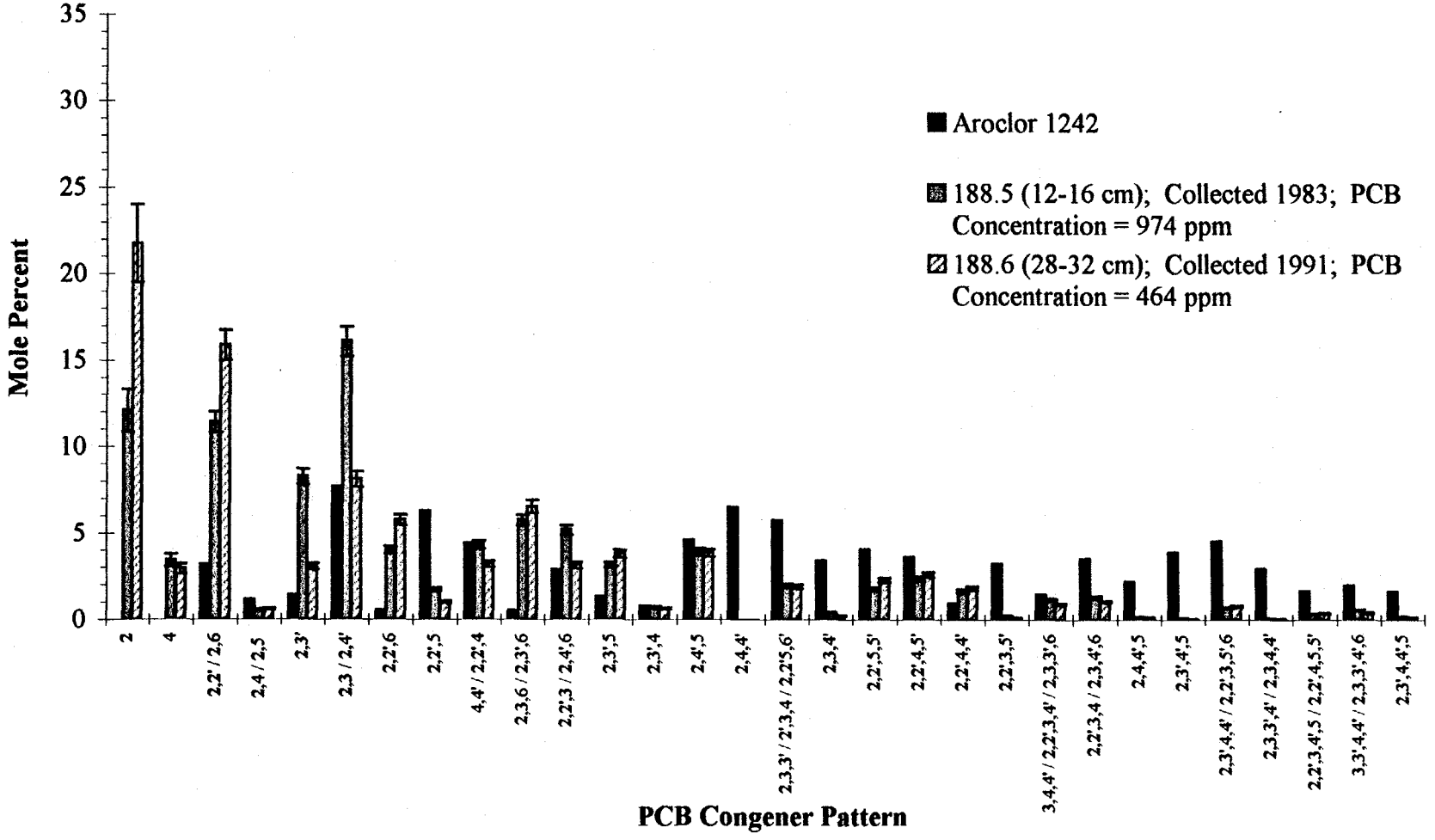
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1979



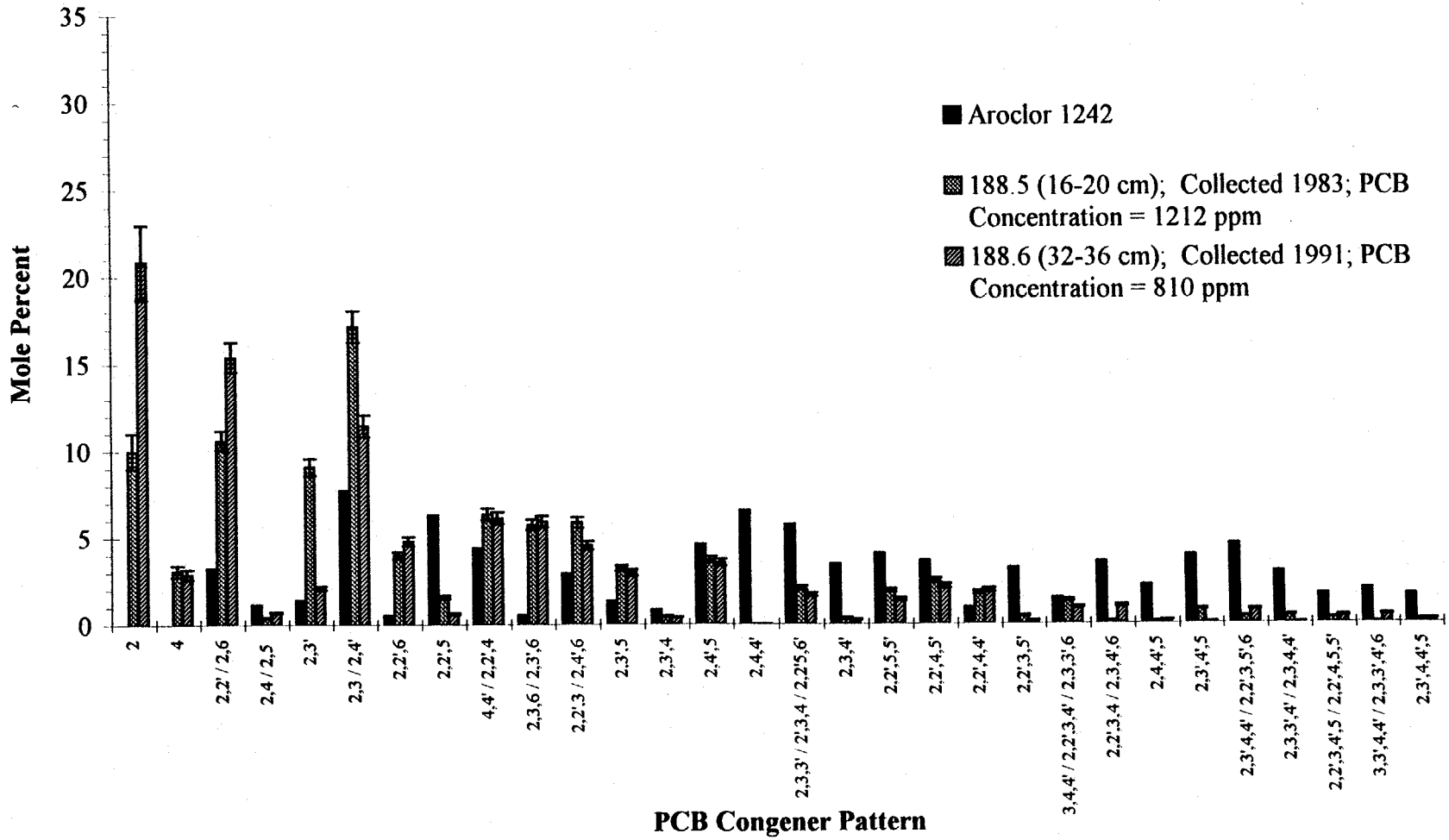
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1976



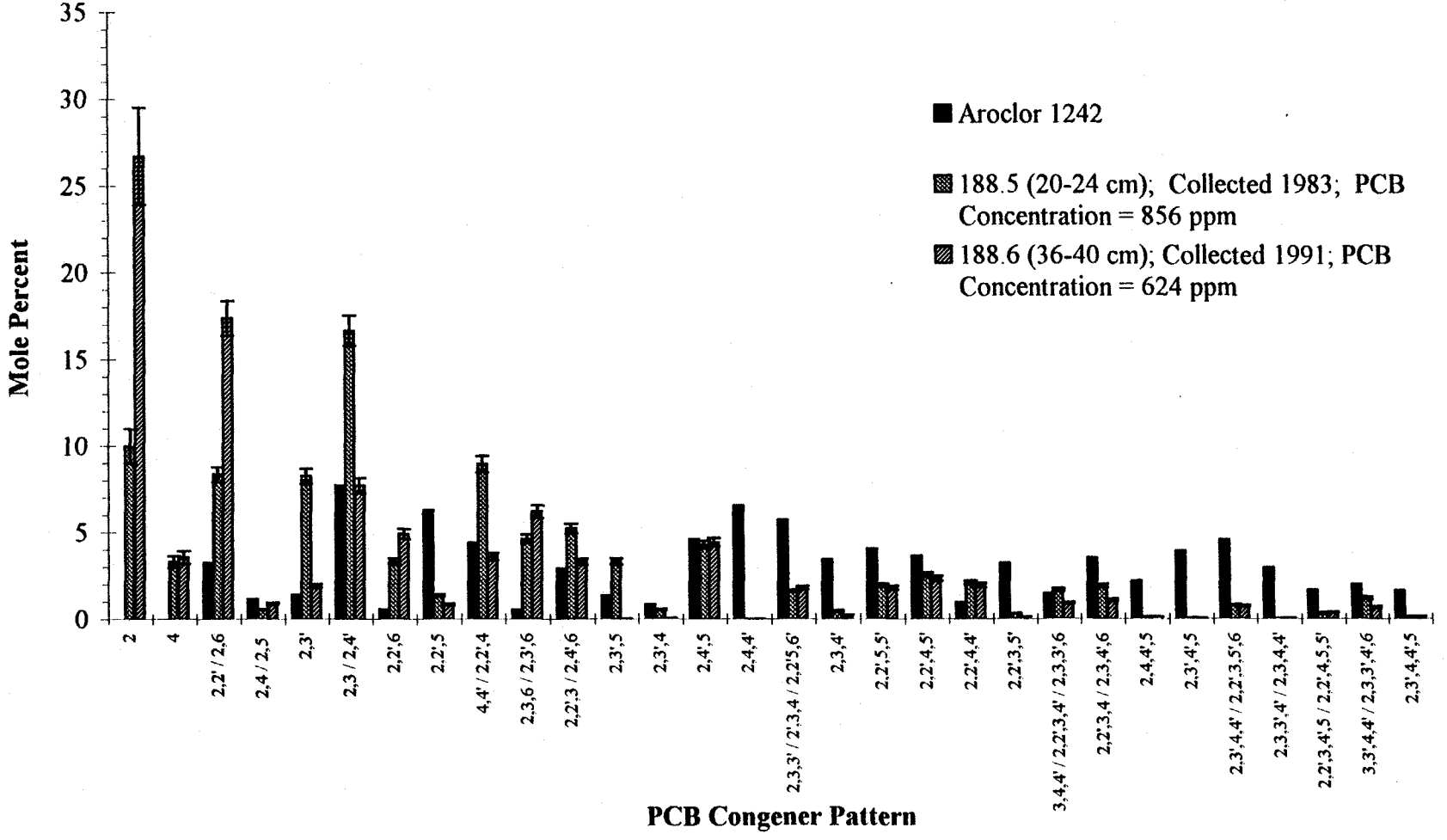
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1975



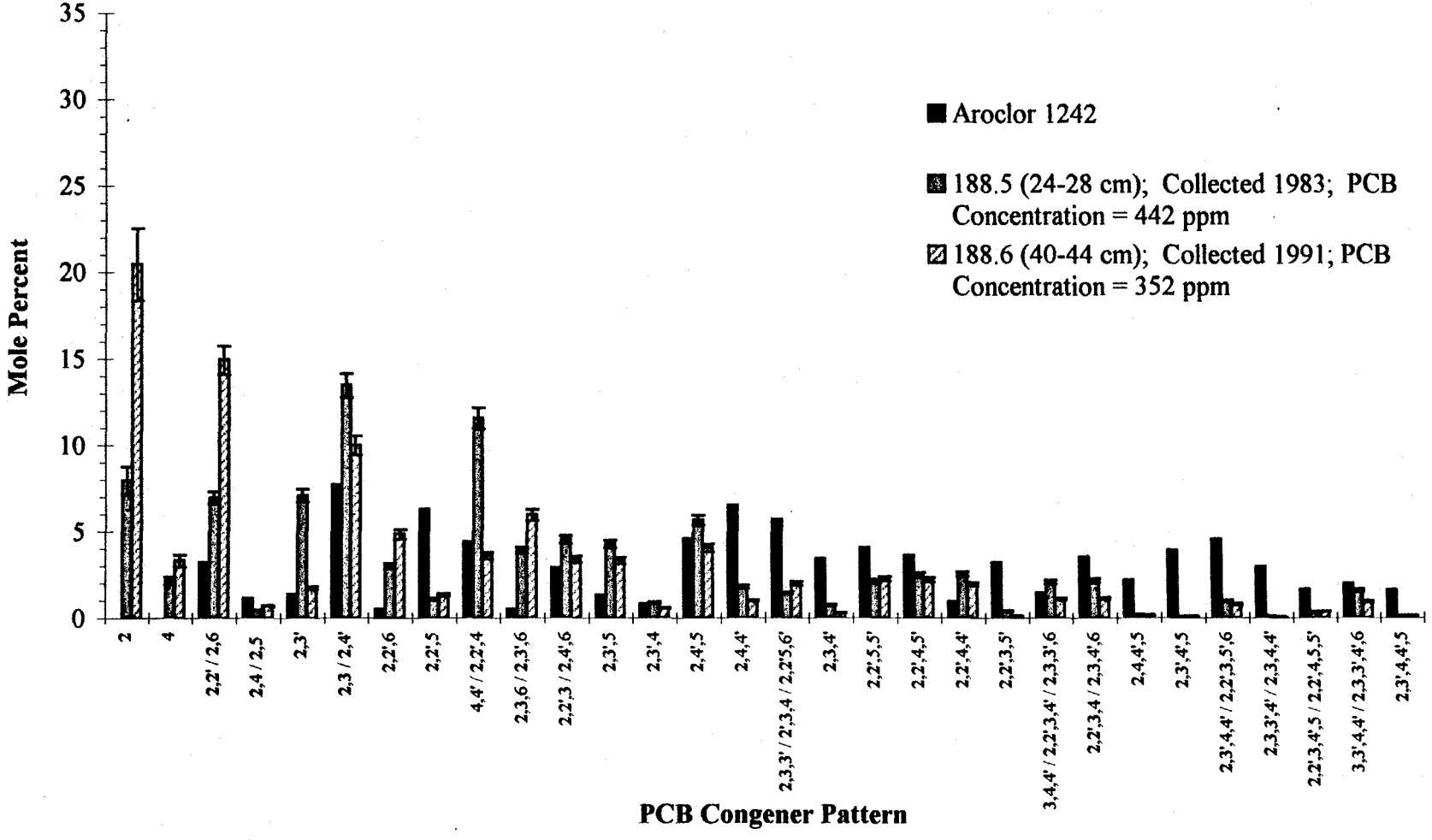
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1973



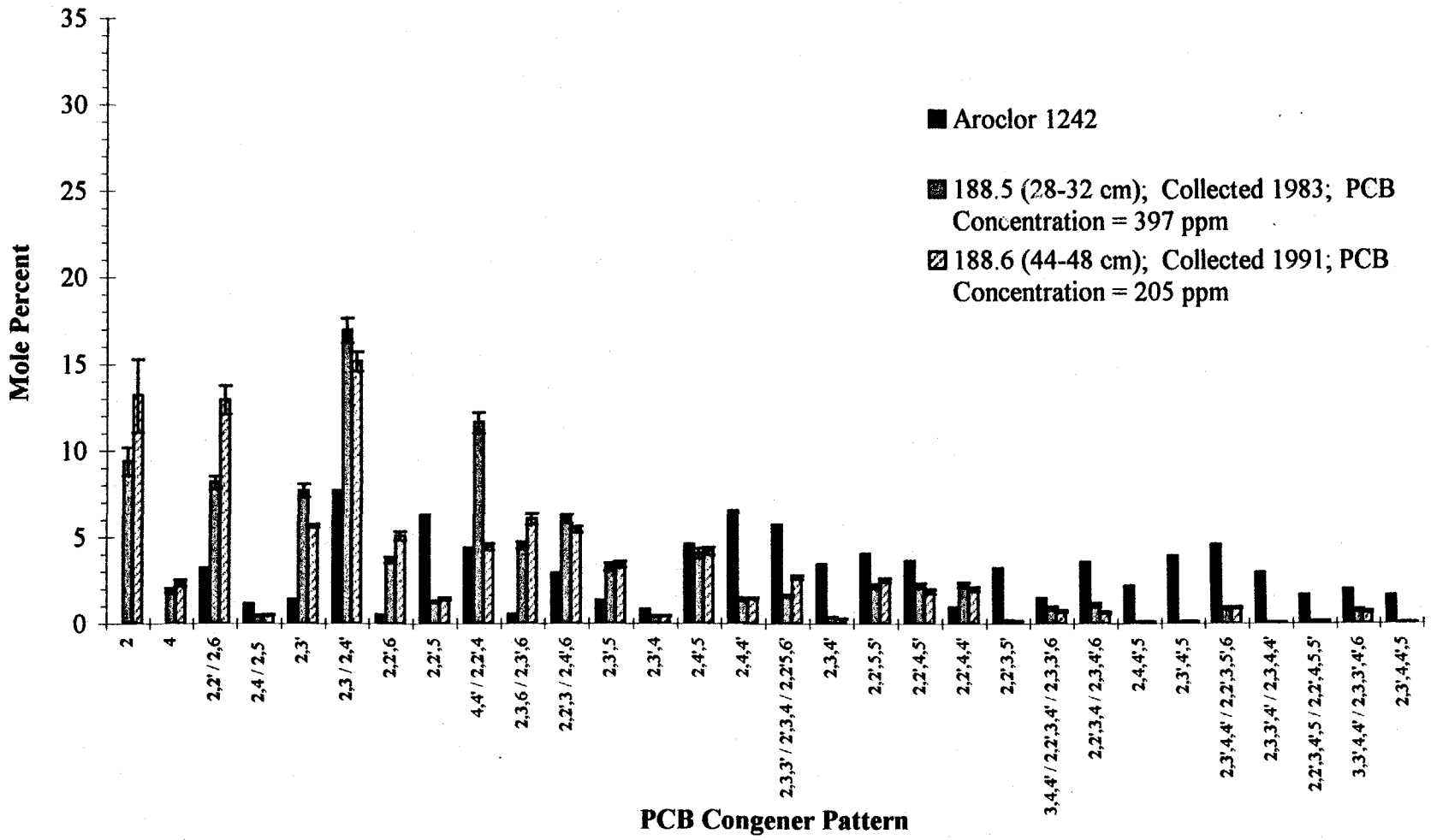
Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1968



Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1963



Comparison of PCB Congener Patterns
Upper Hudson - Thompson Island Pool
Sediment Deposited ~ 1960



COMPOSITIONAL BALANCES

Compositional Balance
188.5 (0-2 cm) and 188.6 (12-16 cm); Sediment Deposited ~ 1982
Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (0-2 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (12-16 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	12.32	1.25	12.32	1.25	15.86	1.62	3.54	2.05
7/9	2,4/2,5	1.14	0.52	0.03	-0.62	0.03	0.96	0.05	0.44	0.06
6	2,3'	1.38	5.38	0.29	4.00	0.29	2.46	0.13	-2.93	0.31
5/8	2,3/2,4'	7.71	12.59	0.67	4.88	0.67	6.58	0.35	-6.01	0.76
26	2,3',5	1.33	3.16	0.17	1.83	0.17	3.51	0.19	0.35	0.25
25	2,3',4	0.79	1.27	0.07	0.48	0.07	0.99	0.05	-0.28	0.09
31	2,4',5	4.59	5.52	0.29	0.93	0.29	7.96	0.43	2.44	0.52
28	2,4,4'	6.52	1.68	0.09	-4.84	0.09	0.00	0.09	-1.68	0.13
20/33	2,3,3'/2',3,4	5.08	1.45	0.08	-3.63	0.08	2.07	0.11	0.62	0.14
22	2,3,4'	3.41	0.70	0.04	-2.71	0.04	0.52	0.03	-0.19	0.05
67	2,3',4,5	0.41	0.05	0.01	-0.36	0.01	0.07	0.01	0.02	0.01
74	2,4,4',5	2.17	0.33	0.02	-1.84	0.02	0.28	0.02	-0.05	0.02
70	2,3',4',5	3.89	0.25	0.01	-3.64	0.01	0.22	0.01	-0.04	0.02
66	2,3',4,4'	1.66	0.28	0.01	-1.38	0.01	0.30	0.02	0.02	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.18	0.01	-2.75	0.01	0.14	0.01	-0.03	0.01
118	2,3',4,4',5	1.62	0.18	0.01	-1.44	0.01	0.16	0.01	-0.02	0.01
Balance		**44.63**	**45.87**	**3.03**	**1.24**	**3.03**	**42.08**	**3.12**	**-3.79**	**4.44**
					2.71%				**8.62%**	

11.0397

188.5 (0-2 cm) and 188.6 (12-16 cm); Sediment Deposited ~ 1982
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (0-2 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (12-16 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	16.21	0.86	13.00	0.86	18.01	0.97	1.80	1.30
18	2,2',5	6.28	1.23	0.07	-5.05	0.07	2.15	0.12	0.92	0.13
17	2,2',4	2.88	3.62	0.19	0.74	0.19	2.34	0.13	-1.28	0.23
24/27	2,3,6/2,3',6	0.50	5.20	0.28	4.70	0.28	7.06	0.38	1.85	0.47
16/32	2,2',3/2,4',6	2.89	4.64	0.25	1.75	0.25	2.26	0.12	-2.38	0.27
52	2,2',5,5'	4.04	1.74	0.09	-2.30	0.09	2.68	0.14	0.94	0.17
49	2,2',4,5'	3.60	0.83	0.04	-2.77	0.04	1.80	0.10	0.97	0.11
47	2,2',4,4'	0.94	2.01	0.11	1.07	0.11	1.99	0.11	-0.02	0.15
48	2,2',4,5	0.82	0.00	0.09	-0.82	0.09	0.00	0.08	0.00	0.12
44	2,2',3,5'	3.20	0.31	0.02	-2.89	0.02	0.23	0.01	-0.08	0.02
40	2,2',3,3'	0.89	0.12	0.01	-0.77	0.01	0.12	0.01	0.01	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	1.29	0.07	0.12	0.07	1.21	0.06	-0.08	0.09
41/64	2,2',3,4/2,3,4',6	3.50	1.45	0.08	-2.05	0.08	0.62	0.03	-0.83	0.08
82	2,2',3,3',4	0.44	0.03	0.01	-0.41	0.01	0.02	0.00	-0.01	0.01
99	2,2',4,4',5	0.86	0.18	0.01	-0.68	0.01	0.16	0.01	-0.02	0.01
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.25	0.01	-1.40	0.01	0.25	0.01	0.01	0.02
110	2,3,3',4',6	1.53	0.53	0.03	-1.01	0.03	0.57	0.03	0.04	0.04
Balance		**38.40**	**39.63**	**2.20**	**1.22**	**2.20**	**41.47**	**2.32**	**1.84**	**3.24**
					3.09%				**4.54%**	

11.0398

188.5 (0-2 cm) and 188.6 (12-16 cm); Sediment Deposited ~ 1982
Congeners Contributing to 2,2',6 - trichlorobiphenyl

			Core 188.5 (0-2 cm)		188.5 - Aroclor 1242		Core 188.6 (12-16 cm)		188.6 - 188.5	
BZ #	**Structure**	**Aroclor 1242**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
19	2,2',6	0.53	5.60	0.30	5.07	0.30	6.69	0.36	1.09	0.47
53	2,2',5,6'	0.64	0.18	0.01	-0.46	0.01	0.26	0.01	0.08	0.02
95	2,2',3,5',6	2.87	0.49	0.03	-2.38	0.03	0.53	0.03	0.04	0.04
45	2,2',3,6	1.16	0.56	0.03	-0.60	0.03	0.47	0.03	-0.09	0.04
46	2,2',3,6'	0.49	0.08	0.01	-0.41	0.01	0.08	0.01	0.00	0.01
51	2,2',4,6	0.23	0.56	0.03	0.33	0.03	0.52	0.03	-0.04	0.04
84	2,2',3,3',6	0.72	0.21	0.01	-0.51	0.01	0.23	0.01	0.02	0.02
91	2,2',3,4',6	0.17	0.30	0.02	0.13	0.02	0.34	0.02	0.04	0.02
132	2,2',3,3',4,6'	0.30	0.04	0.002	-0.26	0.002	0.02	0.001	-0.01	0.002
149	2,2',3,4',5',6	0.63	0.16	0.01	-0.47	0.01	0.30	0.02	0.13	0.02
Balance		**7.74**	**8.19**	**0.44**	**0.44**	**0.44**	**9.44**	**0.51**	**1.26**	**0.67**
					5.41%				**14.26%**	

11.0399

Compositional Balance
188.5 (2-4 cm) and 188.6 (16-20 cm); Sediment Deposited ~ 1980
Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (2-4 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (16-20 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	14.39	1.46	14.39	1.46	23.21	2.40	8.82	2.81
7/9	2,4/2,5	1.14	0.67	0.04	-0.47	0.04	1.00	0.06	0.33	0.07
6	2,3'	1.38	5.80	0.31	4.42	0.31	2.35	0.13	-3.45	0.34
5/8	2,3/2,4'	7.71	12.45	0.67	4.74	0.67	6.60	0.37	-5.85	0.76
26	2,3',5	1.33	3.28	0.18	1.95	0.18	3.01	0.17	-0.28	0.24
25	2,3',4	0.79	1.34	0.07	0.55	0.07	0.86	0.05	-0.49	0.09
31	2,4',5	4.59	4.52	0.24	-0.07	0.24	7.88	0.45	3.36	0.51
28	2,4,4'	6.52	1.14	0.06	-5.38	0.06	0.00	0.05	-1.14	0.08
20/33	2,3,3'/2',3,4	5.08	0.99	0.05	-4.09	0.05	1.67	0.09	0.68	0.11
22	2,3,4'	3.41	0.57	0.03	-2.84	0.03	0.38	0.02	-0.20	0.04
67	2,3',4,5	0.41	0.05	0.003	-0.36	0.003	0.04	0.003	-0.01	0.004
74	2,4,4',5	2.17	0.32	0.02	-1.85	0.02	0.15	0.01	-0.17	0.02
70	2,3',4',5	3.89	0.25	0.01	-3.64	0.01	0.07	0.004	-0.18	0.01
66	2,3',4,4'	1.66	0.27	0.01	-1.39	0.01	0.23	0.01	-0.04	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.19	0.01	-2.74	0.01	0.05	0.003	-0.15	0.01
118	2,3',4,4',5	1.62	0.21	0.01	-1.41	0.01	0.05	0.003	-0.15	0.01
Balance		**44.63**	**46.46**	**3.18**	**1.83**	**3.18**	**47.54**	**3.82**	**1.08**	**5.12**
					3.94%				**2.30%**	

11.0400

188.5 (2-4 cm) and 188.6 (16-20 cm)
Congeners Contributing to 2,2'/2,6-dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (2-4 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (16-20 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	15.38	0.82	12.17	0.82	19.48	1.10	4.10	1.37
18	2,2',5	6.28	0.87	0.05	-5.41	0.05	1.26	0.07	0.39	0.09
17	2,2',4	2.88	3.15	0.17	0.27	0.17	1.79	0.10	-1.36	0.20
24/27	2,3,6/2,3',6	0.50	5.92	0.32	5.42	0.32	5.97	0.34	0.06	0.46
16/32	2,2',3/2,4',6	2.89	3.93	0.21	1.04	0.21	2.25	0.13	-1.67	0.25
52	2,2',5,5'	4.04	1.42	0.08	-2.62	0.08	2.12	0.12	0.69	0.14
49	2,2',4,5'	3.60	1.71	0.09	-1.89	0.09	1.99	0.11	0.28	0.14
47	2,2',4,4'	0.94	1.67	0.09	0.73	0.09	1.82	0.10	0.15	0.14
48	2,2',4,5	0.82	0.00	0.04	-0.82	0.04	0.00	0.04	0.00	0.06
44	2,2',3,5'	3.20	0.25	0.01	-2.95	0.01	0.09	0.01	-0.16	0.01
40	2,2',3,3'	0.89	0.08	0.004	-0.81	0.004	0.04	0.003	-0.04	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	1.00	0.05	-0.17	0.05	0.83	0.05	-0.17	0.07
41/64	2,2',3,4/2,3,4',6	3.50	1.07	0.06	-2.43	0.06	0.95	0.05	-0.11	0.08
82	2,2',3,3',4	0.44	0.04	0.002	-0.40	0.002	0.01	0.002	-0.03	0.003
99	2,2',4,4',5	0.86	0.20	0.01	-0.65	0.01	0.10	0.01	-0.09	0.01
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.27	0.01	-1.38	0.01	0.13	0.01	-0.14	0.02
110	2,3,3',4',6	1.53	0.50	0.03	-1.04	0.03	0.20	0.01	-0.29	0.03
Balance		**38.40**	**37.45**	**2.04**	**-0.95**	**2.04**	**39.05**	**2.25**	**1.60**	**3.07**
					2.55%				**4.17%**	

188.5 (2-4 cm) and 188.6 (16-20 cm); Sediment Deposited ~ 1980
Congeners Contributing to 2,2',6 - trichlorobiphenyl

			Core 188.5 (2-4 cm)		188.5 - Aroclor 1242		Core 188.6 (16-20 cm)		188.6 - 188.5	
BZ #	Structure	Aroclor 1242	Mole Percent	error	Change (Mole Percent)	error	Mole Percent	error	Change (Mole Percent)	error
19	2,2',6	0.53	5.62	0.30	5.09	0.30	5.48	0.31	-0.14	0.43
53	2,2',5,6'	0.64	0.13	0.01	-0.52	0.01	0.21	0.01	0.09	0.01
95	2,2',3,5',6	2.87	0.46	0.02	-2.41	0.02	0.39	0.02	-0.07	0.03
45	2,2',3,6	1.16	0.48	0.03	-0.68	0.03	0.49	0.03	0.01	0.04
46	2,2',3,6'	0.49	0.06	0.003	-0.43	0.003	0.07	0.004	0.01	0.005
51	2,2',4,6	0.23	0.50	0.03	0.27	0.03	0.36	0.02	-0.14	0.03
84	2,2',3,3',6	0.72	0.21	0.01	-0.51	0.01	0.17	0.01	-0.04	0.02
91	2,2',3,4',6	0.17	0.30	0.02	0.13	0.02	0.30	0.02	0.00	0.02
132	2,2',3,3',4,6'	0.30	0.04	0.002	-0.26	0.002	0.01	0.001	-0.03	0.002
149	2,2',3,4',5',6	0.63	0.17	0.01	-0.46	0.01	0.13	0.01	-0.04	0.01
Balance		**7.74**	**7.96**	**0.43**	**0.22**	**0.43**	**7.61**	**0.43**	**-0.35**	**0.61**
					2.75%				**4.49%**	

11.0402

Compositional Balance

188.5 (4-8 cm) and 188.6 (20-24 cm); Sediment Deposited ~ 1979

Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (4-8 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (20-24 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	11.42	1.16	11.42	1.16	17.38	1.78	5.96	2.12
7/9	2,4/2,5	1.14	0.45	0.02	-0.69	0.02	0.89	0.05	0.44	0.05
6	2,3'	1.38	8.20	0.43	6.82	0.43	4.85	0.26	-3.35	0.51
5/8	2,3/2,4'	7.71	14.56	0.77	6.85	0.77	8.80	0.48	-5.77	0.90
26	2,3',5	1.33	3.88	0.20	2.55	0.20	0.47	0.03	-3.41	0.21
25	2,3',4	0.79	1.52	0.08	0.73	0.08	1.70	0.09	0.18	0.12
31	2,4',5	4.59	5.47	0.29	0.88	0.29	8.08	0.44	2.62	0.52
28	2,4,4'	6.52	0.00	0.01	-6.52	0.01	0.00	0.04	0.00	0.04
20/33	2,3,3'/2',3,4	5.08	1.32	0.07	-3.76	0.07	1.74	0.09	0.42	0.12
22	2,3,4'	3.41	0.75	0.04	-2.66	0.04	0.69	0.04	-0.06	0.05
67	2,3',4,5	0.41	0.07	0.004	-0.34	0.004	0.07	0.004	0.00	0.01
74	2,4,4',5	2.17	0.19	0.01	-1.98	0.01	0.27	0.01	0.08	0.02
70	2,3',4',5	3.89	0.10	0.01	-3.79	0.01	0.21	0.01	0.11	0.01
66	2,3',4,4'	1.66	0.30	0.02	-1.36	0.02	0.34	0.02	0.04	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.07	0.004	-2.86	0.00	0.12	0.01	0.05	0.01
118	2,3',4,4',5	1.62	0.21	0.01	-1.41	0.01	0.19	0.01	-0.01	0.02
Balance		**44.63**	**48.49**	**3.12**	**3.86**	**3.12**	**45.79**	**3.35**	**-2.69**	**4.73**
					7.96%				**5.71%**	

11.0403

188.5 (4-8 cm) and 188.6 (20-24 cm); Sediment Deposited ~ 1979
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (4-8 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (20-24 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	10.24	0.54	7.03	0.54	14.86	0.80	4.62	0.97
18	2,2',5	6.28	0.99	0.05	-5.29	0.05	0.91	0.05	-0.08	0.07
17	2,2',4	2.88	3.57	0.19	0.69	0.19	2.46	0.13	-1.11	0.23
24/27	2,3,6/2,3',6	0.50	5.19	0.27	4.69	0.27	6.32	0.34	1.13	0.44
16/32	2,2',3/2,4',6	2.89	4.68	0.25	1.79	0.25	3.02	0.16	-1.66	0.30
52	2,2',5,5'	4.04	1.70	0.09	-2.34	0.09	2.05	0.11	0.35	0.14
49	2,2',4,5'	3.60	2.38	0.13	-1.22	0.13	2.55	0.14	0.18	0.19
47	2,2',4,4'	0.94	1.96	0.10	1.02	0.10	2.21	0.12	0.26	0.16
48	2,2',4,5	0.82	0.00	0.01	-0.82	0.01	0.00	0.03	0.00	0.04
44	2,2',3,5'	3.20	0.22	0.01	-2.98	0.01	0.18	0.01	-0.04	0.02
40	2,2',3,3'	0.89	0.07	0.003	-0.82	0.003	0.06	0.003	-0.01	0.005
42/59	2,2',3,4'/2,3,3',6	1.17	1.20	0.06	0.03	0.06	1.12	0.06	-0.07	0.09
41/64	2,2',3,4/2,3,4',6	3.50	1.97	0.10	-1.53	0.10	1.39	0.08	-0.58	0.13
82	2,2',3,3',4	0.44	0.02	0.001	-0.42	0.00	0.02	0.002	0.00	0.002
99	2,2',4,4',5	0.86	0.27	0.01	-0.59	0.01	0.26	0.01	-0.01	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.35	0.02	-1.30	0.02	0.35	0.02	0.00	0.03
110	2,3,3',4',6	1.53	0.69	0.04	-0.85	0.04	0.52	0.03	-0.17	0.05
Balance		**38.40**	**35.49**	**1.88**	**-2.92**	**1.88**	**38.28**	**2.11**	**2.79**	**2.86**
					8.22%				**7.57%**	

11.0404

188.5 (4-8 cm) and 188.6 (20-24 cm); Sediment Deposited ~ 1979
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (4-8 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (20-24 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
19	2,2',6	0.53	4.00	0.21	3.47	0.21	4.97	0.27	0.97	0.34
53	2,2',5,6'	0.64	0.17	0.01	-0.47	0.01	0.22	0.01	0.05	0.01
95	2,2',3,5',6	2.87	0.51	0.03	-2.36	0.03	0.59	0.03	0.08	0.04
45	2,2',3,6	1.16	0.63	0.03	-0.53	0.03	0.58	0.03	-0.05	0.05
46	2,2',3,6'	0.49	0.11	0.01	-0.38	0.01	0.08	0.004	-0.03	0.01
51	2,2',4,6	0.23	0.55	0.03	0.32	0.03	0.45	0.02	-0.10	0.04
84	2,2',3,3',6	0.72	0.35	0.02	-0.37	0.02	0.35	0.02	0.00	0.03
91	2,2',3,4',6	0.17	0.45	0.02	0.28	0.02	0.49	0.03	0.04	0.04
132	2,2',3,3',4,6'	0.30	0.08	0.004	-0.22	0.004	0.00	0.01	-0.08	0.01
149	2,2',3,4',5',6	0.63	0.22	0.01	-0.41	0.01	0.27	0.02	0.04	0.02
Balance		**7.74**	**7.08**	**0.37**	**-0.66**	**0.37**	**8.01**	**0.44**	**0.92**	**0.58**
					9.32%				**12.23%**	

11.0405

Compositional Balance
188.5 (8-12 cm) and 188.6 (24-28 cm); Sediment Deposited ~ 1976
Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (8-12 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (24-28 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	11.60	1.18	11.60	1.18	17.65	1.80	6.05	2.15
7/9	2,4/2,5	1.14	0.57	0.03	-0.57	0.03	0.62	0.03	0.06	0.05
6	2,3'	1.38	8.33	0.44	6.95	0.44	5.05	0.27	-3.27	0.52
5/8	2,3/2,4'	7.71	15.89	0.84	8.18	0.84	12.16	0.66	-3.72	1.07
26	2,3',5	1.33	3.31	0.17	1.98	0.17	4.83	0.26	1.52	0.31
25	2,3',4	0.79	0.82	0.04	0.03	0.04	0.91	0.05	0.09	0.07
31	2,4',5	4.59	4.14	0.22	-0.45	0.22	5.66	0.31	1.52	0.38
28	2,4,4'	6.52	0.00	0.01	-6.52	0.01	0.00	0.02	0.00	0.02
20/33	2,3,3'/2',3,4	5.08	1.74	0.09	-3.34	0.09	1.57	0.09	-0.17	0.13
22	2,3,4'	3.41	0.46	0.02	-2.95	0.02	0.38	0.02	-0.08	0.03
67	2,3',4,5	0.41	0.07	0.004	-0.34	0.004	0.08	0.004	0.01	0.01
74	2,4,4',5	2.17	0.17	0.009	-2.00	0.01	0.14	0.01	-0.03	0.01
70	2,3',4',5	3.89	0.08	0.004	-3.81	0.004	0.06	0.003	-0.01	0.01
66	2,3',4,4'	1.66	0.27	0.01	-1.38	0.01	0.34	0.02	0.06	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.05	0.003	-2.88	0.003	0.04	0.002	-0.01	0.003
118	2,3',4,4',5	1.62	0.19	0.01	-1.43	0.01	0.16	0.01	-0.03	0.01
Balance		**44.63**	**47.69**	**3.09**	**3.06**	**3.09**	**49.66**	**3.56**	**1.97**	**4.79**
					6.42%				**4.05%**	

11.0406

188.5 (8-12 cm) and 188.6 (24-28 cm); Sediment Deposited ~ 1976
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (8-12 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (24-28 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	11.12	0.59	7.91	0.59	11.99	0.65	0.87	0.88
18	2,2',5	6.28	1.67	0.09	-4.61	0.09	0.98	0.05	-0.69	0.10
17	2,2',4	2.88	2.83	0.15	-0.05	0.15	2.80	0.15	-0.03	0.21
24/27	2,3,6/2,3',6	0.50	5.77	0.30	5.27	0.30	6.06	0.33	0.29	0.45
16/32	2,2',3/2,4',6	2.89	5.15	0.27	2.26	0.27	4.48	0.24	-0.68	0.36
52	2,2',5,5'	4.04	1.83	0.10	-2.21	0.10	2.44	0.13	0.61	0.16
49	2,2',4,5'	3.60	2.45	0.13	-1.15	0.13	2.95	0.16	0.50	0.21
47	2,2',4,4'	0.94	1.74	0.09	0.80	0.09	2.17	0.12	0.44	0.15
48	2,2',4,5	0.82	0.00	0.01	-0.82	0.01	0.00	0.02	0.00	0.02
44	2,2',3,5'	3.20	0.23	0.01	-2.97	0.01	0.13	0.01	-0.10	0.01
40	2,2',3,3'	0.89	0.07	0.004	-0.82	0.004	0.04	0.002	-0.02	0.005
42/59	2,2',3,4'/2,3,3',6	1.17	1.03	0.05	-0.14	0.05	1.01	0.05	-0.02	0.08
41/64	2,2',3,4/2,3,4',6	3.50	1.58	0.08	-1.92	0.08	1.55	0.08	-0.02	0.12
82	2,2',3,3',4	0.44	0.03	0.001	-0.41	0.001	0.01	0.001	-0.01	0.002
99	2,2',4,4',5	0.86	0.26	0.01	-0.60	0.01	0.27	0.01	0.01	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.36	0.02	-1.29	0.02	0.39	0.02	0.03	0.03
110	2,3,3',4',6	1.53	0.49	0.03	-1.04	0.03	0.36	0.02	-0.13	0.03
Balance		**38.40**	**36.60**	**1.94**	**-1.80**	**1.94**	**37.64**	**2.06**	**1.04**	**2.84**
					4.92%				**2.81%**	

11.0407

188.5 (8-12 cm) and 188.6 (24-28 cm); Sediment Deposited ~ 1976
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (8-12 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (24-28 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
19	2,2',6	0.53	4.03	0.21	3.50	0.21	4.15	0.22	0.12	0.31
53	2,2',5,6'	0.64	0.22	0.01	-0.42	0.01	0.20	0.01	-0.02	0.02
95	2,2',3,5',6	2.87	0.48	0.03	-2.40	0.03	0.59	0.03	0.11	0.04
45	2,2',3,6	1.16	0.51	0.03	-0.65	0.03	0.63	0.03	0.13	0.04
46	2,2',3,6'	0.49	0.13	0.01	-0.36	0.01	0.13	0.01	0.00	0.01
51	2,2',4,6	0.23	0.60	0.03	0.37	0.03	0.61	0.03	0.01	0.05
84	2,2',3,3',6	0.72	0.31	0.02	-0.41	0.02	0.44	0.02	0.13	0.03
91	2,2',3,4',6	0.17	0.38	0.02	0.21	0.02	0.56	0.03	0.18	0.04
132	2,2',3,3',4,6'	0.30	0.00	0.002	-0.30	0.002	0.00	0.004	0.00	0.005
149	2,2',3,4',5',6	0.63	0.20	0.01	-0.43	0.01	0.26	0.01	0.05	0.02
Balance		**7.74**	**6.85**	**0.36**	**-0.89**	**0.36**	**7.57**	**0.41**	**0.71**	**0.55**
					12.97%				**9.88%**	

11.0408

Compositional Balance
188.5 (12-16 cm) and 188.6 (28-32 cm); Sediment Deposited ~ 1975
Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (12-16 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (28-32 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	12.11	1.23	12.11	1.23	21.77	2.24	9.66	2.56
7/9	2,4/2,5	1.14	0.59	0.03	-0.55	0.03	0.62	0.03	0.04	0.05
6	2,3'	1.38	8.29	0.44	6.91	0.44	3.08	0.17	-5.20	0.47
5/8	2,3/2,4'	7.71	16.11	0.85	8.40	0.85	8.13	0.45	-7.98	0.97
26	2,3',5	1.33	3.18	0.17	1.85	0.17	3.82	0.21	0.64	0.27
25	2,3',4	0.79	0.73	0.04	-0.06	0.04	0.64	0.04	-0.09	0.05
31	2,4',5	4.59	3.93	0.21	-0.66	0.21	3.88	0.22	-0.05	0.30
28	2,4,4'	6.52	0.00	0.01	-6.52	0.01	0.00	0.02	0.00	0.02
20/33	2,3,3'/2',3,4	5.08	1.76	0.09	-3.32	0.09	1.70	0.09	-0.05	0.13
22	2,3,4'	3.41	0.41	0.02	-3.00	0.02	0.23	0.01	-0.18	0.03
67	2,3',4,5	0.41	0.07	0.003	-0.34	0.003	0.08	0.004	0.01	0.01
74	2,4,4',5	2.17	0.17	0.01	-2.00	0.01	0.13	0.01	-0.04	0.01
70	2,3',4',5	3.89	0.08	0.004	-3.81	0.004	0.04	0.002	-0.04	0.005
66	2,3',4,4'	1.66	0.26	0.01	-1.40	0.01	0.29	0.02	0.03	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.05	0.003	-2.88	0.003	0.03	0.001	-0.03	0.003
118	2,3',4,4',5	1.62	0.18	0.01	-1.44	0.01	0.13	0.01	-0.05	0.01
Balance		**44.63**	**47.91**	**3.14**	**3.28**	**3.14**	**44.57**	**3.53**	**-3.33**	**4.90**
					6.85%				**7.21%**	

11.0409

188.5 (12-16 cm) and 188.6 (28-32 cm); Sediment Deposited ~ 1975
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (12-16 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (28-32 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	11.44	0.61	8.23	0.61	15.90	0.89	4.45	1.07
18	2,2',5	6.28	1.74	0.09	-4.54	0.09	1.04	0.06	-0.70	0.11
17	2,2',4	2.88	2.85	0.15	-0.03	0.15	2.12	0.12	-0.73	0.19
24/27	2,3,6/2,3',6	0.50	5.79	0.31	5.29	0.31	6.55	0.36	0.76	0.48
16/32	2,2',3/2,4',6	2.89	5.21	0.28	2.32	0.28	3.17	0.18	-2.04	0.33
52	2,2',5,5'	4.04	1.77	0.09	-2.27	0.09	2.30	0.13	0.53	0.16
49	2,2',4,5'	3.60	2.40	0.13	-1.20	0.13	2.62	0.15	0.22	0.19
47	2,2',4,4'	0.94	1.69	0.09	0.75	0.09	1.83	0.10	0.14	0.14
48	2,2',4,5	0.82	0.00	0.01	-0.82	0.01	0.00	0.01	0.00	0.02
44	2,2',3,5'	3.20	0.22	0.01	-2.98	0.01	0.09	0.01	-0.13	0.01
40	2,2',3,3'	0.89	0.06	0.003	-0.83	0.003	0.00	0.01	-0.06	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	0.96	0.05	-0.21	0.05	0.75	0.04	-0.21	0.07
41/64	2,2',3,4/2,3,4',6	3.50	1.31	0.07	-2.19	0.07	1.05	0.06	-0.25	0.09
82	2,2',3,3',4	0.44	0.03	0.001	-0.41	0.001	0.01	0.001	-0.02	0.002
99	2,2',4,4',5	0.86	0.25	0.01	-0.61	0.01	0.26	0.01	0.01	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.34	0.02	-1.31	0.02	0.38	0.02	0.04	0.03
110	2,3,3',4',6	1.53	0.44	0.02	-1.09	0.02	0.31	0.02	-0.13	0.03
Balance		**38.40**	**36.51**	**1.94**	**-1.90**	**1.94**	**38.39**	**2.17**	**1.89**	**2.95**
					5.19%				**5.04%**	

11.0410

188.5 (12-16 cm) and 188.6 (28-32 cm); Sediment Deposited ~ 1975
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (12-16 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (28-32 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
19	2,2',6	0.53	4.04	0.21	3.51	0.21	5.78	0.32	1.74	0.39
53	2,2',5,6'	0.64	0.22	0.01	-0.42	0.01	0.21	0.01	-0.01	0.02
95	2,2',3,5',6	2.87	0.45	0.02	-2.42	0.02	0.50	0.03	0.05	0.04
45	2,2',3,6	1.16	0.47	0.03	-0.69	0.03	0.59	0.03	0.12	0.04
46	2,2',3,6'	0.49	0.12	0.01	-0.37	0.01	0.09	0.005	-0.03	0.01
51	2,2',4,6	0.23	0.61	0.03	0.38	0.03	0.50	0.03	-0.11	0.04
84	2,2',3,3',6	0.72	0.29	0.02	-0.43	0.02	0.36	0.02	0.08	0.03
91	2,2',3,4',6	0.17	0.36	0.02	0.19	0.02	0.48	0.03	0.12	0.03
132	2,2',3,3',4,6'	0.30	0.00	0.002	-0.30	0.002	0.00	0.003	0.00	0.003
149	2,2',3,4',5',6	0.63	0.19	0.01	-0.44	0.01	0.25	0.01	0.06	0.02
Balance		**7.74**	**6.76**	**0.36**	**-0.98**	**0.36**	**8.78**	**0.49**	**2.01**	**0.61**
					14.49%				**25.91%**	

11.0411

Compositional Balance
188.5 (16-20 cm) and 188.6 (32-36 cm); Sediment Deposited ~ 1973
Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (16-20 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (32-36 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	9.97	1.01	9.97	1.01	20.84	2.14	10.87	2.37
7/9	2,4/2,5	1.14	0.39	0.02	-0.75	0.02	0.67	0.04	0.28	0.04
6	2,3'	1.38	9.06	0.48	7.68	0.48	2.08	0.12	-6.98	0.49
5/8	2,3/2,4'	7.71	17.13	0.90	9.42	0.90	11.43	0.63	-5.70	1.10
26	2,3',5	1.33	3.19	0.17	1.86	0.17	2.95	0.16	-0.24	0.23
25	2,3',4	0.79	0.42	0.02	-0.37	0.02	0.36	0.02	-0.06	0.03
31	2,4',5	4.59	3.68	0.19	-0.91	0.19	3.52	0.20	-0.15	0.27
28	2,4,4'	6.52	0.00	0.01	-6.52	0.01	0.00	0.01	0.00	0.01
20/33	2,3,3'/2',3,4	5.08	1.82	0.10	-3.26	0.10	1.50	0.08	-0.33	0.13
22	2,3,4'	3.41	0.34	0.02	-3.07	0.02	0.24	0.01	-0.09	0.02
67	2,3',4,5	0.41	0.88	0.05	0.47	0.05	0.08	0.004	-0.80	0.05
74	2,4,4',5	2.17	0.08	0.004	-2.09	0.004	0.17	0.01	0.08	0.01
70	2,3',4',5	3.89	0.81	0.04	-3.08	0.04	0.05	0.003	-0.76	0.04
66	2,3',4,4'	1.66	0.13	0.01	-1.52	0.01	0.28	0.02	0.15	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.44	0.02	-2.49	0.02	0.02	0.001	-0.41	0.02
118	2,3',4,4',5	1.62	0.18	0.01	-1.44	0.01	0.18	0.01	0.00	0.01
Balance		**44.63**	**48.53**	**3.05**	**3.90**	**3.05**	**44.36**	**3.46**	**-4.16**	**4.86**
					8.03%				**8.96%**	

11.0412

188.5 (16-20 cm) and 188.6 (32-36 cm); Sediment Deposited ~ 1973
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (16-20 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (32-36 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	10.58	0.56	7.37	0.56	15.39	0.85	4.80	1.02
18	2,2',5	6.28	1.55	0.08	-4.73	0.08	0.60	0.03	-0.95	0.09
17	2,2',4	2.88	4.15	0.22	1.27	0.22	4.00	0.22	-0.14	0.31
24/27	2,3,6/2,3',6	0.50	5.72	0.30	5.22	0.30	5.89	0.33	0.17	0.44
16/32	2,2',3/2,4',6	2.89	5.85	0.31	2.96	0.31	4.53	0.25	-1.32	0.40
52	2,2',5,5'	4.04	1.89	0.10	-2.15	0.10	1.41	0.08	-0.48	0.13
49	2,2',4,5'	3.60	2.47	0.13	-1.13	0.13	2.16	0.12	-0.31	0.18
47	2,2',4,4'	0.94	1.77	0.09	0.83	0.09	1.92	0.11	0.14	0.14
48	2,2',4,5	0.82	0.00	0.01	-0.82	0.01	0.00	0.01	0.00	0.01
44	2,2',3,5'	3.20	0.42	0.02	-2.78	0.02	0.15	0.01	-0.26	0.02
40	2,2',3,3'	0.89	0.07	0.004	-0.82	0.004	0.00	0.01	-0.07	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	1.07	0.06	-0.10	0.06	0.74	0.04	-0.33	0.07
41/64	2,2',3,4/2,3,4',6	3.50	0.12	0.01	-3.38	0.01	1.00	0.06	0.88	0.06
82	2,2',3,3',4	0.44	0.12	0.01	-0.32	0.01	0.02	0.001	-0.10	0.01
99	2,2',4,4',5	0.86	0.05	0.002	-0.81	0.002	0.29	0.02	0.25	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.26	0.01	-1.39	0.01	0.39	0.02	0.12	0.03
110	2,3,3',4',6	1.53	0.03	0.002	-1.50	0.002	0.36	0.02	0.33	0.02
Balance		**38.40**	**36.12**	**1.91**	**-2.28**	**1.91**	**38.85**	**2.17**	**2.72**	**2.94**
					6.31%				**7.26%**	

11.0413

188.5 (16-20 cm) and 188.6 (32-36 cm); Sediment Deposited ~ 1973
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (16-20 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (32-36 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
19	2,2',6	0.53	3.96	0.21	3.43	0.21	4.77	0.26	0.81	0.34
53	2,2',5,6'	0.64	0.23	0.01	-0.41	0.01	0.19	0.01	-0.04	0.02
95	2,2',3,5',6	2.87	0.23	0.01	-2.64	0.01	0.49	0.03	0.26	0.03
45	2,2',3,6	1.16	0.51	0.03	-0.65	0.03	0.61	0.03	0.10	0.04
46	2,2',3,6'	0.49	0.12	0.01	-0.37	0.01	0.04	0.002	-0.08	0.01
51	2,2',4,6	0.23	0.80	0.04	0.57	0.04	0.79	0.04	-0.01	0.06
84	2,2',3,3',6	0.72	0.36	0.02	-0.36	0.02	0.26	0.01	-0.09	0.02
91	2,2',3,4',6	0.17	0.04	0.002	-0.13	0.002	0.39	0.02	0.35	0.02
132	2,2',3,3',4,6'	0.30	0.00	0.001	-0.30	0.001	0.00	0.002	0.00	0.002
149	2,2',3,4',5',6	0.63	0.20	0.01	-0.43	0.01	0.23	0.01	0.04	0.02
Balance		**7.74**	**6.45**	**0.34**	**-1.29**	**0.34**	**7.78**	**0.43**	**1.32**	**0.56**
					19.99%				**18.61%**	

11.0414

Compositional Balance
188.5 (20-24 cm) and 188.6 (36-40 cm); Sediment Deposited ~ 1968

Congeners Contributing to 2-monochlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (20-24 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (36-40 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
1	2	0.00	9.96	1.01	9.96	1.01	26.73	2.78	16.77	2.96
7/9	2,4/2,5	1.14	0.53	0.03	-0.61	0.03	0.88	0.05	0.36	0.06
6	2,3'	1.38	8.24	0.43	6.86	0.43	1.89	0.11	-6.35	0.45
5/8	2,3/2,4'	7.71	16.67	0.88	8.96	0.88	7.69	0.45	-8.97	0.98
26	2,3',5	1.33	3.31	0.17	1.98	0.17	0.04	0.002	-3.27	0.17
25	2,3',4	0.79	0.52	0.03	-0.27	0.03	0.03	0.002	-0.49	0.03
31	2,4',5	4.59	4.24	0.22	-0.35	0.22	4.40	0.25	0.16	0.34
28	2,4,4'	6.52	0.00	0.01	-6.52	0.01	0.00	0.01	0.00	0.015
20/33	2,3,3'/2',3,4	5.08	1.41	0.07	-3.67	0.07	1.58	0.09	0.17	0.12
22	2,3,4'	3.41	0.45	0.02	-2.96	0.02	0.22	0.01	-0.22	0.03
67	2,3',4,5	0.41	0.06	0.003	-0.35	0.003	0.07	0.004	0.01	0.01
74	2,4,4',5	2.17	0.09	0.005	-2.08	0.005	0.11	0.01	0.01	0.01
70	2,3',4',5	3.89	0.05	0.003	-3.84	0.003	0.04	0.002	-0.01	0.004
66	2,3',4,4'	1.66	0.29	0.02	-1.37	0.02	0.27	0.02	-0.02	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.03	0.002	-2.90	0.002	0.02	0.001	-0.01	0.002
118	2,3',4,4',5	1.62	0.13	0.01	-1.49	0.01	0.13	0.01	0.00	0.01
Sum		**44.63**	**45.99**	**2.91**	**1.36**	**2.91**	**44.10**	**3.80**	**-1.89**	**5.20**
					2.96%				**4.19%**	

227

11.0415

188.5 (20-24 cm) and 188.6 (36-40 cm); Sediment Deposited ~ 1968
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

			Core 188.5 (20-24 cm)		188.5 - Aroclor 1242		Core 188.6 (36-40 cm)		188.6 - 188.5	
BZ #	Structure	Aroclor 1242	Mole Percent	error	Change (Mole Percent)	error	Mole Percent	error	Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	8.33	0.44	5.12	0.44	17.37	1.01	9.04	1.10
18	2,2',5	6.28	1.35	0.07	-4.93	0.07	0.82	0.05	-0.53	0.09
17	2,2',4	2.88	5.87	0.31	2.99	0.31	2.36	0.14	-3.52	0.34
24/27	2,3,6/2,3',6	0.50	4.61	0.24	4.11	0.24	6.18	0.36	1.57	0.43
16/32	2,2',3/2,4',6	2.89	5.21	0.27	2.32	0.27	3.27	0.19	-1.94	0.33
52	2,2',5,5'	4.04	1.92	0.10	-2.12	0.10	1.79	0.10	-0.13	0.14
49	2,2',4,5'	3.60	2.51	0.13	-1.09	0.13	2.31	0.13	-0.20	0.19
47	2,2',4,4'	0.94	2.08	0.11	1.14	0.11	1.91	0.11	-0.17	0.16
48	2,2',4,5	0.82	0.00	0.01	-0.82	0.01	0.00	0.01	0.00	0.01
44	2,2',3,5'	3.20	0.27	0.01	-2.93	0.01	0.09	0.01	-0.18	0.01
40	2,2',3,3'	0.89	0.07	0.004	-0.82	0.004	0.00	0.01	-0.07	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	1.34	0.07	0.17	0.07	0.73	0.04	-0.61	0.08
41/64	2,2',3,4/2,3,4',6	3.50	1.90	0.10	-1.60	0.10	1.05	0.06	-0.85	0.12
82	2,2',3,3',4	0.44	0.02	0.001	-0.42	0.001	0.01	0.001	-0.01	0.001
99	2,2',4,4',5	0.86	0.24	0.01	-0.62	0.01	0.27	0.02	0.03	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.35	0.02	-1.30	0.02	0.37	0.02	0.02	0.03
110	2,3,3',4',6	1.53	0.93	0.05	-0.60	0.05	0.51	0.03	-0.42	0.06
Sum		**38.40**	**37.01**	**1.95**	**-1.39**	**1.95**	**39.05**	**2.28**	**2.04**	**3.12**
					3.77%				**5.38%**	

11.0416

188.5 (20-24 cm) and 188.6 (36-40 cm); Sediment Deposited ~ 1968
Congeners Contributing to 2,2',6 - trichlorobiphenyl

			Core 188.5 (20-24 cm)		188.5 - Aroclor 1242		Core 188.6 (36-40 cm)		188.6 - 188.5	
BZ #	Structure	Aroclor 1242	Mole Percent	error	Change (Mole Percent)	error	Mole Percent	error	Change (Mole Percent)	error
19	2,2',6	0.53	3.30	0.17	2.77	0.17	4.90	0.28	1.60	0.33
53	2,2',5,6'	0.64	0.18	0.01	-0.46	0.01	0.20	0.01	0.02	0.01
95	2,2',3,5',6	2.87	0.50	0.03	-2.37	0.03	0.47	0.03	-0.03	0.04
45	2,2',3,6	1.16	0.65	0.03	-0.51	0.03	0.61	0.04	-0.04	0.05
46	2,2',3,6'	0.49	0.13	0.01	-0.36	0.01	0.06	0.004	-0.07	0.01
51	2,2',4,6	0.23	0.78	0.04	0.55	0.04	0.59	0.03	-0.19	0.05
84	2,2',3,3',6	0.72	0.34	0.02	-0.38	0.02	0.29	0.02	-0.04	0.02
91	2,2',3,4',6	0.17	0.43	0.02	0.26	0.02	0.35	0.02	-0.08	0.03
132	2,2',3,3',4,6'	0.30	0.00	0.002	-0.30	0.002	0.00	0.002	0.00	0.003
149	2,2',3,4',5',6	0.63	0.26	0.01	-0.37	0.01	0.28	0.02	0.02	0.02
Sum		**7.74**	**6.58**	**0.35**	**-1.16**	**0.35**	**7.75**	**0.45**	**1.17**	**0.57**
					17.65%				**16.36%**	

Notes:
The sum of the changes in mole percent are expressed as a percentage of the total mole percentage for each catagory.

11.0417

Compositional Balance
188.5 (24-28 cm) and 188.6 (40-44 cm); Sediment Deposited ~ 1963
Congeners Contributing to 2-monochlorobiphenyl

			Core 188.5 (24-28 cm)		188.5 - Aroclor 1242		Core 188.6 (40-44 cm)		188.6 - 188.5	
BZ #	**Structure**	**Aroclor 1242**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
1	2	0.00	7.97	0.81	7.97	0.81	20.46	2.10	12.49	2.25
7/9	2,4/2,5	1.14	0.44	0.02	-0.70	0.02	0.71	0.04	0.27	0.05
6	2,3'	1.38	7.10	0.37	5.72	0.37	1.75	0.10	-5.34	0.38
5/8	2,3/2,4'	7.71	13.46	0.70	5.75	0.70	9.98	0.55	-3.47	0.89
26	2,3',5	1.33	4.28	0.22	2.95	0.22	3.32	0.18	-0.96	0.29
25	2,3',4	0.79	0.90	0.05	0.11	0.05	0.57	0.03	-0.33	0.06
31	2,4',5	4.59	5.66	0.29	1.07	0.29	4.06	0.22	-1.60	0.37
28	2,4,4'	6.52	1.81	0.09	-4.71	0.09	1.02	0.06	-0.79	0.11
20/33	2,3,3'/2',3,4	5.08	1.29	0.07	-3.79	0.07	1.79	0.10	0.51	0.12
22	2,3,4'	3.41	0.77	0.04	-2.64	0.04	0.29	0.02	-0.47	0.04
67	2,3',4,5	0.41	0.07	0.004	-0.34	0.004	0.07	0.004	0.00	0.01
74	2,4,4',5	2.17	0.18	0.01	-1.99	0.01	0.15	0.01	-0.03	0.01
70	2,3',4',5	3.89	0.11	0.01	-3.78	0.01	0.09	0.005	-0.02	0.01
66	2,3',4,4'	1.66	0.36	0.02	-1.30	0.02	0.29	0.02	-0.07	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.08	0.004	-2.85	0.004	0.06	0.003	-0.02	0.01
118	2,3',4,4',5	1.62	0.14	0.01	-1.48	0.01	0.12	0.01	-0.02	0.01
Balance		**44.63**	**44.61**	**2.71**	**-0.02**	**2.71**	**44.73**	**3.44**	**0.12**	**4.62**
					0.04%				**0.28%**	

11.0418

188.5 (24-28 cm) and 188.6 (40-44 cm); Sediment Deposited ~ 1963
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (24-28 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (40-44 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	6.97	0.36	3.76	0.36	14.95	0.82	7.98	0.90
18	2,2',5	6.28	1.11	0.06	-5.17	0.06	1.34	0.07	0.23	0.09
17	2,2',4	2.88	7.59	0.39	4.71	0.39	2.36	0.13	-5.23	0.42
24/27	2,3,6/2,3',6	0.50	3.93	0.20	3.43	0.20	5.97	0.33	2.04	0.39
16/32	2,2',3/2,4',6	2.89	4.54	0.24	1.65	0.24	3.42	0.19	-1.12	0.30
52	2,2',5,5'	4.04	2.15	0.11	-1.89	0.11	2.29	0.13	0.14	0.17
49	2,2',4,5'	3.60	2.50	0.13	-1.10	0.13	2.23	0.12	-0.27	0.18
47	2,2',4,4'	0.94	2.56	0.13	1.62	0.13	1.96	0.11	-0.59	0.17
48	2,2',4,5	0.82	0.00	0.02	-0.82	0.02	0.00	0.02	0.00	0.03
44	2,2',3,5'	3.20	0.42	0.02	-2.78	0.02	0.13	0.01	-0.29	0.02
40	2,2',3,3'	0.89	0.21	0.01	-0.68	0.01	0.04	0.002	-0.16	0.01
42/59	2,2',3,4'/2,3,3',6	1.17	1.69	0.09	0.52	0.09	0.89	0.05	-0.80	0.10
41/64	2,2',3,4/2,3,4',6	3.50	2.19	0.11	-1.31	0.11	1.14	0.06	-1.05	0.13
82	2,2',3,3',4	0.44	0.02	0.001	-0.42	0.001	0.01	0.001	-0.01	0.001
99	2,2',4,4',5	0.86	0.24	0.01	-0.62	0.01	0.25	0.01	0.00	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.34	0.02	-1.31	0.02	0.37	0.02	0.03	0.03
110	2,3,3',4',6	1.53	1.24	0.06	-0.29	0.06	0.74	0.04	-0.50	0.08
Balance		**38.40**	**37.69**	**1.98**	**-0.72**	**1.98**	**38.09**	**2.12**	**0.41**	**3.03**
					1.91%				**1.08%**	

11.0419

188.5 (24-28 cm) and 188.6 (40-44 cm); Sediment Deposited ~ 1963
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (24-28 cm)		188.5 - Aroclor 1242		Core 188.6 (40-44 cm)		188.6 - 188.5	
			Mole Percent	error	Change (Mole Percent)	error	Mole Percent	error	Change (Mole Percent)	error
19	2,2',6	0.53	3.03	0.16	2.50	0.16	4.86	0.27	1.83	0.31
53	2,2',5,6'	0.64	0.16	0.01	-0.48	0.01	0.23	0.01	0.06	0.02
95	2,2',3,5',6	2.87	0.62	0.03	-2.25	0.03	0.50	0.03	-0.13	0.04
45	2,2',3,6	1.16	0.80	0.04	-0.36	0.04	0.62	0.03	-0.18	0.05
46	2,2',3,6'	0.49	0.15	0.01	-0.34	0.01	0.09	0.005	-0.06	0.01
51	2,2',4,6	0.23	0.82	0.04	0.59	0.04	0.51	0.03	-0.31	0.05
84	2,2',3,3',6	0.72	0.44	0.02	-0.28	0.02	0.34	0.02	-0.10	0.03
91	2,2',3,4',6	0.17	0.51	0.03	0.34	0.03	0.46	0.03	-0.05	0.04
132	2,2',3,3',4,6'	0.30	0.00	0.004	-0.30	0.004	0.00	0.004	0.00	0.01
149	2,2',3,4',5',6	0.63	0.37	0.02	-0.26	0.02	0.36	0.02	-0.01	0.03
Balance		**7.74**	**6.89**	**0.36**	**-0.85**	**0.36**	**7.96**	**0.44**	**1.07**	**0.58**
					12.36%				**14.37%**	

11.0420

Compositional Balance
188.5 (28-32 cm) and 188.6 (44-48 cm); Sediment Deposited ~1960
Congeners Contributing to 2-monochlorobiphenyl

			Core 188.5 (28-32 cm)		188.5 - Aroclor 1242		Core 188.6 (44-48 cm)		188.6 - 188.5	
BZ #	Structure	Aroclor 1242	Mole Percent	error	Change (Mole Percent)	error	Mole Percent	error	Change (Mole Percent)	error
1	2	0.00	9.37	0.95	9.37	0.95	13.17	1.34	3.79	1.64
7/9	2,4/2,5	1.14	0.47	0.02	-0.67	0.02	0.51	0.03	0.04	0.04
6	2,3'	1.38	7.71	0.40	6.33	0.40	5.67	0.30	-2.03	0.50
5/8	2,3/2,4'	7.71	16.96	0.89	9.25	0.89	15.16	0.81	-1.80	1.20
26	2,3',5	1.33	3.28	0.17	1.95	0.17	3.43	0.18	0.15	0.25
25	2,3',4	0.79	0.42	0.02	-0.37	0.02	0.45	0.02	0.03	0.03
31	2,4',5	4.59	4.07	0.21	-0.52	0.21	4.20	0.22	0.13	0.31
28	2,4,4'	6.52	1.43	0.07	-5.09	0.07	1.47	0.08	0.04	0.11
20/33	2,3,3'/2',3,4	5.08	1.44	0.08	-3.64	0.08	2.38	0.13	0.94	0.15
22	2,3,4'	3.41	0.38	0.02	-3.03	0.02	0.30	0.02	-0.08	0.03
67	2,3',4,5	0.41	0.08	0.004	-0.33	0.004	0.09	0.005	0.01	0.01
74	2,4,4',5	2.17	0.10	0.005	-2.07	0.01	0.09	0.005	-0.01	0.01
70	2,3',4',5	3.89	0.12	0.01	-3.77	0.01	0.11	0.01	-0.003	0.01
66	2,3',4,4'	1.66	0.33	0.02	-1.33	0.02	0.34	0.02	0.005	0.02
56/60	2,3,3',4/2,3,4,4'	2.93	0.06	0.003	-2.87	0.003	0.06	0.003	0.002	0.005
118	2,3',4,4',5	1.62	0.07	0.004	-1.55	0.004	0.07	0.003	-0.01	0.01
Totals		**44.63**	**46.29**	**2.89**	**1.67**	**2.89**	**47.51**	**3.16**	**1.21**	**4.32**
Balance					**3.60%**				**2.59%**	

11.0421

188.5 (28-32 cm) and 188.6 (44-48 cm); Sediment Deposited ~ 1960
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (28-32 cm) Mole Percent	error	188.5 - Aroclor 1242 Change (Mole Percent)	error	Core 188.6 (44-48 cm) Mole Percent	error	188.6 - 188.5 Change (Mole Percent)	error
4/10	2,2'/2,6	3.21	8.18	0.43	4.97	0.43	12.94	0.69	4.76	0.81
18	2,2',5	6.28	1.29	0.07	-4.99	0.07	1.44	0.08	0.15	0.10
17	2,2',4	2.88	7.63	0.40	4.75	0.40	2.91	0.15	-4.71	0.43
24/27	2,3,6/2,3',6	0.50	4.55	0.24	4.05	0.24	6.06	0.32	1.52	0.40
16/32	2,2',3/2,4',6	2.89	6.08	0.32	3.19	0.32	5.47	0.29	-0.61	0.43
52	2,2',5,5'	4.04	2.17	0.11	-1.87	0.11	2.53	0.13	0.35	0.18
49	2,2',4,5'	3.60	2.24	0.12	-1.36	0.12	1.87	0.10	-0.37	0.15
47	2,2',4,4'	0.94	2.26	0.12	1.32	0.12	2.03	0.11	-0.23	0.16
48	2,2',4,5	0.82	0.00	0.02	-0.82	0.02	0.00	0.04	0.00	0.04
44	2,2',3,5'	3.20	0.19	0.01	-3.01	0.01	0.12	0.01	-0.06	0.01
40	2,2',3,3'	0.89	0.26	0.01	-0.63	0.01	0.20	0.01	-0.06	0.02
42/59	2,2',3,4'/2,3,3',6	1.17	0.73	0.04	-0.44	0.04	0.58	0.03	-0.15	0.05
41/64	2,2',3,4/2,3,4',6	3.50	1.09	0.06	-2.41	0.06	0.65	0.03	-0.43	0.07
82	2,2',3,3',4	0.44	0.01	0.001	-0.43	0.001	0.00	0.03	-0.01	0.031
99	2,2',4,4',5	0.86	0.07	0.004	-0.79	0.004	0.06	0.003	-0.01	0.005
90/101	2,2',3,4',5/2,2',4,5,5'	1.65	0.13	0.01	-1.52	0.01	0.12	0.01	-0.01	0.01
110	2,3,3',4',6	1.53	0.61	0.03	-0.92	0.03	0.54	0.03	-0.07	0.04
Totals		**38.40**	**37.47**	**1.99**	**-0.93**	**1.99**	**37.52**	**2.06**	**0.05**	**2.94**
Balance					**2.49%**				**0.12%**	

11.0422

188.5 (28-32 cm) and 188.6 (44-48 cm); Sediment Deposited ~ 1960
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Aroclor 1242	Core 188.5 (28-32 cm)		188.5 - Aroclor 1242 Change (Mole Percent)		Core 188.6 (44-48 cm)		188.6 - 188.5 Change (Mole Percent)	
			Mole Percent	error		error	Mole Percent	error		error
19	2,2',6	0.53	3.71	0.19	3.18	0.19	5.10	0.27	1.39	0.33
53	2,2',5,6'	0.64	0.18	0.01	-0.46	0.01	0.30	0.02	0.12	0.02
95	2,2',3,5',6	2.87	0.57	0.03	-2.30	0.03	0.58	0.03	0.01	0.04
45	2,2',3,6	1.16	0.55	0.03	-0.61	0.03	0.31	0.02	-0.24	0.03
46	2,2',3,6'	0.49	0.13	0.01	-0.36	0.01	0.06	0.003	-0.07	0.01
51	2,2',4,6	0.23	1.06	0.06	0.83	0.06	0.66	0.04	-0.40	0.07
84	2,2',3,3',6	0.72	0.29	0.02	-0.43	0.02	0.22	0.01	-0.07	0.02
91	2,2',3,4',6	0.17	0.31	0.02	0.14	0.02	0.26	0.01	-0.05	0.02
132	2,2',3,3',4,6'	0.30	0.00	0.004	-0.30	0.004	0.00	0.01	0.00	0.01
149	2,2',3,4',5',6	0.63	0.12	0.01	-0.51	0.01	0.11	0.01	-0.01	0.01
Totals		**7.74**	**6.92**	**0.37**	**-0.82**	**0.37**	**7.60**	**0.41**	**0.68**	**0.56**
Balance					**11.83%**				**9.35%**	

11.0423

PARENT DAUGHTER ANALYSIS

Parent - Daughter Analysis
Core 188.5 (12-16 cm) - Aroclor 1242; Sediment Deposited ~ 1982
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	12.32	1.25	All decreasing peaks listed below
6	2,3'	4.00	0.29	2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	4.88	0.67	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.83	0.17	2,3',4,5; 2,3',4',5; 2,3',4,4',5
25	2,3',4	0.48	0.07	2,3',4,5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
31	2,4',5	0.93	0.29	2,4,4',5; 2,3',4',5; 2,3',4,4',5
Total		**24.45**	**2.73**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.62	0.03	2	--
28	2,4,4'	-4.84	0.09	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.63	0.08	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-2.71	0.04	2,3; 2,4'; 2	--
67	2,3',4,5	-0.36	0.01	2,3',4; 2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-1.84	0.02	2,4',5; 2,4'; 2	2,4,4'; 2,4; 2,5
70	2,3',4',5	-3.64	0.01	2,4',5; 2,3',5; 2,4'; 2,3'; 2	2,5
66	2,3',4,4'	-1.38	0.01	2,3',4; 2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.75	0.01	2,3',4; 2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,4
118	2,3',4,4',5	-1.44	0.01	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,5; 2,4'
Total		**-23.20**	**0.30**		

Core 188.5 (12-16 cm) - Aroclor 1242; Sediment Deposited ~ 1982
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	13.00	0.86	All decreasing peaks listed below
17	2,2',4	0.74	0.19	2,2',4,5'; 2,2',4,5; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	4.70	0.28	2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	1.75	0.25	2,2',3,5'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	1.07	0.11	2,2',4,4',5
42/59	2,2',3,4'/2,3,3',6	0.12	0.07	2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
Total		**21.39**	**1.75**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-5.05	0.07	2,2'	--
52	2,2',5,5'	-2.30	0.09	2,2'	2,2',5
49	2,2',4,5'	-2.77	0.04	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.09	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.89	0.02	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.77	0.01	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-2.05	0.08	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.41	0.01	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,3'
99	2,2',4,4',5	-0.68	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.40	0.01	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-1.01	0.03	2,3,3',6; 2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6
Total		**-20.16**	**0.45**		

Core 188.5 (12-16 cm) - Aroclor 1242; Sediment Deposited ~ 1982
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	5.07	0.30	All decreasing peaks listed below
51	2,2',4,6'	0.33	0.03	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.13	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**5.54**	**0.34**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.46	0.01	2,2',6	--
95	2,2',3,5',6	-2.38	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.60	0.03	2,2',6	--
46	2,2',3,6'	-0.41	0.01	2,2',6	--
84	2,2',3,3',6	-0.51	0.01	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.26	0.002	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.47	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-5.09**	**0.09**		

11.0427

Core 188.6 (12-16) - 188.5 (2-4 cm); Sediment Deposited ~ 1982
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	3.54	2.05	All decreasing peaks listed below
7/9	2,4/2,5	0.44	0.06	2,3',4
26	2,3',5	0.35	0.25	?
31	2,4',5	2.44	0.52	?
20/33	2,3,3'/2',3,4	0.62	0.14	?
Total		**7.38**	**3.01**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-2.93	0.31	2	--
5/8	2,3/2,4'	-6.01	0.76	2	--
25	2,3',4	-0.28	0.09	2,4; 2	--
28	2,4,4'	-1.68	0.13	2,4; 2	2,4'
22	2,3,4'	-0.19	0.05	2	--
Total		**-11.08**	**1.33**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
67	2,3',4,5	0.02	0.01
74	2,4,4',5	-0.05	0.02
70	2,3',4',5	-0.04	0.02
66	2,3',4,4'	0.02	0.02
56/60	2,3,3',4/2,3,4,4'	-0.03	0.01
118	2,3',4,4',5	-0.02	0.01

Core 188.6 (12-16) - 188.5 (2-4 cm); Sediment Deposited ~ 1982
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	1.80	1.30	All decreasing peaks listed below
18	2,2',5	0.92	0.13	2,2',3,5'; ?
24,27	2,3,6/2,3',6	1.85	0.47	2,3,4',6; ?
52	2,2',5,5'	0.94	0.17	?
49	2,2',4,5'	0.97	0.11	?
Total		**6.49**	**2.18**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
17	2,2',4	-1.28	0.23	2,2'	--
16/32	2,2',3/2,4',6	-2.38	0.27	2,2'; 2,6	--
44	2,2',3,5'	-0.08	0.02	2,2',5; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-0.83	0.08	2,3,6; 2,2'; 2,6	2,2',4; 2,4',6
Total		**-4.57**	**0.61**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
40	2,2'3,3'	0.01	0.01
47	2,2',4,4'	-0.02	0.15
48	2,2',4,5	0.00	0.12
42/59	2,2',3,4'/2,3,3',6	-0.08	0.09
82	2,2',3,3',4	-0.01	0.01
90/101	2,2',3,4',5/2,2',4,5,5'	0.01	0.02
110	2,3,3',4',6	0.04	0.04
99	2,2',4,4',5	-0.02	0.01

Core 188.6 (12-16) - 188.5 (2-4 cm); Sediment Deposited ~ 1982
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	1.09	0.47	All decreasing peaks listed below
53	2,2',5,6'	0.08	0.02	?
149	2,2',3,4',5',6	0.13	0.02	?
Total		**1.17**	**0.48**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
45	2,2',3,6	-0.09	0.04	2,2',6	--
Total		**-0.09**	**0.04**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
95	2,2',3,5',6	0.04	0.04
46	2,2',3,6'	0.00	0.01
51	2,2',4,6'	-0.04	0.04
84	2,2',3,3',6	0.02	0.02
91	2,2',3,4',6	0.04	0.02
132	2,2',3,3',4,6'	-0.01	0.002

11.0430

Parent Daughter Analysis
Core 188.5 (2-4 cm) - Aroclor 1242; Sediment Deposited ~ 1980
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	14.39	1.46	All decreasing peaks listed below
6	2,3'	4.42	0.31	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	4.74	0.67	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.95	0.18	2,3',4,5; 2,3',4',5; 2,3',4,4',5
25	2,3',4	0.55	0.07	2,3',4,5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
Total		**26.05**	**2.69**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.47	0.04	2	--
28	2,4,4'	-5.38	0.06	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-4.09	0.05	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-2.84	0.03	2,3; 2,4'; 2	--
67	2,3',4,5	-0.36	0.003	2,3',4; 2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-1.85	0.02	2,4'; 2	2,4,4'; 2,4',5; 2,4; 2,5
70	2,3',4',5	-3.64	0.01	2,3',5; 2,4'; 2,3'; 2	2,4',5; 2,5
66	2,3',4,4'	-1.39	0.01	2,3',4; 2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.74	0.01	2,3',4; 2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,4
118	2,3',4,4',5	-1.41	0.01	2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,4',5; 2,5; 2,4'
Total		**-24.15**	**0.25**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
31	2,4',5	-0.07	0.24

Core 188.5 (2-4 cm) - Aroclor 1242; Sediment Deposited ~ 1980
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	12.17	0.82	All decreasing peaks listed below
17	2,2',4	0.27	0.17	2,2',4,5'; 2,2',4,5; 2,2',3,4'; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	5.42	0.32	2,3,3',6; 2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	1.04	0.21	2,2',3,5'; 2,2',3,3'; 2,2',3,4'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	0.73	0.09	2,2',4,4',5
Total		**19.62**	**1.61**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-5.41	0.05	2,2'	--
52	2,2',5,5'	-2.62	0.08	2,2'	2,2',5
49	2,2',4,5'	-1.89	0.09	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.04	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.95	0.01	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.81	0.004	2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-0.17	0.05	2,2',3; 2,3,6; 2,3',6; 2,2',4; 2,2'; 2,6	--
41/64	2,2',3,4/2,3,4',6	-2.43	0.06	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.40	0.002	2,2',3; 2,2',4; 2,2'	2,2',3,4'; 2,2',3,4; 2,2',3,3'
99	2,2',4,4',5	-0.66	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.38	0.01	2,2',3; 2,2',4; 2,2'	2,2',3,4'; 2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-1.04	0.03	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6
Total		**-20.57**	**0.43**		

Core 188.5 (2-4 cm) - Aroclor 1242; Sediment Deposited ~ 1980
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	5.09	0.30	All decreasing peaks listed below
51	2,2',4,6'	0.27	0.03	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.13	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**5.48**	**0.34**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.52	0.01	2,2',6	--
95	2,2',3,5',6	-2.41	0.02	2,2',6	2,2',5,6'
45	2,2',3,6	-0.68	0.03	2,2',6	--
46	2,2',3,6'	-0.43	0.003	2,2',6	--
84	2,2',3,3',6	-0.51	0.01	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.26	0.002	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.46	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-5.26**	**0.08**		

11.0433

Core 188.6 (12-16 cm) - 188.5 (2-4 cm); Sediment Deposited ~ 1980
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	8.82	2.81	All decreasing peaks listed below
7/9	2,4/2,5	0.33	0.07	2,3',5; 2,3',4; 2,4,4'; 2,3',4; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3,4,4'; 2,3',4,4',5
31	2,4',5	3.36	0.51	2,4,4',5; 2,3',4',5; 2,3',4,4',5
20/33	2,3,3'/2',3,4	0.68	0.11	2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
Total		**13.19**	**3.49**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-3.45	0.34	2	--
5/8	2,3/2,4'	-5.85	0.76	2	--
26	2,3',5	-0.28	0.24	2,5; 2	2,3'
25	2,3',4	-0.49	0.09	2,4; 2	2,3'
28	2,4,4'	-1.14	0.08	2,4; 2	2,4'
22	2,3,4'	-0.20	0.04	2	2,3; 2,4'
74	2,4,4',5	-0.17	0.02	2,4',5; 2,4; 2,5; 2	2,4'; 2,4,4'
70	2,3',4',5	-0.18	0.01	2',3,4; 2,4',5; 2,5; 2	2,3',5; 2,4'; 2,3'
66	2,3',4,4'	-0.04	0.02	2',3,4; 2,4; 2	2,4,4'; 2,3',4; 2,4'; 2,3'
56/60	2,3,3',4/2,3,4,4'	-0.15	0.01	2,3,3'; 2,4; 2	2,3,4'; 2,4,4'; 2,3',4; 2,3; 2,4'; 2,3'
118	2,3',4,4',5	-0.15	0.01	2',3,4' 2,4',5; 2,4; 2,5; 2	2,3',4,4'; 2,3',4',5; 2,4,4',5; 2,4,4'; 2,3',4; 2,3',5; 2,4'; 2,3'
Total		**-12.09**	**1.62**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
67	2,3',4,5	-0.01	0.004

Core 188.6 (12-16 cm) - 188.5 (2-4 cm); Sediment Deposited ~ 1980
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	4.10	1.37	All decreasing peaks listed below
18	2,2',5	0.39	0.09	2,2',3,5'; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
52	2,2',5,5'	0.69	0.14	2,2',4,5,5'
49	2,2',4,5'	0.28	0.14	2,2',4,4',5; 2,2',4,5,5'
Total		**5.46**	**1.75**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
17	2,2',4	-1.36	0.20	2,2'	--
16/32	2,2',3/2,4',6	-1.67	0.25	2,2'; 2,6	--
44	2,2',3,5'	-0.16	0.01	2,2',5; 2,2'	2,2',3
42/59	2,2',3,4'/2,3,3',6	-0.17	0.07	2,2'	2,2',3; 2,36; 2,3',6
41/64	2,2',3,4/2,3,4',6	-0.11	0.08	2,2'; 2,6	2,2',3; 2,4',6; 2,2',4; 2,3,6
90/101	2,2',3,4',5/2,2',4,5,5'	-0.14	0.02	2,2',4,5'; 2,2',5,5'; 2,2',5; 2,2'	2,2',3; 2,2',4
99	2,2',4,4',5	-0.09	0.01	2,2',4,5'; 2,2',5; 2,2'	2,2',4; 2,2',4,4'
110	2,3,3',4',6	-0.29	0.03	2,6	2,3,3',6; 2,4',6; 2,3,6; 2,3',6
Total		**-4.01**	**0.66**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
24,27	2,3,6/2,3',6	0.06	0.46
40	2,2',3,3'	-0.04	0.005
47	2,2',4,4'	0.15	0.14
48	2,2',4,5	0.00	0.06
82	2,2',3,3',4	-0.03	0.003

Core 188.6 (12-16 cm) - 188.5 (2-4 cm); Sediment Deposited ~ 1980
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
53	2,2',5,6'	0.09	0.01	2,2',3,5',6; 2,2',3,4',5',6
Total		**0.09**	**0.01**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
95	2,2',3,5',6	-0.07	0.03	2,2',5,6'	2,2',3,6
51	2,2',4,6'	-0.14	0.03	?	2,2',6
84	2,2',3,3',6	-0.04	0.02	?	2,2',6; 2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.03	0.002	?	2,2',6; 2,2',3,6; 2,2',3,6'; 2,2',3,4',6
149	2,2',3,4',5',6	-0.04	0.01	2,2',5,6'	2,2',6; 2,2',3,6; 2,2',3,4',6
Total		**-0.32**	**0.10**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
19	2,2',6	-0.14	0.43
45	2,2',3,6	0.01	0.04
46	2,2',3,6'	0.01	0.005
91	2,2',3,4',6	0.00	0.02

11.0436

Parent - Daughter Analysis
Core 188.5 (4-8 cm) - Aroclor 1242; Sediment Deposited ~ 1979
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	11.42	1.16	All decreasing peaks listed below
6	2,3'	6.82	0.43	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	6.85	0.77	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	2.55	0.20	2,3',4,5; 2,3',4',5; 2,3',4,4',5
25	2,3',4	0.73	0.08	2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
31	2,4',5	0.88	0.29	2,3',4,5; 2,4,4',5; 2,3',4',5; 2,3',4,4',5
Total		**29.24**	**2.93**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.69	0.02	2	--
28	2,4,4'	-6.52	0.01	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.76	0.07	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-2.66	0.04	2,3; 2,4'; 2	--
67	2,3',4,5	-0.34	0.004	2,4',5; 2,3',4; 2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-1.98	0.010	2,4',5; 2,4'; 2	2,4,4'; 2,4; 2,5
70	2,3',4',5	-3.79	0.005	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,4',5; 2,5
66	2,3',4,4'	-1.36	0.02	2,3',4; 2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.86	0.004	2,3',4; 2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,4
118	2,3',4,4',5	-1.41	0.01	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,5; 2,4'
Total		**-25.38**	**0.20**		

11.0437

Core 188.5 (4-8 cm) - Aroclor 1242; Sediment Deposited ~ 1979
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	7.03	0.54	All decreasing peaks listed below
17	2,2',4	0.69	0.19	2,2',4,5'; 2,2',4,5; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	4.69	0.27	2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	1.79	0.25	2,2',3,5'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	1.02	0.10	2,2',4,4',5
Total		**15.22**	**1.35**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-5.29	0.05	2,2'	--
52	2,2',5,5'	-2.34	0.09	2,2'	2,2',5
49	2,2',4,5'	-1.22	0.13	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.01	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.98	0.01	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.82	0.003	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-1.53	0.10	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.42	0.001	2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,3'
99	2,2',4,4',5	-0.59	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.30	0.02	2,2',3; 2,2',4; 2,2'	2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-0.85	0.04	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6
Total		**-18.16**	**0.47**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
42/59	2,2',3,4'/2,3,3',6	0.03	0.06

Core 188.5 (4-8 cm) - Aroclor 1242; Sediment Deposited ~ 1979
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	3.47	0.21	All decreasing peaks listed below
51	2,2',4,6'	0.32	0.03	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.28	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**4.08**	**0.26**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.47	0.01	2,2',6	--
95	2,2',3,5',6	-2.36	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.53	0.03	2,2',6	--
46	2,2',3,6'	-0.38	0.01	2,2',6	--
84	2,2',3,3',6	-0.37	0.02	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.22	0.004	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.41	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-4.74**	**0.11**		

11.0439

Core 188.6 (20-24) - 188.5 (4-8 cm); Sediment Deposited ~ 1979
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	5.96	2.12	All decreasing peaks listed below
7/9	2,4/2,5	0.44	0.05	2,3',5
31	2,4',5	2.62	0.52	?
20/33	2,3,3'/2',3,4	0.42	0.12	?
74	2,4,4',5	0.08	0.02	?
70	2,3',4',5	0.11	0.01	?
Total		**9.62**	**2.84**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-3.35	0.51	2	--
5/8	2,3/2,4'	-5.77	0.90	2	--
26	2,3',5	-3.41	0.21	2,5; 2	2,3'
Total		**-12.52**	**1.61**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
25	2,3',4	0.18	0.12
28	2,4,4'	0.00	0.00
22	2,3,4'	-0.06	0.05
67	2,3',4,5	0.00	0.01
66	2,3',4,4'	0.04	0.02
56/60	2,3,3',4/2,3,4,4'	0.05	0.01
118	2,3',4,4',5	-0.01	0.02

Core 188.6 (20-24) - 188.5 (4-8 cm); Sediment Deposited ~ 1979
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	4.62	0.97	All decreasing peaks listed below
24,27	2,3,6/2,3',6	1.13	0.44	2,3,4',6; 2,3,3',4',6
52	2,2',5,5'	0.35	0.14	?
47	2,2',4,4'	0.26	0.16	?
Total		**6.35**	**1.71**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
17	2,2',4	-1.11	0.23	2,2'	--
16/32	2,2',3/2,4',6	-1.66	0.30	2,2'; 2,6	--
41/64	2,2',3,4/2,3,4',6	-0.58	0.13	2,3,6; 2,2'; 2,6	2,2',3; 2,4',6
110	2,3,3',4',6	-0.17	0.05	2,3,6; 2,3',6; 2,6	2,3,4',6; 24',6
Total		**-3.52**	**0.70**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
18	2,2',5	-0.08	0.07
49	2,2',4,5'	0.18	0.19
48	2,2',4,5	0.00	0.04
44	2,2',3,5'	-0.04	0.02
40	2,2'3,3'	-0.01	0.005
42/59	2,2',3,4'/2,3,3',6	-0.07	0.09
82	2,2',3,3',4	0.00	0.002
99	2,2',4,4',5	-0.01	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	0.00	0.03

Core 188.6 (20-24) - 188.5 (4-8 cm); Sediment Deposited ~ 1979
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	0.97	0.34	All decreasing peaks listed below
53	2,2',5,6'	0.05	0.01	?
95	2,2',3,5',6	0.08	0.04	?
Total		**1.10**	**0.40**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
46	2,2',3,6'	-0.03	0.01	2,2',6	--
51	2,2',4,6'	-0.10	0.04	2,2',6	--
132	2,2',3,3',4,6'	-0.08	0.01	2,2',6	2,2',4,6'; 2,2',3,6'
Total		**-0.21**	**0.05**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
45	2,2',3,6	-0.05	0.05
84	2,2',3,3',6	0.00	0.03
91	2,2',3,4',6	0.04	0.04
149	2,2',3,4',5',6	0.04	0.02

11.0442

Parent - Daughter Analysis
Core 188.5 (8-12 cm) - Aroclor 1242; Sediment Deposited ~ 1976
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	11.60	1.18	All decreasing peaks listed below
6	2,3'	6.95	0.44	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	8.18	0.84	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.98	0.17	2,3',4,5; 2,3',4',5; 2,3',4,4',5
25	2,3',4	0.03	0.04	2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
Total		**28.73**	**2.68**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.57	0.03	2	--
31	2,4',5	-0.45	0.22	2,4'; 2	2,5
28	2,4,4'	-6.52	0.01	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.34	0.09	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-2.95	0.02	2,3; 2,4'; 2	--
67	2,3',4,5	-0.34	0.004	2,3',4; 2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-2.00	0.009	2,4'; 2	2,4,4'; 2,4',5; 2,4; 2,5
70	2,3',4',5	-3.81	0.004	2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,4',5; 2,5
66	2,3',4,4'	-1.38	0.01	2,3',4; 2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.88	0.003	2,3',4; 2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,4
118	2,3',4,4',5	-1.43	0.01	2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,4',5; 2,5; 2,4'
Total		**-25.67**	**0.42**		

Core 188.5 (8-12 cm) - Aroclor 1242; Sediment Deposited ~ 1976
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	7.91	0.59	All decreasing peaks listed below
24,27	2,3,6/2,3',6	5.27	0.30	2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	2.26	0.27	2,2',3,5'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	0.80	0.09	2,2',4,4',5
Total		**16.24**	**1.26**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-4.61	0.09	2,2'	--
17	2,2',4	-0.05	0.15	2,2'	--
52	2,2',5,5'	-2.21	0.10	2,2'	2,2',5
49	2,2',4,5'	-1.15	0.13	2,2'	2,2',5
48	2,2',4,5	-0.82	0.01	2,2'	2,2',5
44	2,2',3,5'	-2.97	0.01	2,2',3; 2,2'	2,2',5
42/59	2,2',3,4'/2,3,3',6	-0.14	0.05	2,2',3; 2,3,6; 2,3',6; 2,2'; 2,6	2,2',4
40	2,2',3,3'	-0.82	0.004	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-1.92	0.08	2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.41	0.001	2,2',3; 2,2'	2,2',3,4; 2,2',3,3'; 2,2',3,4'; 2,2',4
99	2,2',4,4',5	-0.60	0.01	2,2',4,4'; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',4; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.29	0.02	2,2',3; 2,2'	2,2',3,4'; 2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',4; 2,2',5
110	2,3,3',4',6	-1.04	0.03	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6
Total		**-18.04**	**0.69**		

Core 188.5 (8-12 cm) - Aroclor 1242; Sediment Deposited ~ 1976
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	3.50	0.21	All decreasing peaks listed below
51	2,2',4,6'	0.37	0.03	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.21	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**4.08**	**0.26**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.42	0.01	2,2',6	--
95	2,2',3,5',6	-2.40	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.65	0.03	2,2',6	--
46	2,2',3,6'	-0.36	0.01	2,2',6	--
84	2,2',3,3',6	-0.41	0.02	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.30	0.002	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.43	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-4.97**	**0.10**		

11.0445

Core 188.6 (24-28) - 188.5 (8-12 cm); Sediment Deposited ~ 1976
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	6.05	2.15	All decreasing peaks listed below
26	2,3',5	1.52	0.31	?
31	2,4',5	1.52	0.38	?
Total		**9.08**	**2.84**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-3.27	0.52	2	--
5/8	2,3/2,4'	-3.72	1.07	2	--
20/33	2,3,3'/2',3,4	-0.17	0.13	2	--
22	2,3,4'	-0.08	0.03	2	--
Total		**-7.25**	**1.74**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
7/9	2,4/2,5	0.06	0.05
25	2,3',4	0.09	0.07
28	2,4,4'	0.00	0.02
67	2,3',4,5	0.01	0.01
74	2,4,4',5	-0.03	0.01
70	2,3',4',5	-0.01	0.01
66	2,3',4,4'	0.06	0.02
56/60	2,3,3',4/2,3,4,4'	-0.01	0.003
118	2,3',4,4',5	-0.03	0.01

Core 188.6 (24-28) - 188.5 (8-12 cm); Sediment Deposited ~ 1976
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	0.87	0.88	
52	2,2',5,5'	0.61	0.16	?
49	2,2',4,5'	0.50	0.21	?
47	2,2',4,4'	0.44	0.15	?
Total		**1.55**	**0.52**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-0.69	0.10	2,2'/2,6	--
16/32	2,2',3/2,4',6	-0.68	0.36	2,2'/2,6	?
44	2,2',3,5'	-0.10	0.01	2,2'/2,6	?
110	2,3,3',4',6	-0.13	0.03	2,2'/2,6	?
Total		**-1.60**	**0.51**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
17	2,2',4	-0.03	0.21
24,27	2,3,6/2,3',6	0.29	0.45
48	2,2',4,5	0.00	0.02
40	2,2',3,3'	-0.02	0.005
42/59	2,2',3,4'/2,3,3',6	-0.02	0.08
41/64	2,2',3,4/2,3,4',6	-0.02	0.12
82	2,2',3,3',4	-0.01	0.002
99	2,2',4,4',5	0.01	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	0.03	0.03

11.0447

Core 188.6 (24-28) - 188.5 (8-12 cm); Sediment Deposited ~ 1976
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
84	2,2',3,3',6	0.13	0.03	?
91	2,2',3,4',6	0.18	0.04	?
95	2,2',3,5',6	0.11	0.04	?
45	2,2',3,6	0.13	0.04	?
Total		**0.55**	**0.15**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
--	--	--	--	--	--
Total		**0.00**	**0.00**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
19	2,2',6	0.12	0.31
46	2,2',3,6'	0.00	0.01
51	2,2',4,6'	0.01	0.05
53	2,2',5,6'	-0.02	0.02
132	2,2',3,3',4,6'	0.00	0.005
149	2,2',3,4',5',6	0.05	0.02

11.0448

Parent - Daughter Analysis
Core 188.5 (12-16 cm) - Aroclor 1242; Sediment Deposited ~ 1975
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	12.11	1.23	All decreasing peaks listed below
6	2,3'	6.91	0.44	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	8.40	0.85	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4';
26	2,3',5	1.85	0.17	2,3',4,5; 2,3',4',5; 2,3',4,4',5
Total		**29.26**	**2.69**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.55	0.03	2	--
25	2,3',4	-0.06	0.04	2,3'; 2	2,4
31	2,4',5	-0.66	0.21	2,4'; 2	2,5
28	2,4,4'	-6.52	0.01	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.32	0.09	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-3.00	0.02	2,3; 2,4'; 2	--
67	2,3',4,5	-0.34	0.003	2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-2.00	0.01	2,4'; 2	2,4,4'; 2,4',5; 2,4; 2,5
70	2,3',4',5	-3.81	0.004	2,3',5; 2,4'; 2,3'; 2	2,3',4; 2,4',5; 2,5
66	2,3',4,4'	-1.40	0.01	2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,3',4; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.88	0.003	2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,3',4; 2,4
118	2,3',4,4',5	-1.44	0.01	2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,4',5; 2,3',4; 2,5; 2,4'
Total		**-25.98**	**0.44**		

Core 188.5 (12-16 cm) - Aroclor 1242; Sediment Deposited ~ 1975
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	8.23	0.61	All decreasing peaks listed below
24,27	2,3,6/2,3',6	5.29	0.31	2,3,3',6; 2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	2.32	0.28	2,2',3,5'; 2,2',3,3'; 2,2',3,4'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	0.75	0.09	2,2',4,4',5
Total		**16.59**	**1.28**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
17	2,2',4	-0.03	0.15	2,2'	--
18	2,2',5	-4.54	0.09	2,2'	--
52	2,2',5,5'	-2.27	0.09	2,2'	2,2',5
49	2,2',4,5'	-1.20	0.13	2,2'	2,2',5
48	2,2',4,5	-0.82	0.01	2,2'	2,2',5
44	2,2',3,5'	-2.98	0.01	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.83	0.003	2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-0.21	0.05	2,2',3; 2,3,6; 2,3',6; 2,2'; 2,6	2,2',4
41/64	2,2',3,4/2,3,4',6	-2.19	0.07	2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.41	0.001	2,2',3; 2,2'	2,2',3,4; 2,2',3,3'
99	2,2',4,4',5	-0.61	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.31	0.02	2,2',3; 2,2'	2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-1.09	0.02	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6
Total		**-18.49**	**0.66**		

11.0450

Core 188.5 (12-16 cm) - Aroclor 1242; Sediment Deposited ~ 1975
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	3.51	0.21	All decreasing peaks listed below
51	2,2',4,6'	0.38	0.03	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.19	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**4.09**	**0.27**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.42	0.01	2,2',6	--
95	2,2',3,5',6	-2.42	0.02	2,2',6	2,2',5,6'
45	2,2',3,6	-0.69	0.03	2,2',6	--
46	2,2',3,6'	-0.37	0.01	2,2',6	--
84	2,2',3,3',6	-0.43	0.02	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.30	0.002	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.44	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-5.07**	**0.09**		

11.0451

Core 188.6 (28-32) - 188.5 (12-16 cm); Sediment Deposited ~ 1975
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	9.66	2.56	All decreasing peaks listed below
26	2,3',5	0.64	0.27	?
Total		**10.30**	**2.83**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-5.20	0.47	2	--
5/8	2,3/2,4'	-7.98	0.97	2	--
25	2,3',4	-0.09	0.05	2	2,3'; 2,4
22	2,3,4'	-0.18	0.03	2	2,3; 2,4'
Total		**-13.45**	**1.52**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
7/9	2,4/2,5	0.04	0.05
31	2,4',5	-0.05	0.30
28	2,4,4'	0.00	0.02
70	2,3',4',5	-0.04	0.005
67	2,3',4,5	0.01	0.01
74	2,4,4',5	-0.04	0.01
20/33	2,3,3'/2',3,4	-0.05	0.13
66	2,3',4,4'	0.03	0.02
56/60	2,3,3',4/2,3,4,4'	-0.03	0.003
118	2,3',4,4',5	-0.05	0.01

Core 188.6 (28-32) - 188.5 (12-16 cm); Sediment Deposited ~ 1975
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	4.45	1.07	All decreasing peaks listed below
24,27	2,3,6/2,3',6	0.76	0.48	2,3,3',6; 2,3,4,',6; 2,3,3',4',6
52	2,2',5,5'	0.53	0.16	?
Total		**5.74**	**1.71**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-0.70	0.11	2,2'	--
17	2,2',4	-0.73	0.19	2,2'	--
16/32	2,2',3/2,4',6	-2.04	0.33	2,2'; 2,6	--
44	2,2',3,5'	-0.13	0.01	2,2'	2,2',5; 2,2',3
40	2,2'3,3'	-0.06	0.014	2,2'	2,2',3
42/59	2,2',3,4'/2,3,3',6	-0.21	0.07	2,3,6; 2,3',6; 2,2'; 2,6	2,2',4; 2,2',3
41/64	2,2',3,4/2,3,4',6	-0.25	0.09	2,3,6; 2,2'; 2,6	2,2',3; 2,4',6; 2,2',4
110	2,3,3',4',6	-0.13	0.03	2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6; 2,4',6
Total		**-4.25**	**0.84**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
49	2,2',4,5'	0.22	0.19
47	2,2',4,4'	0.14	0.14
48	2,2',4,5	0.00	0.02
82	2,2',3,3',4	-0.02	0.002
99	2,2',4,4',5	0.01	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	0.04	0.03

Core 188.6 (28-32) - 188.5 (12-16 cm); Sediment Deposited ~ 1975
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	1.74	0.39	All decreasing peaks listed below
45	2,2',3,6	0.12	0.04	?
84	2,2',3,3',6	0.08	0.03	?
91	2,2',3,4',6	0.12	0.03	?
Total		**2.05**	**0.49**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
51	2,2',4,6'	-0.11	0.04	2,2',6	--
Total		**-0.11**	**0.04**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
53	2,2',5,6'	-0.01	0.02
95	2,2',3,5',6	0.05	0.04
46	2,2',3,6'	-0.03	0.01
149	2,2',3,4',5',6	0.06	0.02

11.0454

Parent - Daughter Analysis
Core 188.5 (16-20 cm) - Aroclor 1242; Sediment Deposited ~ 1973
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	9.97	1.01	All decreasing peaks listed below
6	2,3'	7.68	0.48	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	9.42	0.90	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.86	0.17	2,3',4',5; 2,3',4,4',5
67	2,3',4,5	0.47	0.05	2,2',4,4',5
Total		**29.40**	**2.60**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.75	0.02	2	--
25	2,3',4	-0.37	0.02	2,3'; 2	2,4
31	2,4',5	-0.91	0.19	2,4'; 2	2,5
28	2,4,4'	-6.52	0.01	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.26	0.10	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-3.07	0.02	2,3; 2,4'; 2	--
74	2,4,4',5	-2.09	0.004	2,4'; 2	2,4,4'; 2,4',5; 2,4; 2,5
70	2,3',4',5	-3.08	0.04	2,3',5; 2,4'; 2,3'; 2	2,3',4; 2,4',5; 2,5
66	2,3',4,4'	-1.52	0.01	2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,3',4; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.49	0.02	2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,3',4; 2,4
118	2,3',4,4',5	-1.44	0.01	2,3',4,5; 2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,4',5; 2,3',4; 2,5; 2,4'
Total		**-25.50**	**0.44**		

Core 188.5 (16-20 cm) - Aroclor 1242; Sediment Deposited ~ 1973
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	7.37	0.56	All decreasing peaks listed below
17	2,2',4	1.27	0.22	2,2',4,5'; 2,2',4,5; 2,2',3,4'; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	5.22	0.30	2,3,3',6; 2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	2.96	0.31	2,2',3,5'; 2,2',3,4'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	0.83	0.09	2,2',4,4',5
Total		**17.66**	**1.48**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-4.73	0.08	2,2'	--
52	2,2',5,5'	-2.15	0.10	2,2'	2,2',5
49	2,2',4,5'	-1.13	0.13	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.01	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.78	0.02	2,2',3; 2,2'	2,2',5
42/59	2,2',3,4'/2,3,3',6	-0.10	0.06	2,2',3; 2,3,6; 2,3',6; 2,2',4; 2,2'	--
40	2,2',3,3'	-0.82	0.004	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-3.38	0.01	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.32	0.01	2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,3'; 2,2',3,4'
99	2,2',4,4',5	-0.81	0.00	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.39	0.01	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',3,4'; 2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2
110	2,3,3',4',6	-1.50	0.00	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6
Total		**-19.94**	**0.43**		

Core 188.5 (16-20 cm) - Aroclor 1242; Sediment Deposited ~ 1973
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	3.43	0.21	All decreasing peaks listed below
51	2,2',4,6'	0.57	0.04	2,2',3,3',4,6'; 2,2',3,3',4,6'; 2,2',3,4',5',6
Total		**4.00**	**0.25**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.41	0.01	2,2',6	--
95	2,2',3,5',6	-2.64	0.01	2,2',6	2,2',5,6'
45	2,2',3,6	-0.65	0.03	2,2',6	--
46	2,2',3,6'	-0.37	0.01	2,2',6	--
84	2,2',3,3',6	-0.36	0.02	2,2',6	2,2',3,6; 2,2',3,6'
91	2,2',3,4',6	-0.13	0.002	2,2',4,6; 2,2',6	2,2',3,6
132	2,2',3,3',4,6'	-0.30	0.001	2,2',4,6'; 2,2',6	2,2',3,4',6; 2,2',3,3',6; 2,2',3,6; 2,2',3,6'
149	2,2',3,4',5',6	-0.43	0.01	2,2',4,6'; 2,2',6	2,2',3,4',6; 2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-5.29**	**0.09**		

11.0457

Core 188.6 (32-36) - 188.5 (16-20 cm); Sediment Deposited ~ 1973
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	10.87	2.37	All decreasing peaks listed below
7/9	2,4/2,5	0.28	0.04	2,3',5; 2,3',4
66	2,3',4,4'	0.15	0.02	?
74	2,4,4',5	0.08	0.01	?
Total		**11.38**	**2.44**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-6.98	0.49	2	--
5/8	2,3/2,4'	-5.70	1.10	2	--
25	2,3',4	-0.06	0.03	2,4; 2	2,3'
20/33	2,3,3'/2',3,4	-0.33	0.13	2	2,3; 2,4'; 2,3';
22	2,3,4'	-0.09	0.02	2	2,3; 2,4'
67	2,3',4,5	-0.80	0.05	2,4; 2,5; 2	2,3',4; 2,3'
70	2,3',4',5	-0.76	0.04	2,5; 2	2',3,4; 2,4'; 2,3'
56/60	2,3,3',4/2,3,4,4'	-0.41	0.02	2,4; 2	2,3,4'; 2,3',4; 2,3; 2,4'; 2,3'
Total		**-15.15**	**1.88**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
26	2,3',5	-0.24	0.23
31	2,4',5	-0.15	0.27
28	2,4,4'	0.00	0.01
118	2,3',4,4',5	0.00	0.01

Core 188.6 (32-36) - 188.5 (16-20 cm); Sediment Deposited ~ 1973
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	4.80	1.02	All decreasing peaks listed below
41/64	2,2',3,4/2,3,4',6	0.88	0.06	2,2',3,3',4
99	2,2',4,4',5	0.25	0.02	?
90/101	2,2',3,4',5/2,2',4,5,5'	0.12	0.03	?
110	2,3,3',4',6	0.33	0.02	?
Total		**6.38**	**1.14**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-0.95	0.09	2,2'	--
16/32	2,2',3/2,4',6	-1.32	0.40	2,2'; 2,6	--
52	2,2',5,5'	-0.48	0.13	2,2'	2,2',5
49	2,2',4,5'	-0.31	0.18	2,2'	2,2',5; 2,2',4
44	2,2',3,5'	-0.26	0.02	2,2'	2,2',5; 2,2',3
82	2,2',3,3',4	-0.10	0.01	2,2',3,4; 2,2'	2,2',3,3'; 2,2',3; 2,2',4
Total		**-3.43**	**0.82**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
17	2,2',4	-0.14	0.31
24,27	2,3,6/2,3',6	0.17	0.44
47	2,2',4,4'	0.14	0.14
40	2,2'3,3'	-0.07	0.009

11.0459

Core 188.6 (32-36) - 188.5 (16-20 cm); Sediment Deposited ~ 1973
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	0.81	0.34	All decreasing peaks listed below
45	2,2',3,6	0.10	0.04	2,2',3,3',6
95	2,2',3,5',6	0.26	0.03	?
91	2,2',3,4',6	0.35	0.02	2,2',6
Total		**1.52**	**0.43**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
46	2,2',3,6'	-0.08	0.01	2,2',6	--
53	2,2',5,6'	-0.04	0.02	2,2',6	--
84	2,2',3,3',6	-0.09	0.02	2,2',3,6; 2,2',6	2,2',3,6'
Total		**-0.22**	**0.05**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
51	2,2',4,6'	-0.01	0.06
132	2,2',3,3',4,6'	0.00	0.00
149	2,2',3,4',5',6	0.04	0.02

11.0460

Parent - Daughter Analysis
Core 188.5 (20-24 cm) - Aroclor 1242; Sediment Deposited ~ 1968
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	9.96	1.01	All decreasing peaks listed below
6	2,3'	6.86	0.43	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	8.96	0.88	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.98	0.17	2,3',4,5; 2,3',4',5; 2,3',4,4',5
Total		**27.76**	**2.49**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.61	0.03	2	--
25	2,3',4	-0.27	0.03	2,3'; 2	2,4
31	2,4',5	-0.35	0.22	2,4'; 2	2,5
28	2,4,4'	-6.52	0.01	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.67	0.07	2,3; 2,4'; 2,3'; 2	--
22	2,3,4'	-2.96	0.02	2,3; 2,4'; 2	--
67	2,3',4,5	-0.35	0.003	2,3',5; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-2.08	0.005	2,4'; 2	2,4,4'; 2,4',5; 2,4; 2,5
70	2,3',4',5	-3.84	0.003	2,3',5; 2,4'; 2,3'; 2	2,3',4; 2,4',5; 2,5
66	2,3',4,4'	-1.37	0.02	2,4'; 2,3'; 2	2',3,4; 2,4,4'; 2,3',4; 2,4
56/60	2,3,3',4/2,3,4,4'	-2.90	0.002	2,3; 2,4'; 2,3'; 2	2,3,4'; 2,3,3'; 2,4,4'; 2,3',4; 2,4
118	2,3',4,4',5	-1.49	0.01	2,3',5; 2,4'; 2,3'; 2	2,3,4,4'; 2,3',4',5; 2,4,4',5; 2',3,4'; 2,4,4'; 2,4',5; 2,3',4; 2,5; 2,4'
Total		**-26.40**	**0.42**		

Core 188.5 (20-24 cm) - Aroclor 1242; Sediment Deposited ~ 1968
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	5.12	0.44	All decreasing peaks listed below
17	2,2',4	2.99	0.31	2,2',4,5'; 2,2',4,5; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	4.11	0.24	2,3,4',6; 2,3,3',4',6; ?
16/32	2,2',3/2,4',6	2.32	0.27	2,2',3,5'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	1.14	0.11	2,2',4,4',5; ?
42/59	2,2',3,4'/2,3,3',6	0.17	0.07	2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
Total		**15.86**	**1.44**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-4.93	0.07	2,2'	--
52	2,2',5,5'	-2.12	0.10	2,2'	2,2',5
49	2,2',4,5'	-1.09	0.13	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.01	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.93	0.01	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.82	0.004	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-1.60	0.10	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.42	0.001	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,3'
99	2,2',4,4',5	-0.62	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',4,5'; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.30	0.02	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-0.60	0.05	2,3,3',6; 2,4',6; 2,3,6; 2;3',6; 2,6	2,3,4',6
Total		**-17.25**	**0.51**		

Core 188.5 (20-24 cm) - Aroclor 1242; Sediment Deposited ~ 1968
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	2.77	0.17	All decreasing peaks listed below
51	2,2',4,6'	0.55	0.04	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.26	0.02	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**3.59**	**0.24**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.46	0.01	2,2',6	--
95	2,2',3,5',6	-2.37	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.51	0.03	2,2',6	--
46	2,2',3,6'	-0.36	0.01	2,2',6	--
84	2,2',3,3',6	-0.38	0.02	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.30	0.00	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.37	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6; 2,2',3,6
Total		**-4.75**	**0.11**		

11.0463

Core 188.6 (36-40) - 188.5 (20-24 cm); Sediment Deposited ~ 1968
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	16.77	2.96	All decreasing peaks listed below
7/9	2,4/2,5	0.36	0.06	2,3',5; 2,3',4
Total		**17.13**	**3.02**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-6.35	0.45	2	--
5/8	2,3/2,4'	-8.97	0.98	2	--
26	2,3',5	-3.27	0.17	2,5; 2	2,3'
25	2,3',4	-0.49	0.03	2,4; 2	2,3'
22	2,3,4'	-0.22	0.03	2	2,3; 2,4'
Total		**-19.31**	**1.66**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
31	2,4',5	0.16	0.34
28	2,4,4'	0.00	0.01
20/33	2,3,3'/2',3,4	0.17	0.12
67	2,3',4,5	0.01	0.01
74	2,4,4',5	0.01	0.01
70	2,3',4',5	-0.01	0.004
66	2,3',4,4'	-0.02	0.02
56/60	2,3,3',4/2,3,4,4'	-0.01	0.002
118	2,3',4,4',5	0.00	0.01

Core 188.6 (36-40) - 188.5 (20-24 cm); Sediment Deposited ~ 1968
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	9.04	1.10	All decreasing peaks listed below
24,27	2,3,6/2,3',6	1.57	0.43	2,3,3',6; 2,3,4,',6; 2,3,3',4',6
Total		**10.61**	**1.53**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-0.53	0.09	2,2'	--
17	2,2',4	-3.52	0.34	2,2'	--
16/32	2,2',3/2,4',6	-1.94	0.33	2,2'; 2,6	--
44	2,2',3,5'	-0.18	0.01	2,2'	2,2',5; 2,2',3
42/59	2,2',3,4'/2,3,3',6	-0.61	0.08	2,3,6; 2,3',6; 2,2'; 2,6	2,2',4; 2,2',3
41/64	2,2',3,4/2,3,4',6	-0.85	0.12	2,3,6; 2,2'; 2,6	2,2',3; 2,4',6; 2,2',4
110	2,3,3',4',6	-0.42	0.06	2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6; 2,4',6
Total		**-8.04**	**1.03**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
52	2,2',5,5'	-0.13	0.14
49	2,2',4,5'	-0.20	0.19
47	2,2',4,4'	-0.17	0.16
48	2,2',4,5	0.00	0.01
40	2,2',3,3'	-0.07	0.011
82	2,2',3,3',4	-0.01	0.00
99	2,2',4,4',5	0.03	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	0.02	0.03

277

11.0465

Core 188.6 (36-40) - 188.5 (20-24 cm); Sediment Deposited ~ 1968
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	1.60	0.33	All decreasing peaks listed below
Total		**1.60**	**0.33**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
46	2,2',3,6'	-0.07	0.01	2,2',6	--
51	2,2',4,6'	-0.19	0.05	2,2',6	--
84	2,2',3,3',6	-0.04	0.02	2,2',6	2,2',3,6'; 2,2',3,6
91	2,2',3,4',6	-0.08	0.03	2,2',6	2,2',4,6'; 2,2',3,6
Total		**-0.39**	**0.12**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
53	2,2',5,6'	0.02	0.01
95	2,2',3,5',6	-0.03	0.04
45	2,2',3,6	-0.04	0.05
132	2,2',3,3',4,6'	0.00	0.003
149	2,2',3,4',5',6	0.02	0.02

11.0466

Parent - Daughter Analysis
Core 188.5 (24-28 cm) - Aroclor 1242; Sediment Deposited ~ 1963
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	7.97	0.81	All decreasing peaks listed below
6	2,3'	5.72	0.37	2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	5.75	0.70	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
25	2,3',4	0.11	0.05	2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
26	2,3',5	2.95	0.22	2,3',4,5; 2,3',4',5; 2,3',4,4',5
31	2,4',5	1.07	0.29	2,4,4',5; 2,3',4',5; 2,3',4,4',5
Total		**23.56**	**2.44**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.70	0.02	2	--
28	2,4,4'	-4.71	0.09	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.79	0.07	2,3; 2,4'; 2,3'; 2	2,4
22	2,3,4'	-2.64	0.04	2,3; 2,4'; 2	--
67	2,3',4,5	-0.34	0.004	2,3',5; 2,3',4; 2,3'; 2	2,4; 2,5
74	2,4,4',5	-1.99	0.01	2,4',5; 2,4'; 2	2,4; 2,5; 2,4,4'
70	2,3',4',5	-3.78	0.01	2,4',5; 2,3',5; 2,3'; 2,4'; 2	2,5
66	2,3',4,4'	-1.30	0.02	2,3',4; 2,3'; 2,4'; 2	2,4; 2,4,4', 2',3,4
56/60	2,3,3',4/2,3,4,4'	-2.85	0.004	2,3',4; 2,3; 2,4'; 2,3'; 2	2,4; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'
118	2,3',4,4',5	-1.48	0.01	2,4',5; 2,3',5; 2,3',4; 2,4'; 2,3'; 2	2,4; 2,5; 2,4,4'; 2',3,4; 2,3',4,5; 2,4,4',5; 2,3',4',5; 2,3,4,4'
Total		**-23.58**	**0.27**		

279

11.0467

Core 188.5 (24-28 cm) - Aroclor 1242; Sediment Deposited ~ 1963
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	3.76	0.36	All decreasing peaks listed below
17	2,2',4	4.71	0.39	2,2',4,5'; 2,2',4,5; 2,2',3,4; 2,2',3,4,4'; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	3.43	0.20	2,3,4',6; 2,3,3',4',6; ?
16/32	2,2',3/2,4',6	1.65	0.24	2,2',3,5'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
47	2,2',4,4'	1.62	0.13	2,2',4,4',5; ?
42/59	2,2',3,4'/2,3,3',6	0.52	0.09	2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
Total		**15.69**	**1.42**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
18	2,2',5	-5.17	0.06	2,2'	--
52	2,2',5,5'	-1.89	0.11	2,2'	2,2',5
49	2,2',4,5'	-1.10	0.13	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.02	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-2.78	0.02	2,2',3; 2,2'	2,2',5
40	2,2'3,3'	-0.68	0.01	2,2',3; 2,2'	--
41/64	2,2',3,4/2,3,4',6	-1.31	0.11	2,2',3; 2,3,6; 2,4',6; 2,2',4; 2,2'; 2,6	--
82	2,2',3,3',4	-0.42	0.001	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',3,4
99	2,2',4,4',5	-0.62	0.01	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5; 2,2',5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.31	0.02	2,2',3,4'; 2,2',3; 2,2',4; 2,2'	2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',5
110	2,3,3',4',6	-0.29	0.06	2,3,3',6; 2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6
Total		**-16.41**	**0.56**		

280

11.0468

Core 188.5 (24-28 cm) - Aroclor 1242; Sediment Deposited ~ 1963
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	2.50	0.16	All decreasing peaks listed below
51	2,2',4,6'	0.59	0.04	2,2',3,4',5',6; 2,2',3,3',4,6'
91	2,2',3,4',6	0.34	0.03	2,2',3,4',5',6; 2,2',3,3',4,6'
Total		**3.43**	**0.23**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.48	0.01	2,2',6	--
95	2,2',3,5',6	-2.25	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.36	0.04	2,2',6	--
46	2,2',3,6'	-0.34	0.01	2,2',6	--
84	2,2',3,3',6	-0.28	0.02	2,2',6	2,2',3,6; 2,2',3,6'
132	2,2',3,3',4,6'	-0.30	0.004	2,2',3,4',6'; 2,2',4,6'; 2,2',6	2,2',3,6; 2,2',3,6'; 2,2',3,3',6
149	2,2',3,4',5',6	-0.26	0.02	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6" 2,2',3,6
Total		**-4.28**	**0.14**		

11.0469

Core 188.6 40-44) - 188.5 (24-28 cm); Sediment Deposited ~ 1963
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
1	2	12.49	2.25	All decreasing peaks listed below
7/9	2,4/2,5	0.27	0.05	2,3',5; 2,3',4; 2,4,4'; 2,3',4,4'
20/33	2,3,3'/2',3,4	0.51	0.12	2,3',4,4'; ?
Total		**13.27**	**2.42**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
6	2,3'	-5.34	0.38	2	--
5/8	2,3/2,4'	-3.47	0.89	2	--
26	2,3',5	-0.96	0.29	2,5; 2	2,3'
25	2,3',4	-0.33	0.06	2,4; 2	2,3'
31	2,4',5	-1.60	0.37	2,5; 2	2,4'
28	2,4,4'	-0.79	0.11	2,4; 2	2,4'
22	2,3,4'	-0.47	0.04	2	2,4'
66	2,3',4,4'	-0.07	0.02	2',3,4; 2,4; 2	2,3',4; 2,4'; 2,3'
Total		**-13.05**	**2.16**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
67	2,3',4,5	0.00	0.01
74	2,4,4',5	-0.03	0.01
70	2,3',4',5	-0.02	0.01
56/60	2,3,3',4/2,3,4,4'	-0.02	0.01
118	2,3',4,4',5	-0.02	0.01

Core 188.6 40-44) - 188.5 (24-28 cm); Sediment Deposited ~ 1963
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
4/10	2,2'/2,6	7.98	0.90	All decreasing peaks listed below
18	2,2',5	0.23	0.09	2,2',3,5'; 2,2',4,5'
24,27	2,3,6/2,3',6	2.04	0.39	2,3,3',6; 2,3,3',4',6; 2,3,4',6
Total		**10.25**	**1.38**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
17	2,2',4	-5.23	0.42	2,2'	--
16/32	2,2',3/2,4',6	-1.12	0.30	2,2'; 2,6	--
49	2,2',4,5'	-0.27	0.18	2,2',5; 2,2'	2,2',4
47	2,2',4,4'	-0.59	0.17	2,2'	2,2',4
44	2,2',3,5'	-0.29	0.02	2,2',5; 2,2'	2,2',3
40	2,2'3,3'	-0.16	0.01	2,2'	2,2',3
42/59	2,2',3,4'/2,3,3',6	-0.80	0.10	2,3,6; 2,3',6; 2,2'; 2,6	2,2',3; 2,2',4
41/64	2,2',3,4/2,3,4',6	-1.05	0.13	2,3,6; 2,2'; 2,6	2,2',3; 2,4',6; 2,2',4
110	2,3,3',4',6	-0.50	0.08	2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6; 2,4',6
Total		**-10.01**	**1.41**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
52	2,2',5,5'	0.14	0.17
48	2,2',4,5	0.00	0.03
82	2,2',3,3',4	-0.01	0.001
99	2,2',4,4',5	0.00	0.02
90/101	2,2',3,4',5/2,2',4,5,5'	0.03	0.03

Core 188.6 40-44) - 188.5 (24-28 cm); Sediment Deposited ~ 1963
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole Percent)	Possible Parents
19	2,2',6	1.83	0.31	All decreasing peaks listed below
53	2,2',5,6'	0.06	0.02	2,2',3,5',6
Total		**1.83**	**0.31**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole Percent)	Possible Daughters	Possible Intermediates
95	2,2',3,5',6	-0.13	0.04	2,2',5,6'; 2,2',6	2,2',3,6
45	2,2',3,6	-0.18	0.05	2,2',6	--
46	2,2',3,6'	-0.06	0.01	2,2',6	--
51	2,2',4,6'	-0.31	0.05	2,2',6	--
84	2,2',3,3',6	-0.10	0.03	2,2',6	2,2',3,6'; 2,2',3,6
Total		**-0.77**	**0.19**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
91	2,2',3,4',6	-0.05	0.04
132	2,2',3,3',4,6'	0.00	0.01
149	2,2',3,4',5',6	-0.01	0.03

11.0472

Parent - Daughter Analysis
Core 188.5 (28-32 cm) - Aroclor 1242; Sediment Deposited ~ 1960
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error	Possible Parents
1	2	9.37	0.95	All decreasing peaks listed below
6	2,3'	6.33	0.40	2,3',4; 2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3',4,4',5
5/8	2,3/2,4'	9.25	0.89	2,4',5; 2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4'; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.95	0.17	2,3',4,5; 2,3',4',5; 2,3',4,4',5
Total		**26.90**	**2.42**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error	Possible Daughters	Possible Intermediates
7/9	2,4/2,5	-0.67	0.02	2	--
25	2,3',4	-0.37	0.02	2,3'; 2	2,4
31	2,4',5	-0.52	0.21	2,4'; 2	2,5
28	2,4,4'	-5.09	0.07	2,4'; 2	2,4
20/33	2,3,3'/2',3,4	-3.64	0.08	2,3'; 2,4'; 2,3'; 2	2,4
22	2,3,4'	-3.03	0.02	2,3; 2,4'; 2	--
67	2,3',4,5	-0.33	0.004	2,3',5; 2,3'; 2	2,4/2,5
74	2,4,4',5	-2.07	0.01	2,4'; 2	2,4/2,5; 2,4,4'
70	2,3',4',5	-3.77	0.01	2,3',5; 2,3'; 2,4'; 2	2,5; 2,4',5
66	2,3',4,4'	-1.33	0.02	2,3'; 2,4'; 2	2,4; 2,3'4; 2,4,4', 2',3,4
56/60	2,3,3',4/2,3,4,4'	-2.87	0.003	2,3; 2,4'; 2,3'; 2	2,4; 2,4,4'; 2,3,3'/2',3,4; 2,3,4'
118	2,3',4,4',5	-1.55	0.004	2,3',5; 2,3'; 2,4'; 2	2,4; 2,5; 2,4,4'; 2,3',4; 2,4',5; 2',3,4; 2,3',4,5; 2,4,4',5; 2,3',4',5; 2,3',4,4'
Total		**-25.23**	**0.47**		

Core 188.5 (28-32 cm) - Aroclor 1242; Sediment Deposited ~ 1960
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Percent Increase	Error	Possible Parents
4/10	2,2'/2,6	4.97	0.43	All decreasing peaks listed below
17	2,2',4	4.75	0.40	2,2',4,5'; 2,2',4,5; 2,2',3,4'; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24,27	2,3,6/2,3',6	4.05	0.24	2,3,3',6; 2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	3.19	0.32	2,2',3,5'; 2,2',3,3'; 2,2',3,4; 2,3,4',6; 2,2',3,4; 2,2',3,3',4; 2,2',3,4',5
47	2,2',4,4'	1.32	0.12	2,2',4,4',5
Total		**18.26**	**1.51**	

Decreasing Peaks

BZ #	Structure	Percent Decrease	Error	Possible Daughters	Possible Intermediates
18	2,2',5	-4.99	0.07	2,2'	--
52	2,2',5,5'	-1.87	0.11	2,2'	2,2',5
49	2,2',4,5'	-1.36	0.12	2,2',4; 2,2'	2,2',5
48	2,2',4,5	-0.82	0.02	2,2',4; 2,2'	2,2',5
44	2,2',3,5'	-3.01	0.01	2,2',3; 2,2'	2,2',5
40	2,2',3,3'	-0.63	0.01	2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-0.44	0.04	2,2',4; 2,2',3; 2,3,6; 2,3',6; 2,2'; 2,6	--
41/64	2,2',3,4/2,3,4',6	-2.41	0.06	2,2',4; 2,2',3; 2,3,6; 2,4',6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.43	0.001	2,2',3; 2,2',4; 2,2'	2,2',3,4
99	2,2',4,4',5	-0.79	0.004	2,2',4,4'; 2,2',4; 2,2'	2,2',4,5
90/101	2,2',3,4',5/2,2',4,5,5'	-1.52	0.01	2,2',3; 2,2',4; 2,2'	2,2',5; 2,2',5,5'; 2,2',4,5'; 2,2',4,5; 2,2',3,4'
110	2,3,3',4',6	-0.92	0.03	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,4',6; 2,3,3',6
Total		**-19.19**	**0.48**		

286

11.0474

Core 188.5 (28-32 cm) - Aroclor 1242; Sediment Deposited ~ 1960
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Percent Increase	Error	Possible Parents
19	2,2',6	3.18	0.19	All decreasing peaks listed below
51	2,2',4,6'	0.83	0.06	2,2',3,3',4,6'; 2,2',3,4',5',6
91	2,2',3,4',6	0.14	0.02	2,2',3,4',5',6
Total		**4.15**	**0.27**	

Decreasing Peaks

BZ #	Structure	Percent Decrease	Error	Possible Daughters	Possible Intermediates
95	2,2',3,5',6	-2.30	0.03	2,2',6	2,2',5,6'
45	2,2',3,6	-0.61	0.03	2,2',6	--
46	2,2',3,6'	-0.36	0.01	2,2',6	--
53	2,2',5,6'	-0.46	0.01	2,2',6	--
84	2,2',3,3',6	-0.43	0.02	2,2',6	2,2',3,6'
132	2,2',3,3',4,6'	-0.30	0.004	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,3',6; 2,2',3,6; 2,2',3,6'
149	2,2',3,4',5',6	-0.51	0.01	2,2',3,4',6; 2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6" 2,2',3,6
Total		**-4.97**	**0.10**		

11.0475

Core 188.5 (28-32 cm) - 188.6 (20-24 cm); Sediment Deposited ~ 1960
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Inrease (mole percent)	Error	Possible Parents
1	2	3.79	1.64	All decreasing peaks listed below
20/33	2,3,3'/2',3,4	0.94	0.15	?
Total		**4.73**	**1.79**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error	Possible Daughters	Possible Intermediates
6	2,3'	-2.03	0.50	2	--
5/8	2,3/2,4'	-1.80	1.20	2	--
22	2,3,4'	-0.08	0.03	2	2,3; 2,4'
Total		**-3.91**	**1.73**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
7/9	2,4/2,5	0.04	0.04
26	2,3',5	0.15	0.25
25	2,3',4	0.03	0.03
31	2,4',5	0.13	0.31
28	2,4,4'	0.04	0.11
67	2,3',4,5	0.01	0.01
74	2,4,4',5	-0.01	0.01
70	2,3',4',5	-0.003	0.01
66	2,3',4,4'	0.005	0.02
56/60	2,3,3',4/2,3,4,4'	0.002	0.005
118	2,3',4,4',5	-0.01	0.01

Core 188.5 (28-32 cm) - 188.6 (20-24 cm); Sediment Deposited ~ 1960
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error	Possible Parents
4/10	2,2'/2,6	4.76	0.81	All decreasing peaks listed below
18	2,2',5	0.15	0.10	2,2',4,5'; 2,2',3,5'
24,27	2,3,6/2,3',6	1.52	0.40	2,3,3',6; 2,3,4',6; ?
52	2,2',5,5'	0.35	0.18	?
Total		**6.78**	**1.49**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error	Possible Daughters	Possible Intermediates
17	2,2',4	-4.71	0.43	2,2'	--
16/32	2,2',3/2,4',6	-0.61	0.43	2,2'; 2,6	--
49	2,2',4,5'	-0.37	0.15	2,2',5; 2,2'	2,2',4
47	2,2',4,4'	-0.23	0.16	2,2'	2,2',4
44	2,2',3,5'	-0.06	0.01	2,2',5; 2,2'	2,2',3
40	2,2',3,3'	-0.06	0.02	2,2'	2,2',3
42/59	2,2',3,4'/2,3,3',6	-0.15	0.05	2,3,6; 2,3',6; 2,2; 2,6	2,2',4; 2,2',3
41/64	2,2',3,4/2,3,4',6	-0.43	0.07	2,3,6; 2,2'	2,2',4; 2,2',3
Total		**-6.64**	**1.32**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error
48	2,2',4,5	0.00	0.04
82	2,2',3,3',4	-0.01	0.03
99	2,2',4,4',5	-0.01	0.005
90/101	2,2',3,4',5/2,2',4,5,5'	-0.01	0.01
110	2,3,3',4',6	-0.07	0.04

Core 188.5 (28-32 cm) - 188.6 (20-24 cm); Sediment Deposited ~ 1960
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error	Possible Parents
19	2,2',6	1.39	0.33	All decreasing peaks listed below
53	2,2',5,6'	0.12	0.02	?
Total		**1.51**	**0.35**	

Decreasing Peaks

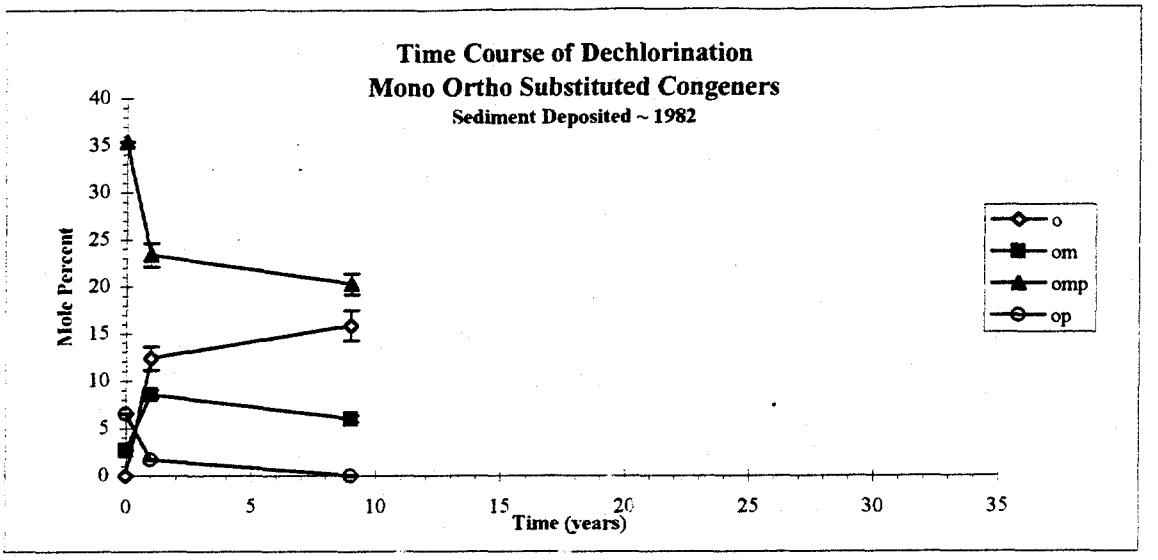
BZ #	Structure	Decrease (mole percent)	Error	Possible Daughters	Possible Intermediates
46	2,2',3,6'	-0.07	0.01	2,2',6	--
51	2,2',4,6'	-0.40	0.07	2,2',6	--
84	2,2',3,3',6	-0.07	0.02	2,2',6	2,2',3,6'
45	2,2',3,6	-0.24	0.03	2,2',6	--
91	2,2',3,4',6	-0.05	0.02	2,2',6	2,2',3,6; 2,2',4,6'
Total		**-0.83**	**0.15**		

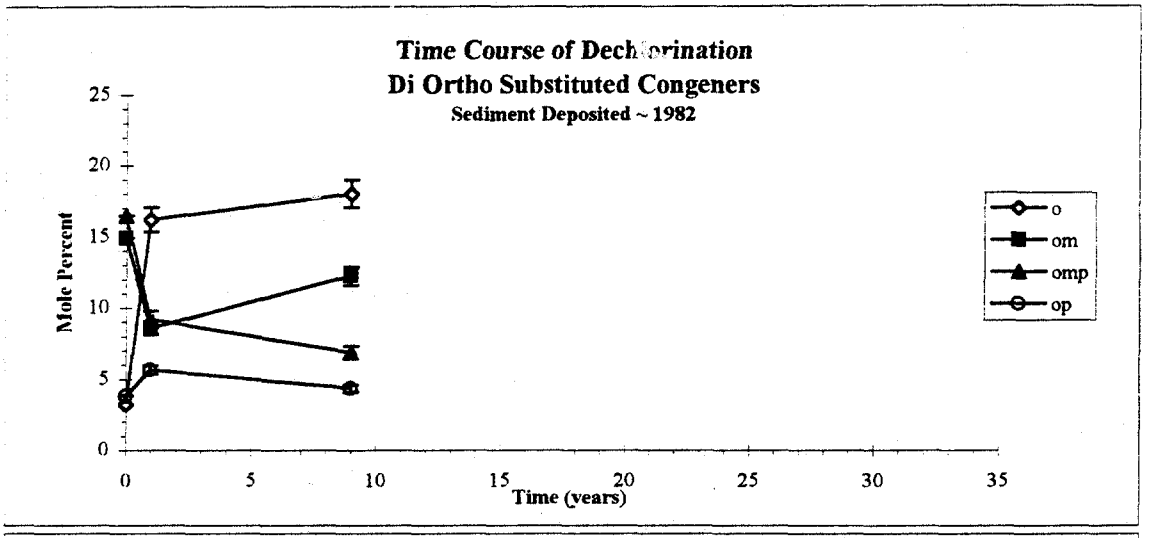
No Significant Change

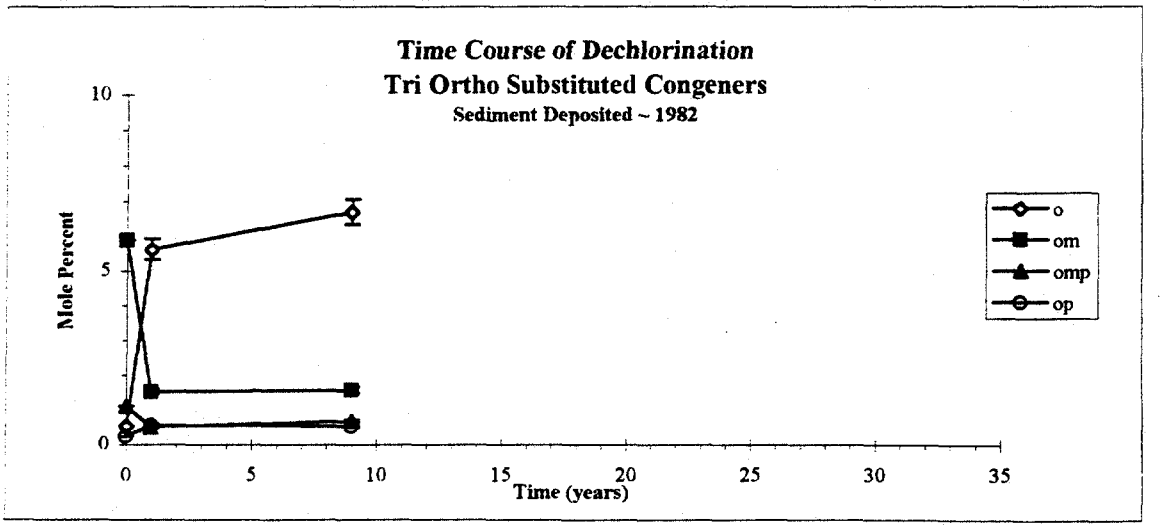
BZ #	Structure	Change (mole percent)	Error
95	2,2',3,5',6	0.01	0.04
132	2,2',3,3',4,6'	0.00	0.01
149	2,2',3,4',5',6	-0.01	0.01

11.0478

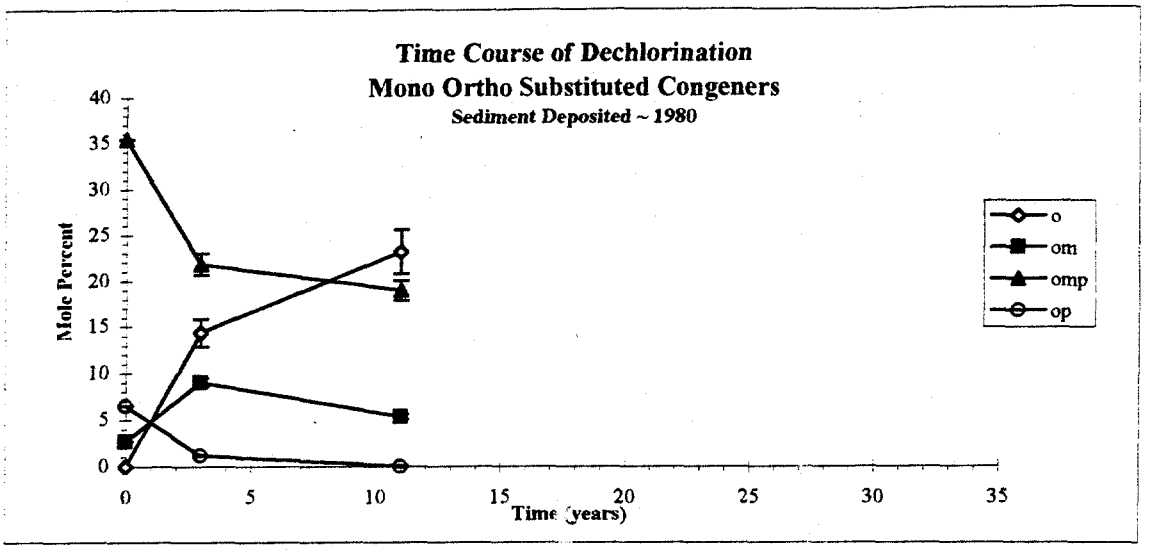
TIME COURSE OF DECHLORINATION

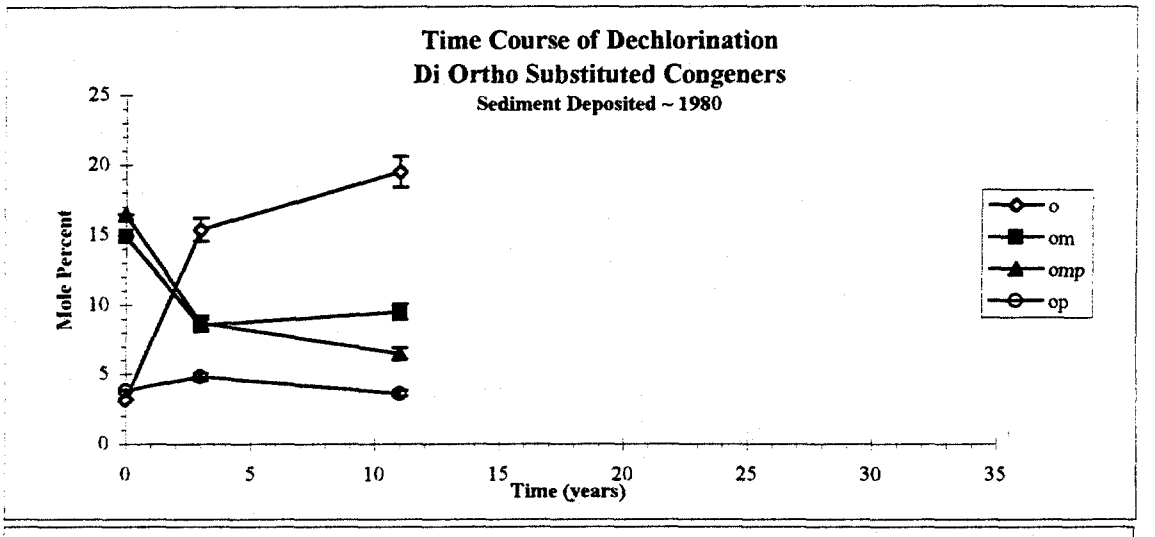

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1982
Mole Percent
Time (years)
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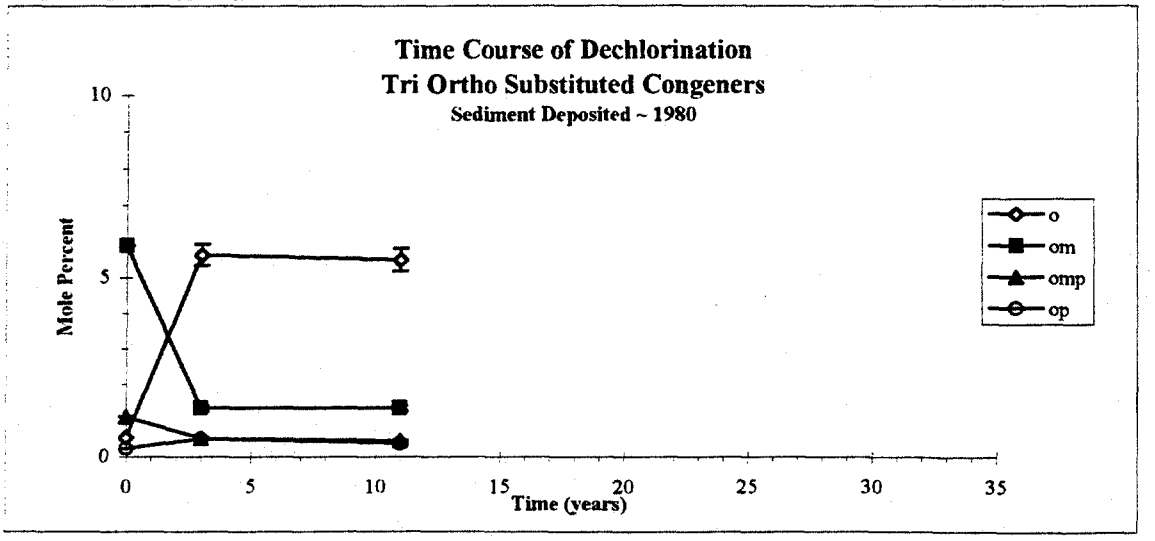

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1982
Mole Percent
Time (years)
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Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1982
Mole Percent
Time (years)
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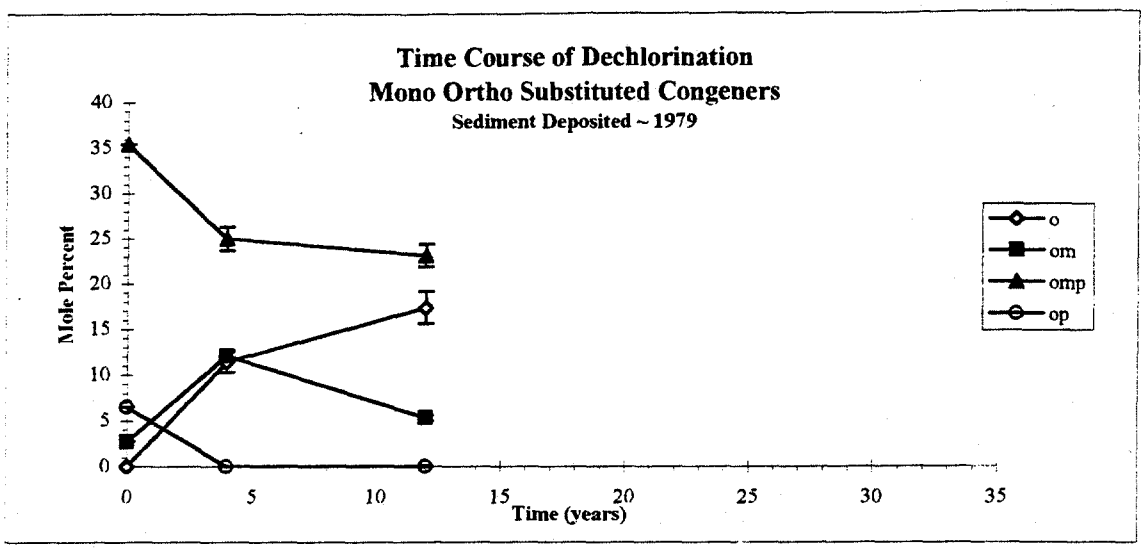
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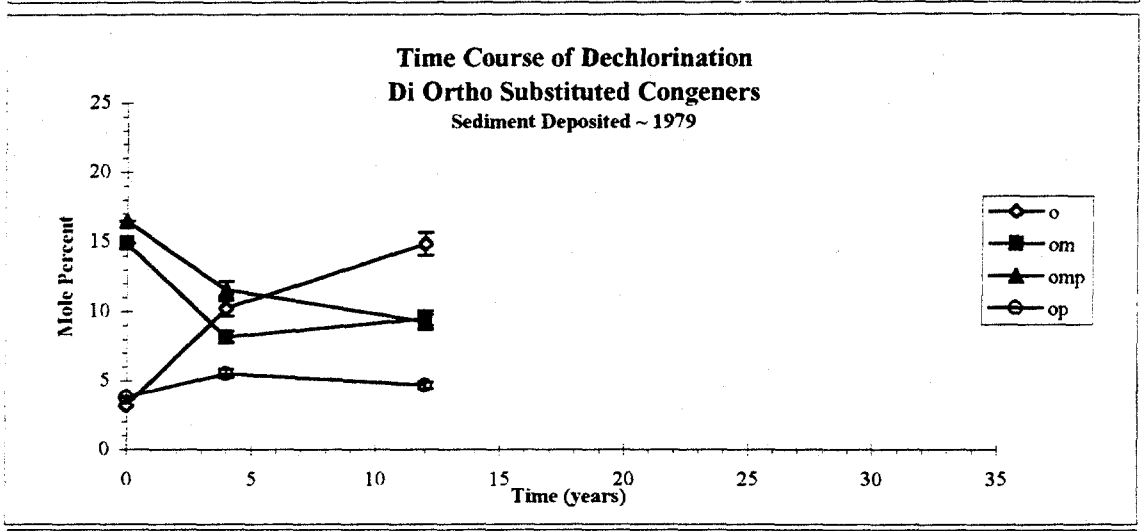

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1980
Mole Percent
Time (years)
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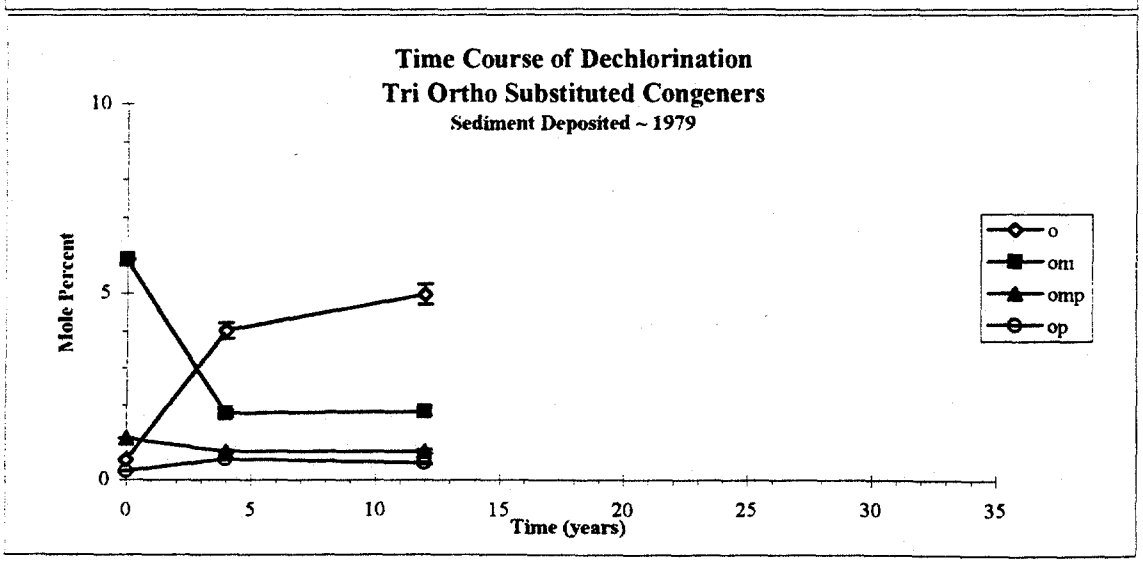

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1980
Mole Percent
Time (years)
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Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1980
Mole Percent
Time (years)
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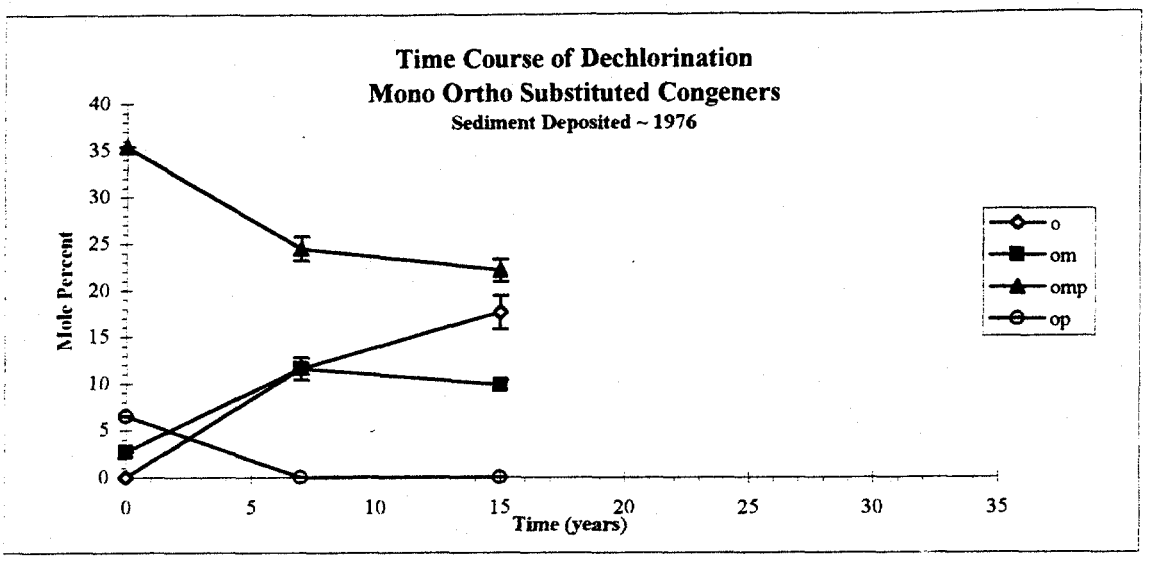
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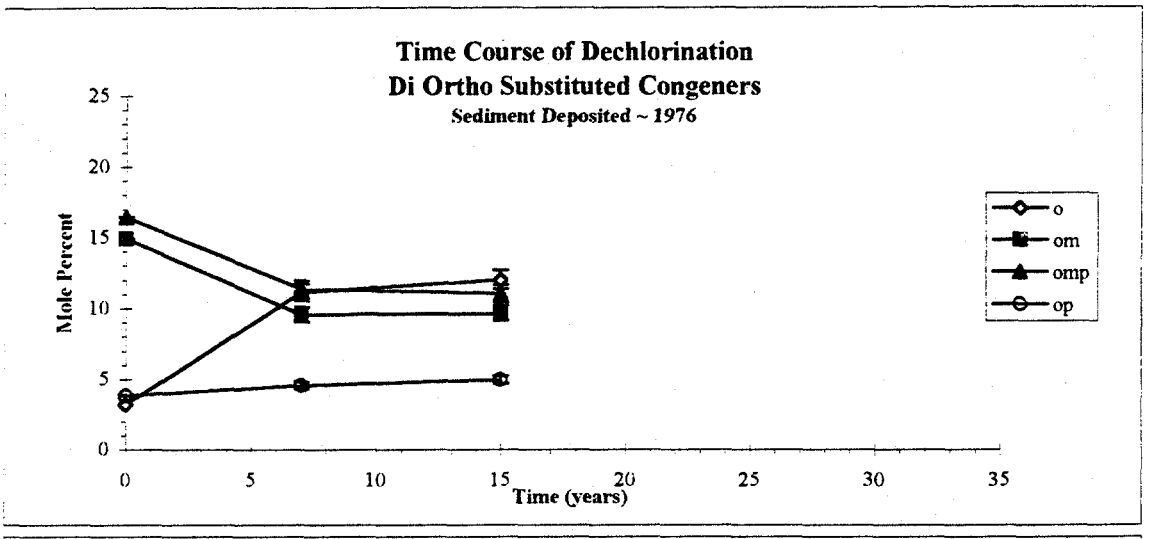

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1979
Mole Percent
Time (years)
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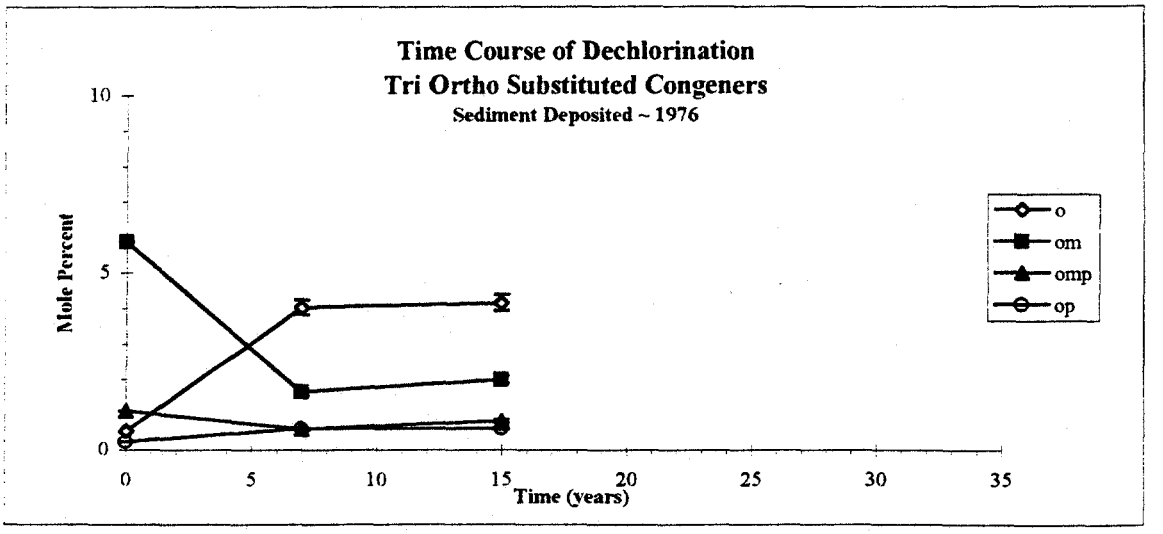

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1979
Mole Percent
Time (years)
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Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1979
Mole Percent
Time (years)
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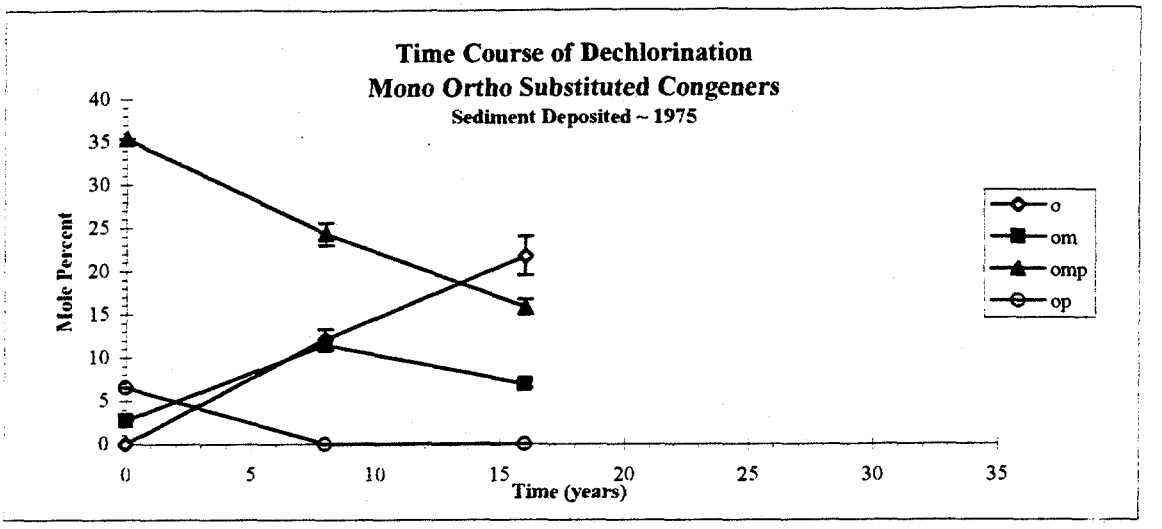
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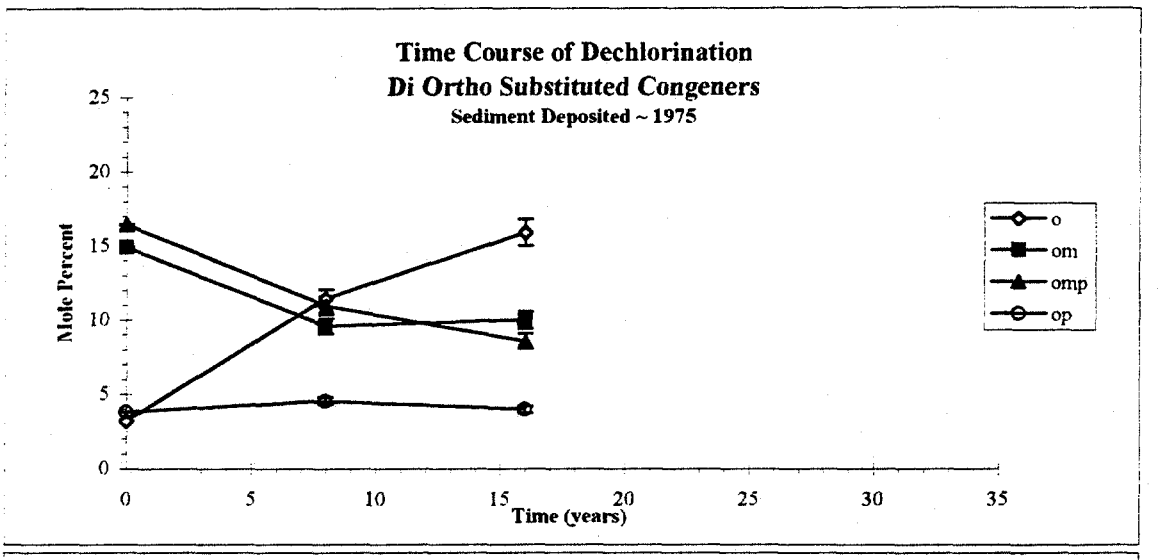

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1976
Mole Percent
Time (years)
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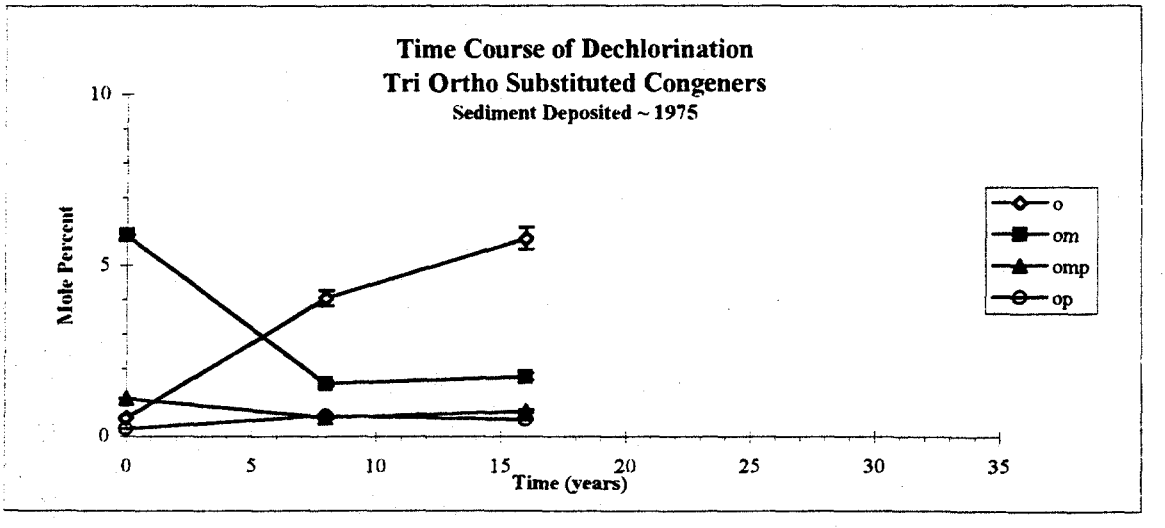

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1976
Mole Percent
Time (years)
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Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1976
Mole Percent
Time (years)
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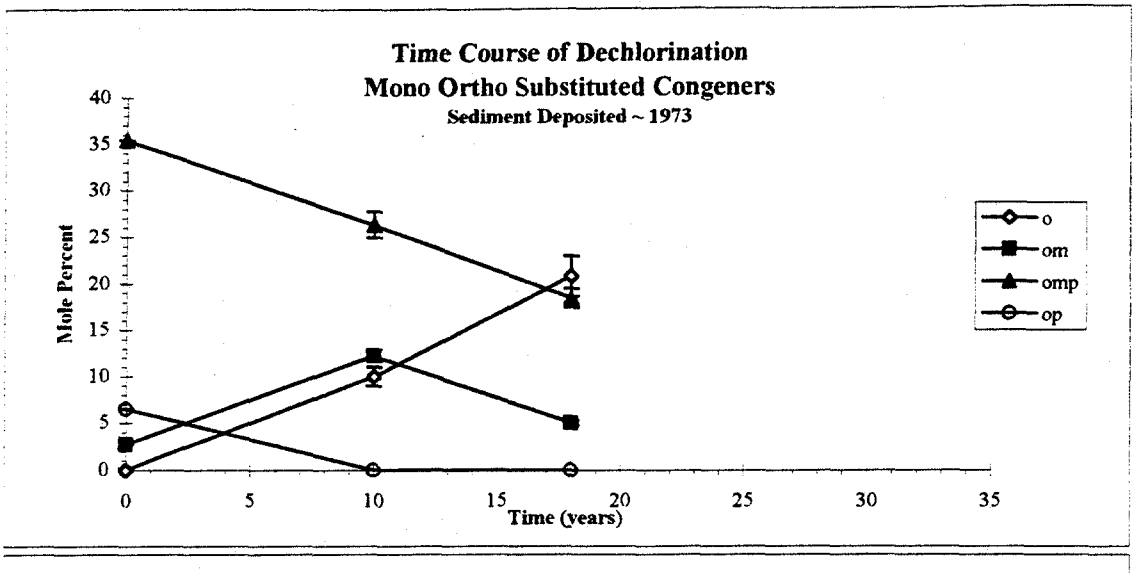
11.0483

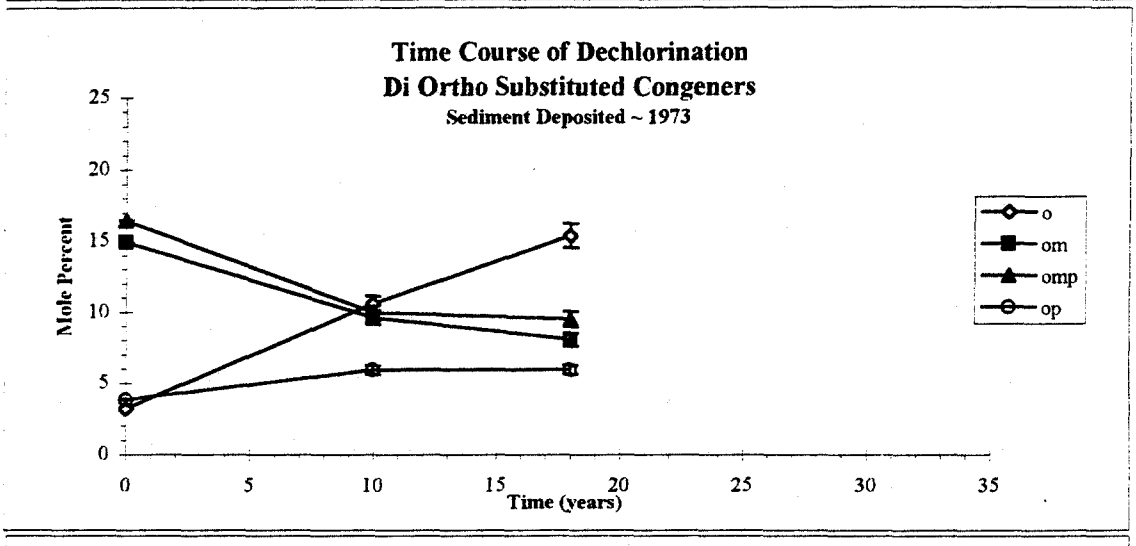

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1975
Mole Percent
Time (years)
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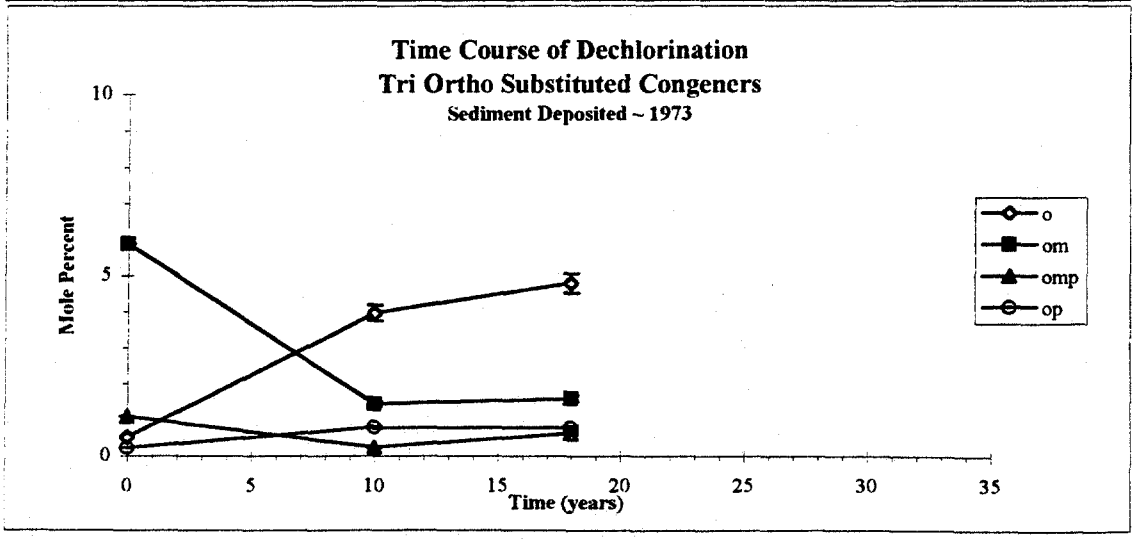

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1975
Mole Percent
Time (years)
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Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1975
Mole Percent
Time (years)
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11.0484

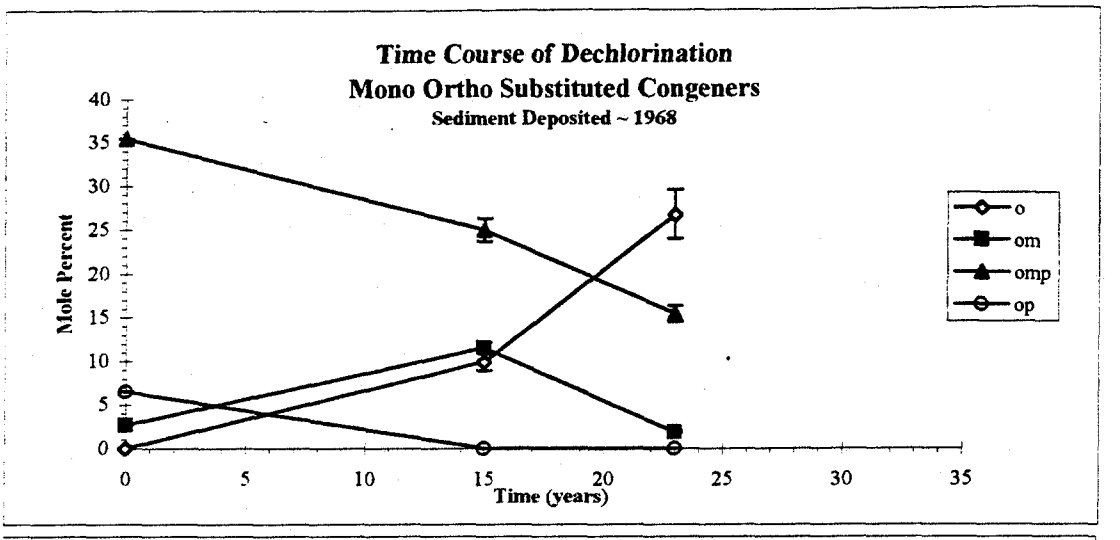

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1973
Mole Percent
Time (years)
o
om
omp
op

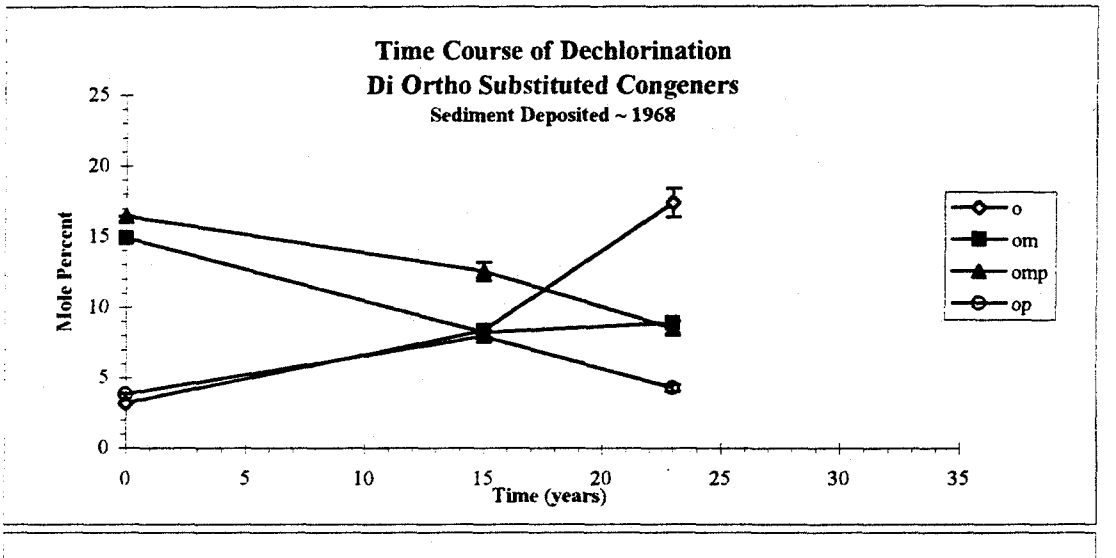

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1973
Mole Percent
Time (years)
o
om
omp
op

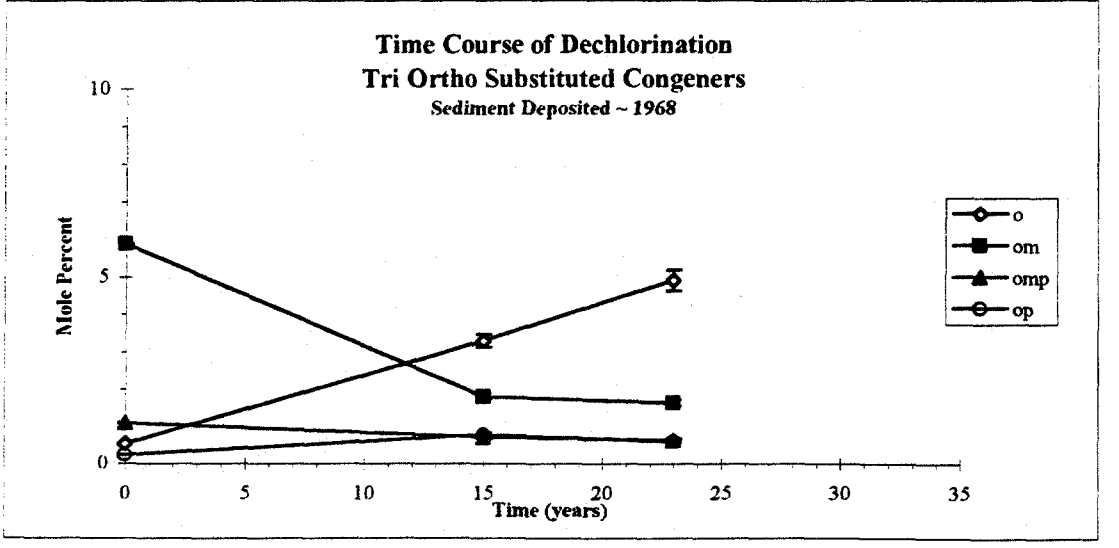

Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1973
Mole Percent
Time (years)
o
om
omp
op

11.0485

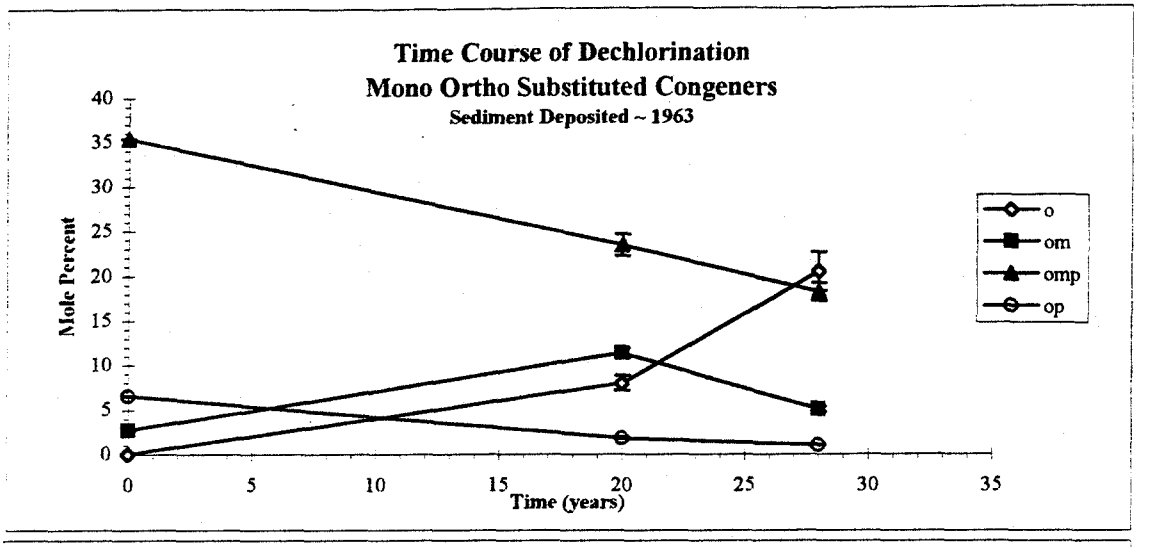
Time Course of Anaerobic Dechlorination - Upper Hudson River

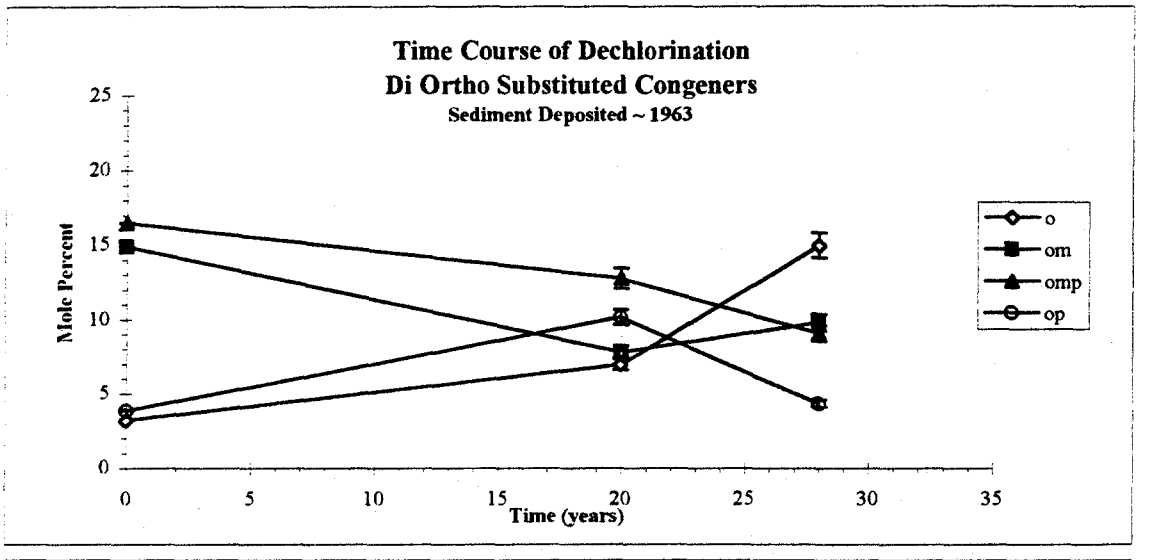


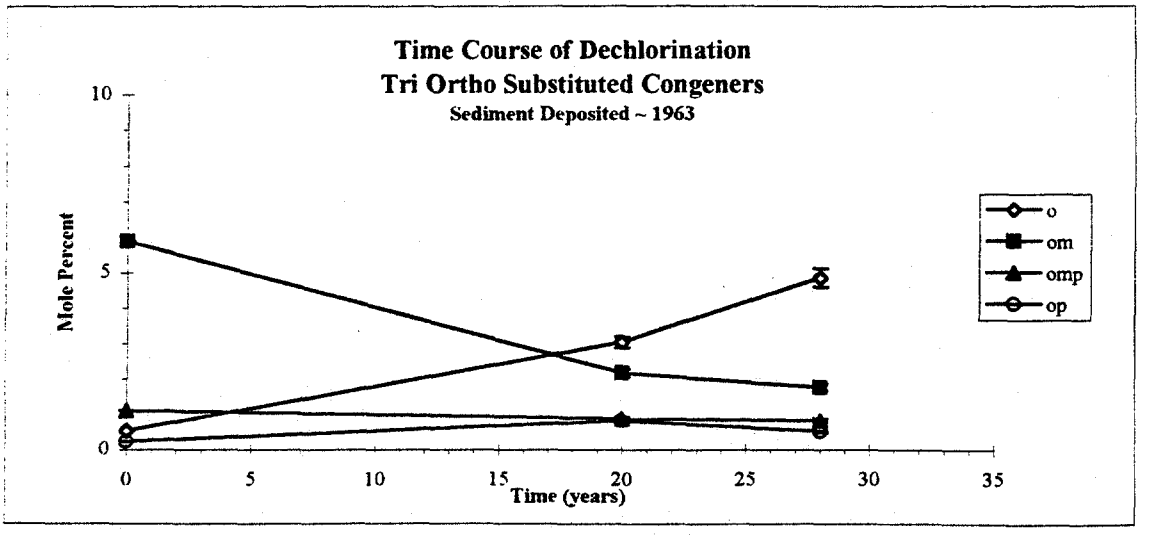




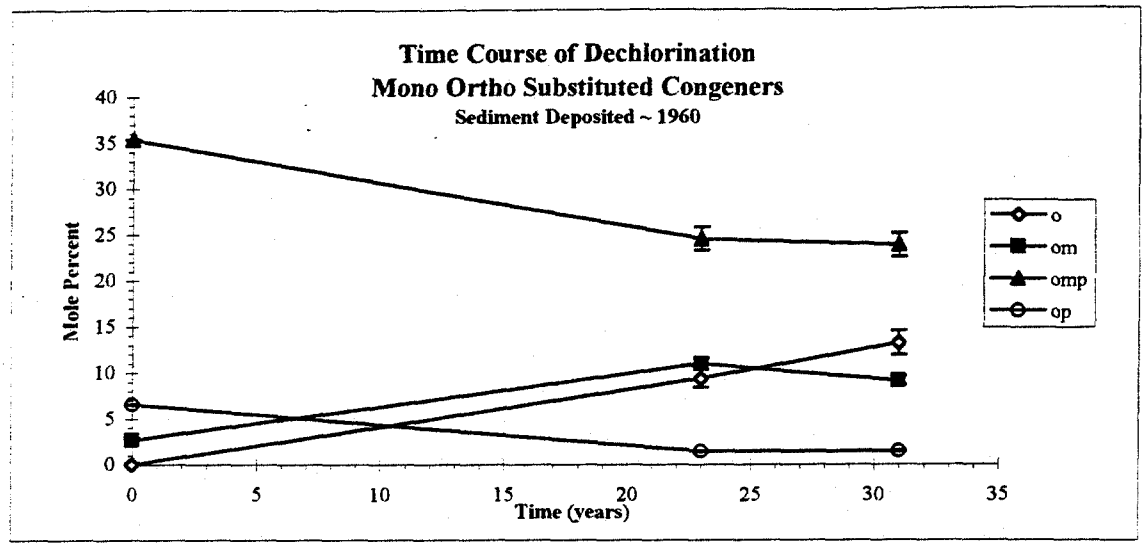
11.0486

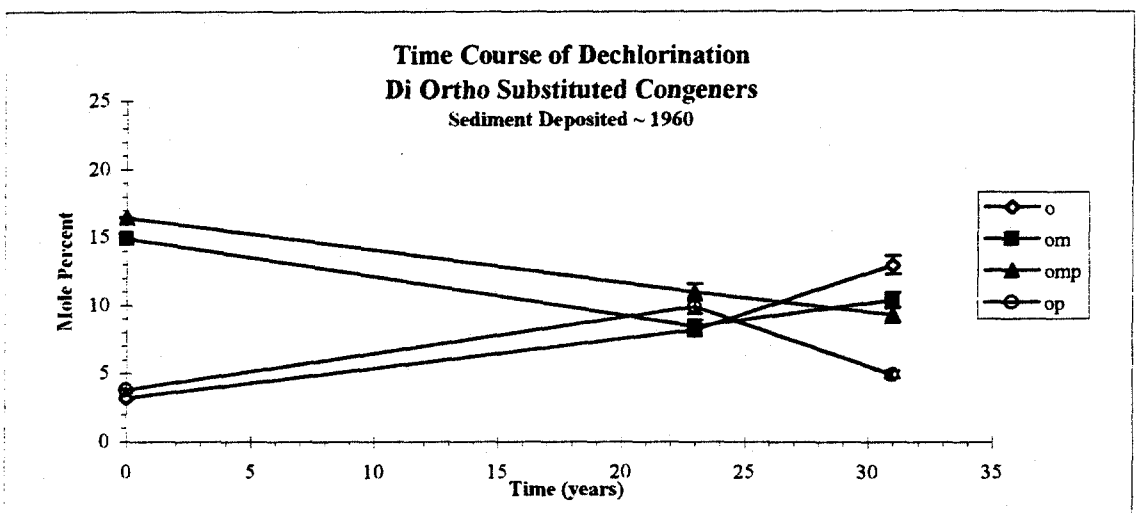

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1963
Mole Percent
Time (years)
o
om
omp
op

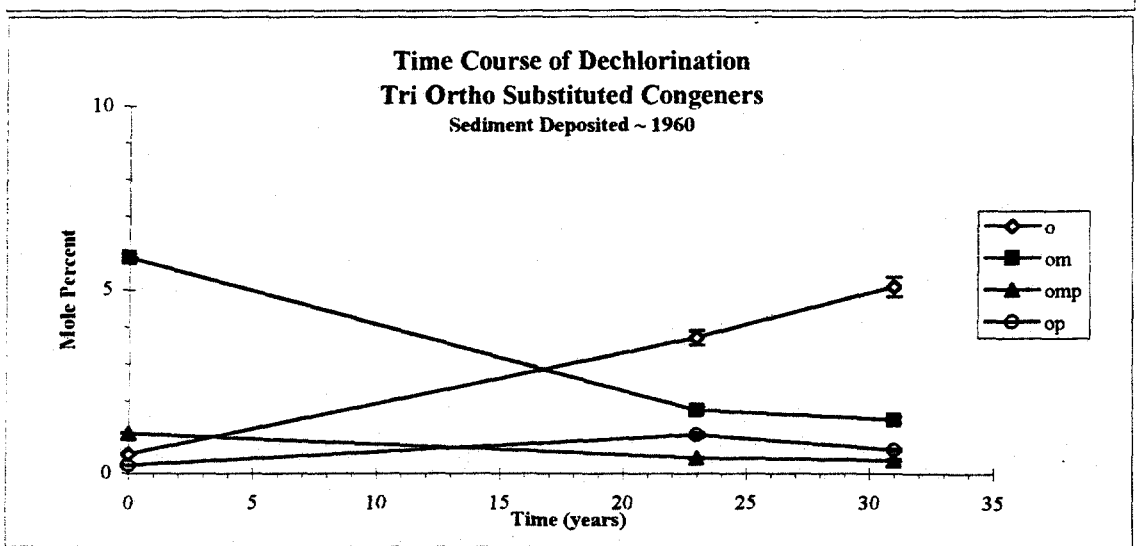

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1963
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1963
Mole Percent
Time (years)
o
om
omp
op

11.0487


Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1960
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1960
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1960
Mole Percent
Time (years)
o
om
omp
op

11.0488

APPENDIX C-2
TIDAL HUDSON RIVER

11.0489

HOMOLOG PLOTS

Homolog Group Distributions
Tidal Hudson River - Kingston

Homolog Group	1963 Sediment				1973 Sediment				1975 Sediment			
	91.8 (24-28 cm)	error	88.6 (32-36 cm)	error	91.8 (4-8 cm)	error	88.6 (20-24 cm)	error	91.8 (2-4 cm)	error	88.6 (16-20 cm)	error
Mono	0.19	2.30	1.46	0.30	0.51	1.55	0.98	0.85	0.69	2.29	2.08	0.53
Di	3.21	0.43	13.31	0.75	9.16	0.53	12.40	0.71	8.25	0.56	13.89	0.85
Tri	29.63	1.68	46.90	2.46	42.10	2.20	44.94	2.37	39.89	2.15	44.37	2.43
Tetra	30.64	2.96	23.95	2.25	28.29	2.35	25.34	2.38	29.77	2.90	24.78	2.86
Penta	20.51	1.22	9.24	0.63	12.93	0.75	10.41	0.70	14.00	0.97	9.65	0.91
Hexa	10.26	0.79	3.07	0.42	4.17	0.41	3.59	0.46	4.28	0.63	3.07	0.72
Hepta	3.33	0.48	1.08	0.31	1.45	0.27	1.29	0.33	1.38	0.45	1.09	1.04
Others (1)	0.73	0.60	0.49	0.44	0.57	0.39	0.48	0.47	0.50	1.01	0.48	1.14

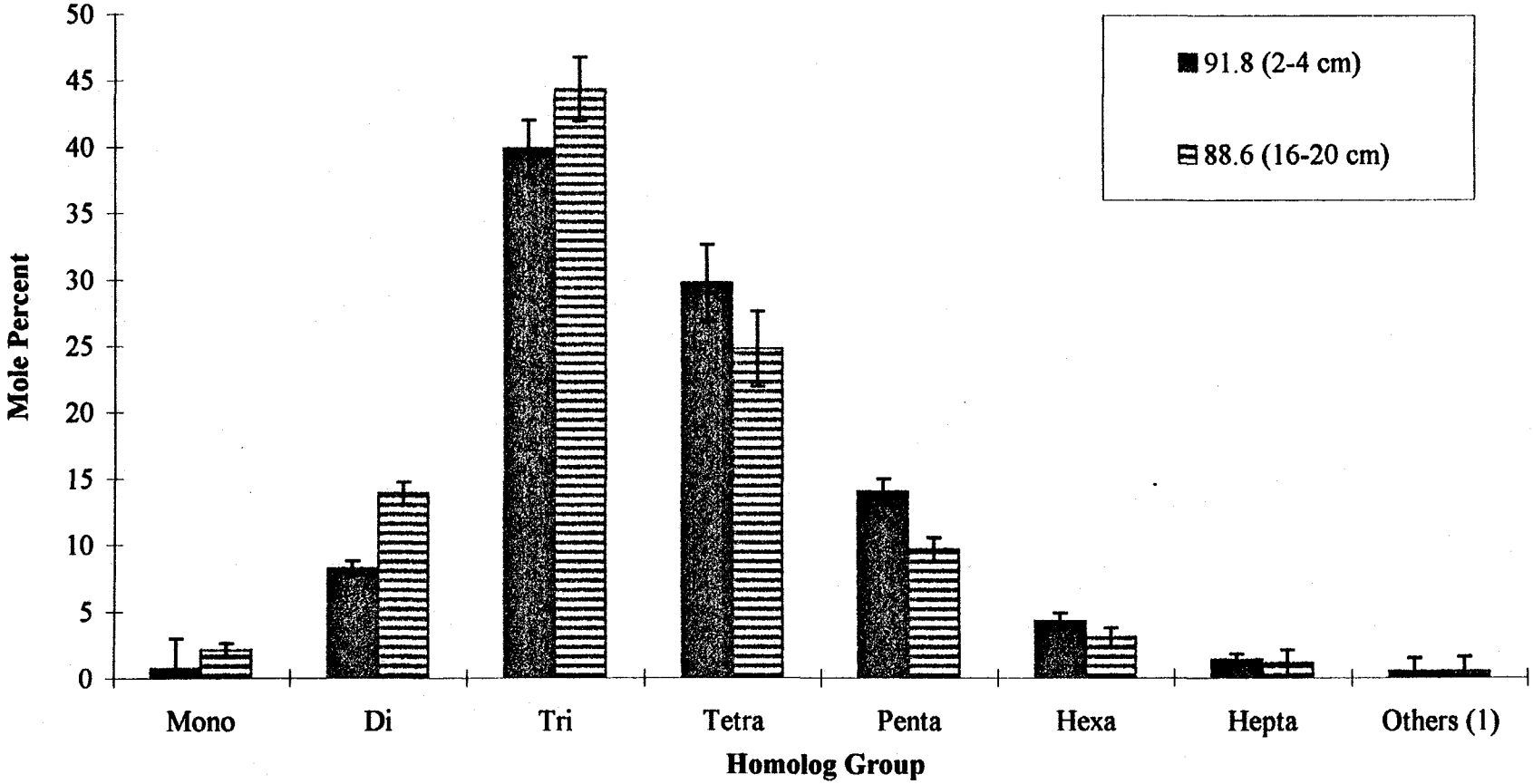
(1) Others refers to all homolog groups larger than hepta

11.0491

Relative Concentrations of Homolog Groups

Tidal Hudson - Kingston

Sediment Deposited ~1975



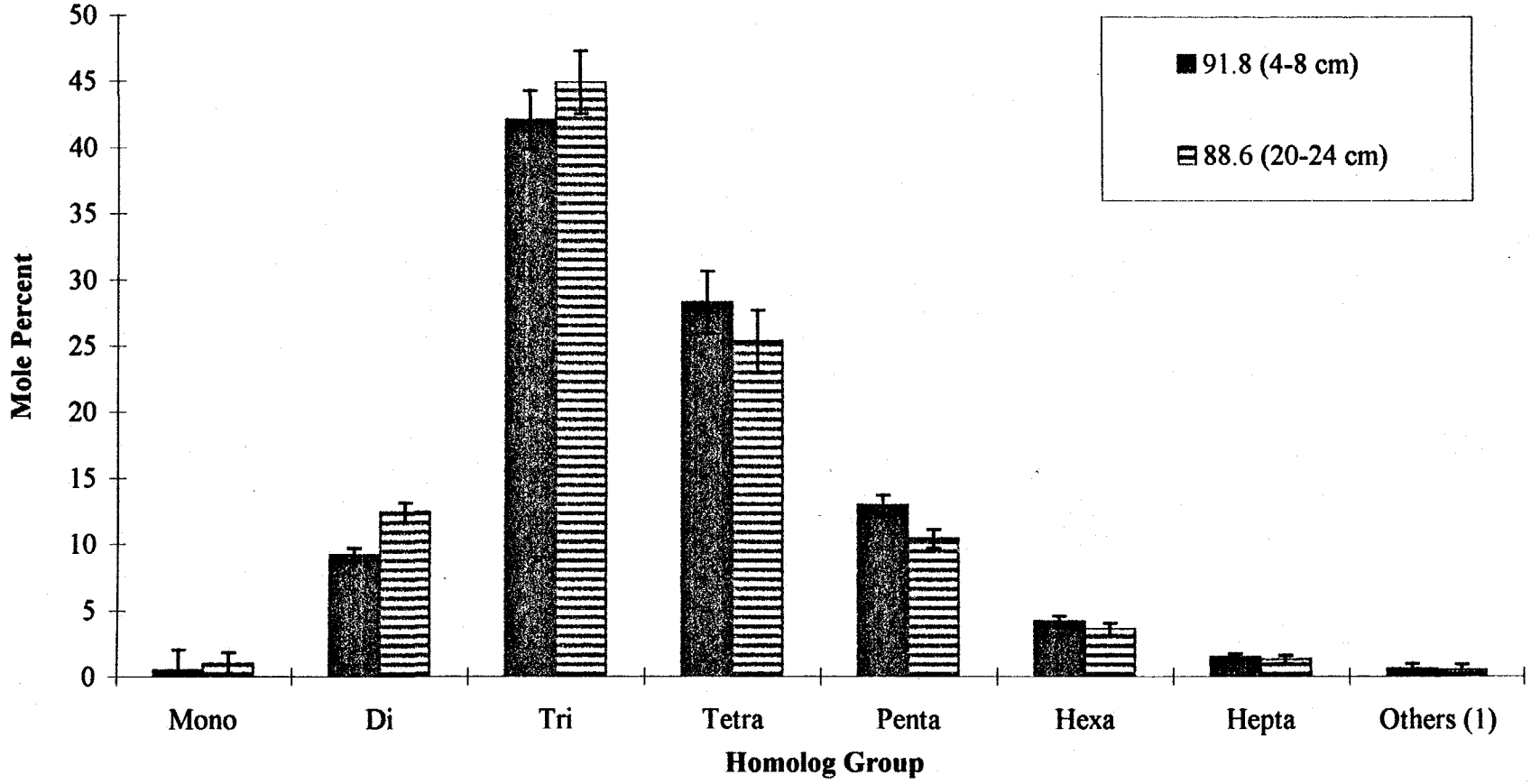
(1) Others refers to homolog groups larger than hepta

11.0492

Relative Concentrations of Homolog Groups

Tidal Hudson - Kingston

Sediment Deposited ~1973



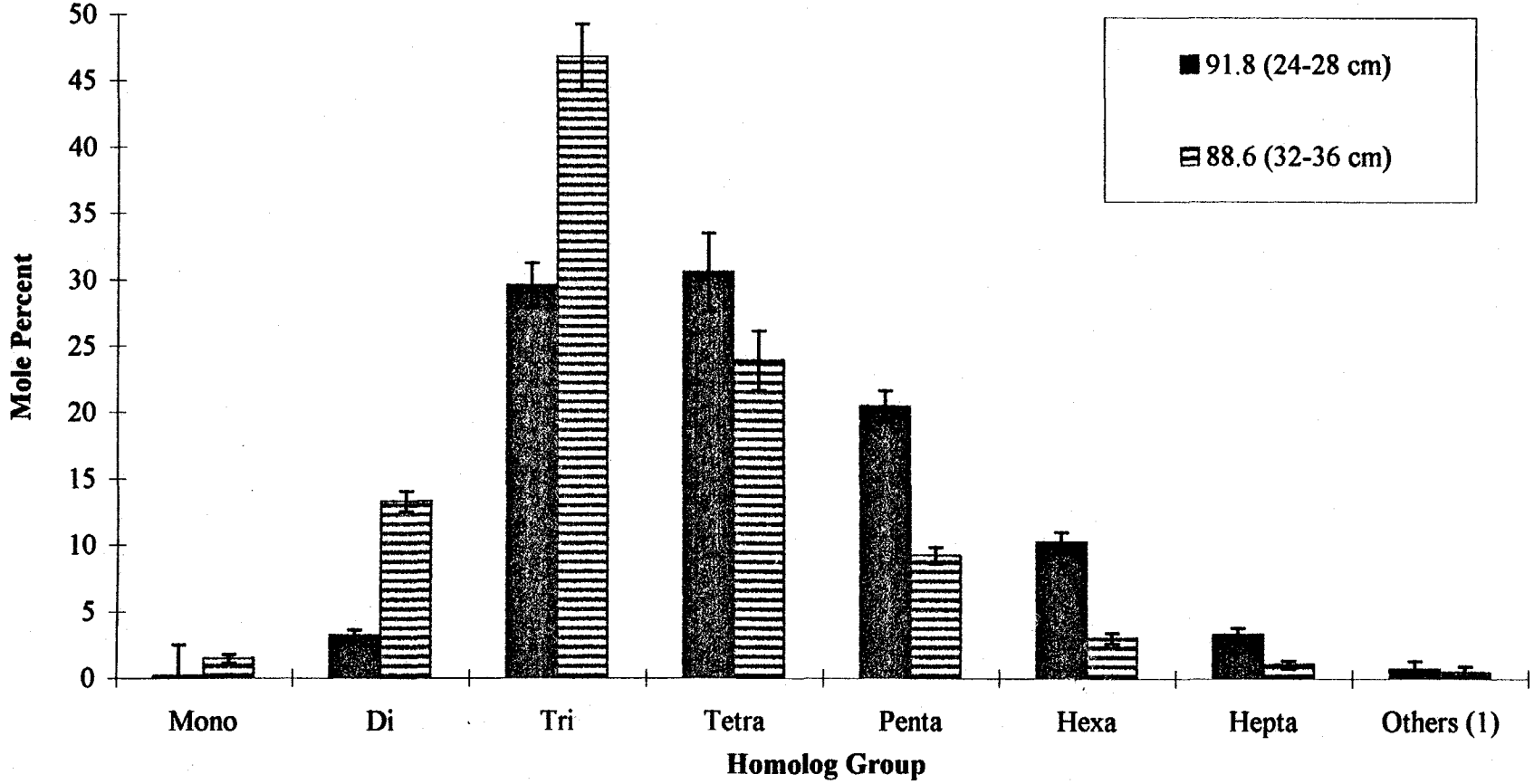
(1) Others refers to homolog groups larger than hepta

11.0493

Relative Concentrations of Homolog Groups

Tidal Hudson - Kingston

Sediment Deposited ~1963



(1) Others refers to homolog groups larger than hepta

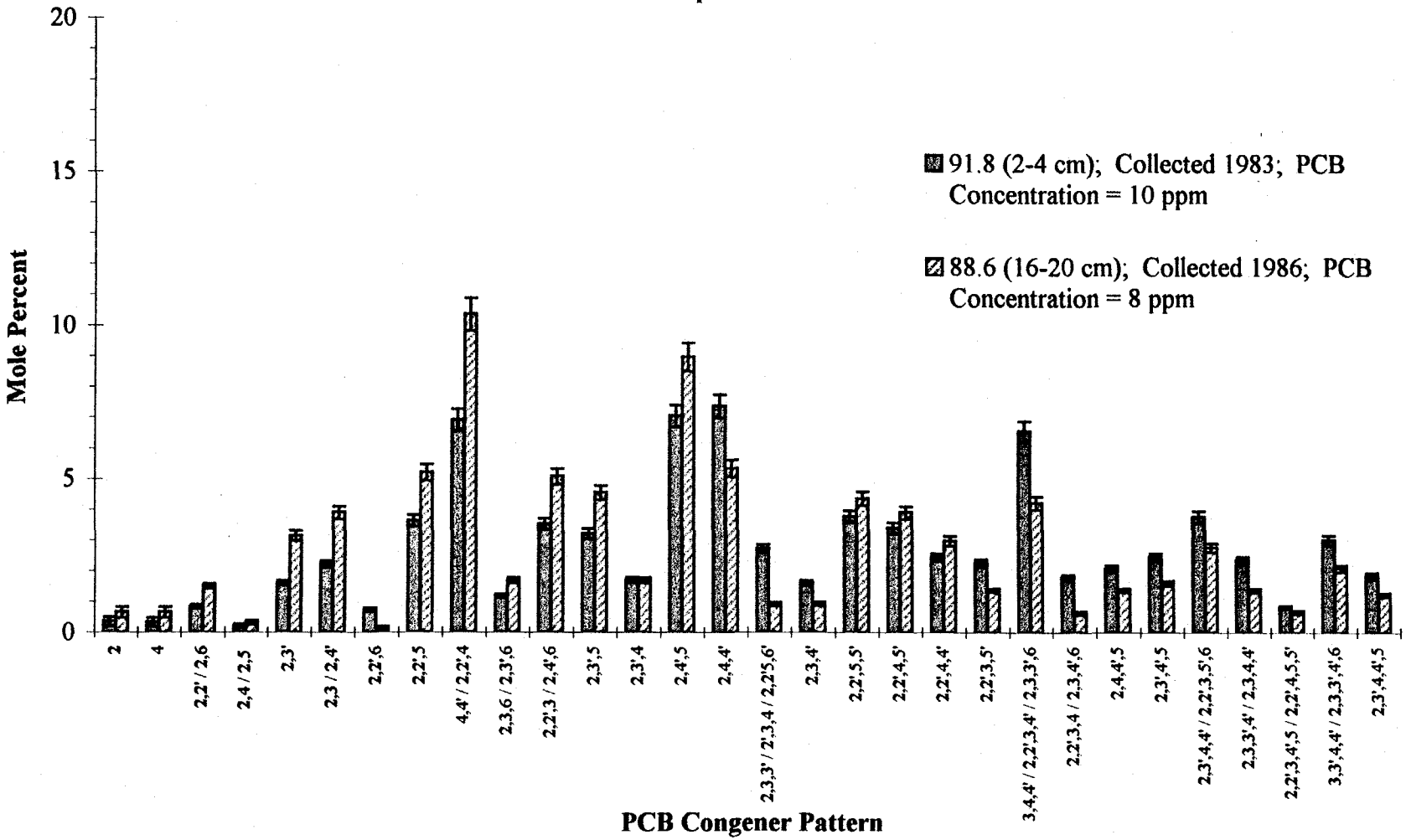
11.0494

30 PEAKS

Comparison of PCB Congener Patterns

Tidal Hudson - Kingston

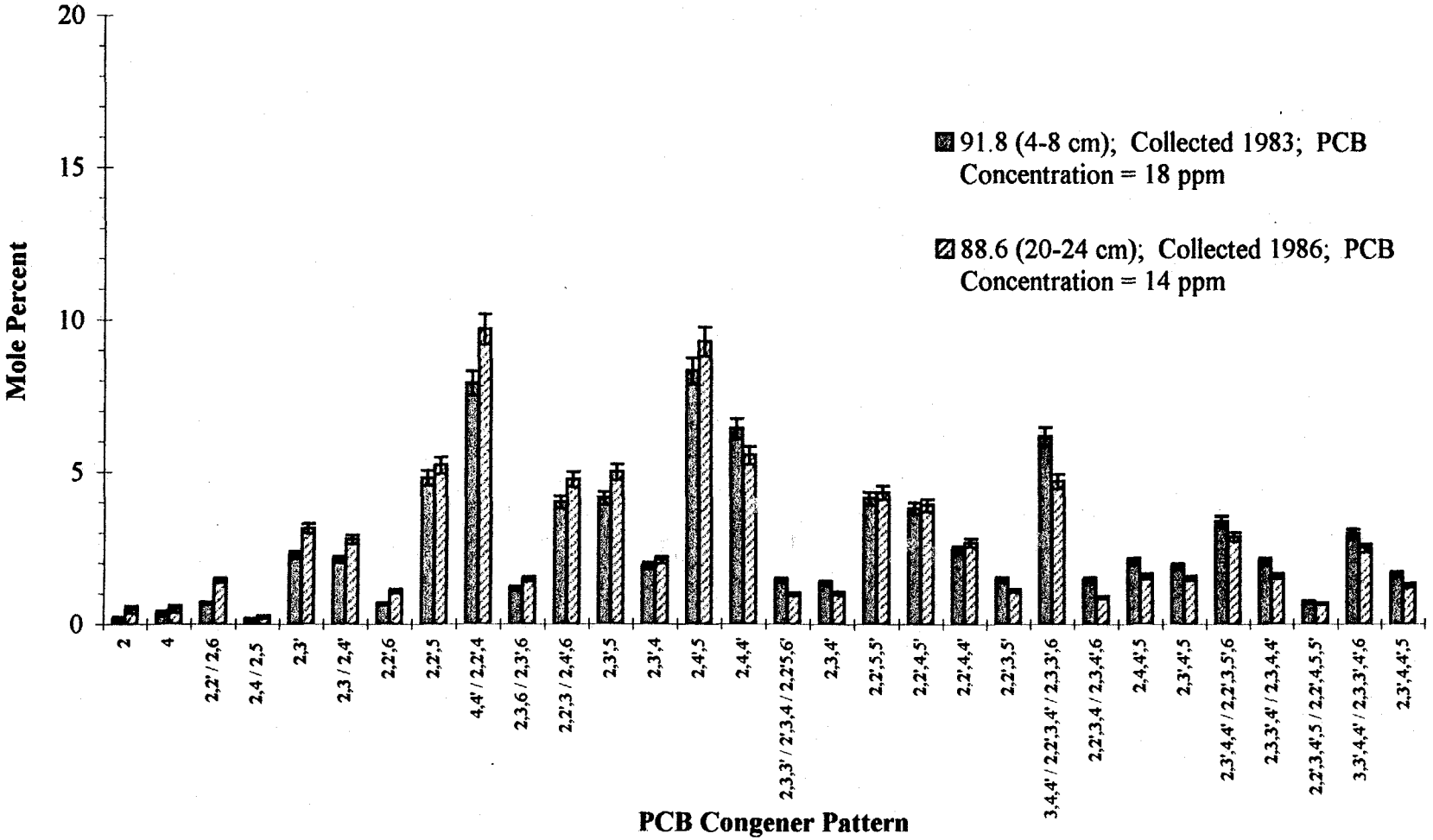
Sediment Deposited ~ 1975



Comparison of PCB Congener Patterns

Tidal Hudson - Kingston

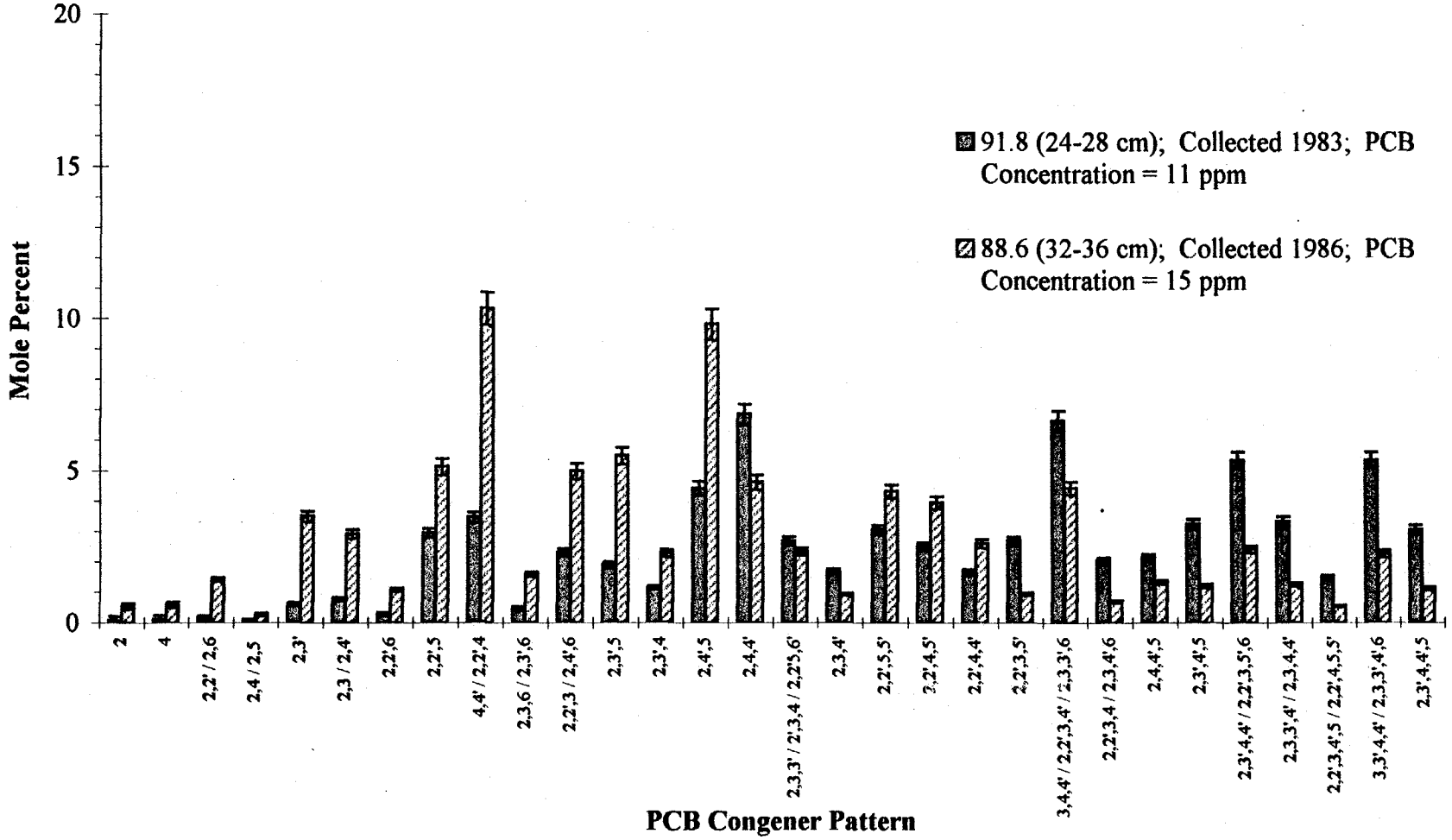
Sediment Deposited ~ 1973



Comparison of PCB Congener Patterns

Tidal Hudson - Kingston

Sediment Deposited ~ 1963



COMPOSITIONAL BALANCES

11.0499

Compositional Balance
91.8 (2-4 cm) and 88.6 (16-20 cm); Sediment Deposited ~ 1975
Congeners Contributing to 2-monochlorobiphenyl

		Core 91.8 (2-4 cm)		Core 88.6 (16-20 cm)		88.6 - 91.8	
BZ #	**Structure**	**Mole Percent**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
1	2	0.35	0.15	0.66	0.18	0.31	0.23
7/9	2,4/2,5	0.20	0.06	0.32	0.08	0.12	0.10
6	2,3'	1.60	0.08	3.16	0.16	1.55	0.18
5/8	2,3/2,4'	2.22	0.11	3.91	0.20	1.69	0.23
26	2,3',5	3.21	0.16	4.56	0.23	1.35	0.29
25	2,3',4	1.71	0.09	1.69	0.09	-0.02	0.12
31	2,4',5	7.05	0.36	8.98	0.46	1.93	0.58
28	2,4,4'	7.37	0.38	5.34	0.27	-2.04	0.47
20/33	2,3,3'/2',3,4	2.42	0.12	0.81	0.06	-1.60	0.14
22	2,3,4'	1.60	0.08	0.94	0.07	-0.67	0.11
67	2,3',4,5	0.22	0.05	0.20	0.06	-0.02	0.07
74	2,4,4',5	2.07	0.11	1.38	0.07	-0.70	0.13
70	2,3',4',5	2.45	0.13	1.61	0.08	-0.84	0.15
66	2,3',4,4'	1.38	0.07	1.02	0.05	-0.36	0.09
56/60	2,3,3',4/2,3,4,4'	2.36	0.12	1.38	0.07	-0.98	0.14
118	2,3',4,4',5	1.86	0.09	1.23	0.06	-0.62	0.11
Balance		**38.07**	**2.16**	**37.16**	**2.19**	**-0.91**	**3.13**
						2.41%	

11.0500

91.8 (2-4 cm) and 88.6 (16-20 cm); Sediment Deposited ~ 1975
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Core 91.8 (2-4 cm) Mole Percent	error	Core 88.6 (16-20 cm) Mole Percent	error	88.6 - 91.8 Change (Mole Percent)	error
4/10	2,2'/2,6	0.84	0.06	1.50	0.08	0.66	0.10
18	2,2',5	3.63	0.19	5.21	0.27	1.57	0.33
17	2,2',4	4.54	0.23	6.79	0.35	2.26	0.42
24/27	2,3,6/2,3',6	1.18	0.06	1.69	0.09	0.52	0.11
16/32	2,2',3/2,4',6	3.53	0.18	5.08	0.26	1.55	0.32
52	2,2',5,5'	3.77	0.19	4.36	0.22	0.59	0.30
49	2,2',4,5'	3.39	0.17	3.90	0.20	0.51	0.26
47	2,2',4,4'	2.45	0.13	2.99	0.15	0.53	0.20
48	2,2',4,5		0.65		0.72	Interference	0.97
44	2,2',3,5'	2.26	0.12	1.38	0.07	-0.88	0.14
40	2,2',3,3'	1.04	0.05	0.68	0.06	-0.36	0.08
42/59	2,2',3,4'/2,3,3',6	5.32	0.27	3.43	0.18	-1.89	0.32
41/64	2,2',3,4/2,3,4',6	1.79	0.09	0.64	0.06	-1.15	0.11
82	2,2',3,3',4	0.23	0.04	0.11	0.05	-0.11	0.07
99	2,2',4,4',5	0.79	0.04	0.59	0.05	-0.21	0.07
90/101	2,2',3,4',5/2,2',4,5,5'	0.84	0.04	0.68	0.05	-0.17	0.07
110	2,3,3',4',6	2.34	0.12	1.63	0.08	-0.71	0.15
Balance		**37.95**	**2.64**	**40.66**	**2.94**	**2.71**	**3.98**
						6.90%	

91.8 (2-4 cm) and 88.6 (16-20 cm); Sediment Deposited ~ 1975
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Core 91.8 (2-4 cm) Mole Percent	error	Core 88.6 (16-20 cm) Mole Percent	error	88.6 - 91.8 Change (Mole Percent)	error
19	2,2',6	0.74	0.05	0.12	0.07	-0.61	0.08
53	2,2',5,6'	0.30	0.02	0.10	0.01	-0.20	0.02
95	2,2',3,5',6	2.39	0.12	1.76	0.09	-0.63	0.15
45	2,2',3,6	0.73	0.05	0.69	0.06	-0.04	0.08
46	2,2',3,6'	0.52	0.05	0.69	0.06	0.17	0.07
51	2,2',4,6	0.58	0.05	0.86	0.06	0.29	0.07
84	2,2',3,3',6	0.68	0.04	0.68	0.05	0.00	0.07
91	2,2',3,4',6	0.49	0.04	0.48	0.05	-0.01	0.07
132	2,2',3,3',4,6'	0.83	0.04	0.35	0.02	-0.49	0.05
149	2,2',3,4',5',6	0.64	0.04	0.56	0.05	-0.08	0.07
Balance		**7.90**	**0.50**	**6.29**	**0.51**	**-1.60**	**0.72**
						22.60%	

11.0502

Compositional Balance
91.8 (4-8 cm) and 88.6 (20-24 cm); Sediment Deposited ~ 1973
Congeners Contributing to 2-monochlorobiphenyl

		Core 91.8 (4-8 cm)		Core 88.6 (20-24 cm)		88.6 - 91.8	
BZ #	**Structure**	**Mole Percent**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
1	2	0.16	0.08	0.48	0.11	0.32	0.14
7/9	2,4/2,5	0.17	0.04	0.25	0.05	0.08	0.06
6	2,3'	2.28	0.12	3.15	0.16	0.87	0.20
5/8	2,3/2,4'	2.14	0.11	2.79	0.14	0.66	0.18
26	2,3',5	4.14	0.21	5.00	0.26	0.86	0.33
25	2,3',4	1.91	0.10	2.11	0.11	0.19	0.15
31	2,4',5	8.33	0.42	9.29	0.47	0.96	0.64
28	2,4,4'	6.42	0.33	5.54	0.28	-0.88	0.43
20/33	2,3,3'/2',3,4	1.29	0.07	0.88	0.05	-0.41	0.08
22	2,3,4'	1.36	0.07	1.01	0.05	-0.34	0.09
67	2,3',4,5	0.21	0.03	0.19	0.03	-0.03	0.04
74	2,4,4',5	2.07	0.11	1.58	0.08	-0.49	0.13
70	2,3',4',5	1.91	0.10	1.51	0.08	-0.39	0.12
66	2,3',4,4'	1.24	0.06	1.06	0.05	-0.19	0.08
56/60	2,3,3',4/2,3,4,4'	2.07	0.11	1.58	0.08	-0.49	0.13
118	2,3',4,4',5	1.66	0.08	1.29	0.07	-0.36	0.11
Balance		**37.35**	**2.02**	**37.73**	**2.07**	**0.38**	**2.91**
						1.01%	

11.0503

91.8 (4-8 cm) and 88.6 (20-24 cm); Sediment Deposited ~ 1973
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

BZ #	Structure	Core 91.8 (4-8 cm) Mole Percent	error	Core 88.6 (20-24 cm) Mole Percent	error	88.6 - 91.8 Change (Mole Percent)	error
4/10	2,2'/2,6	0.71	0.04	1.44	0.07	0.74	0.08
18	2,2',5	4.82	0.25	5.23	0.27	0.42	0.36
17	2,2',4	5.20	0.27	6.36	0.32	1.16	0.42
24/27	2,3,6/2,3',6	1.17	0.06	1.48	0.08	0.31	0.10
16/32	2,2',3/2,4',6	4.01	0.20	4.76	0.24	0.75	0.32
52	2,2',5,5'	4.14	0.21	4.34	0.22	0.20	0.31
49	2,2',4,5'	3.81	0.19	3.93	0.20	0.11	0.28
47	2,2',4,4'	2.45	0.12	2.69	0.14	0.24	0.19
48	2,2',4,5		0.45		0.53	Interference	0.69
44	2,2',3,5'	1.47	0.07	1.10	0.06	-0.37	0.09
40	2,2',3,3'	1.09	0.06	0.96	0.05	-0.12	0.07
42/59	2,2',3,4'/2,3,3',6	5.02	0.26	3.83	0.20	-1.19	0.32
41/64	2,2',3,4/2,3,4',6	1.47	0.07	0.90	0.05	-0.57	0.09
82	2,2',3,3',4	0.17	0.02	0.11	0.03	-0.05	0.04
99	2,2',4,4',5	0.78	0.04	0.68	0.03	-0.10	0.05
90/101	2,2',3,4',5/2,2',4,5,5'	0.73	0.04	0.68	0.03	-0.05	0.05
110	2,3,3',4',6	2.32	0.12	1.96	0.10	-0.36	0.15
Balance		**39.35**	**2.47**	**40.44**	**2.62**	**1.09**	**3.62**
						2.73%	

11.0504

91.8 (4-8 cm) and 88.6 (20-24 cm); Sediment Deposited ~ 1973
Congeners Contributing to 2,2',6 - trichlorobiphenyl

BZ #	Structure	Core 91.8 (4-8 cm) Mole Percent	error	Core 88.6 (20-24 cm) Mole Percent	error	88.6 - 91.8 Change (Mole Percent)	error
19	2,2',6	0.68	0.03	1.09	0.06	0.41	0.07
53	2,2',5,6'	0.16	0.01	0.11	0.01	-0.05	0.01
95	2,2',3,5',6	2.15	0.11	1.83	0.09	-0.32	0.14
45	2,2',3,6	0.76	0.04	0.69	0.04	-0.07	0.05
46	2,2',3,6'	0.60	0.03	0.65	0.04	0.06	0.05
51	2,2',4,6	0.60	0.03	0.76	0.04	0.16	0.05
84	2,2',3,3',6	0.78	0.04	0.74	0.04	-0.04	0.05
91	2,2',3,4',6	0.54	0.03	0.52	0.03	-0.02	0.04
132	2,2',3,3',4,6'	0.69	0.04	0.36	0.02	-0.34	0.04
149	2,2',3,4',5',6	0.66	0.03	0.66	0.03	0.00	0.05
Balance		**7.63**	**0.39**	**7.41**	**0.38**	**-0.22**	**0.55**
						2.93%	

317

11.0505

Compositional Balance
91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963

Congeners Contributing to 2-monochlorobiphenyl

		Core 91.8 (24-28 cm)		Core 88.6 (32-36 cm)		88.6 - 91.8	
BZ #	**Structure**	**Mole Percent**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
1	2	0.07	0.14	0.54	0.10	0.47	0.17
7/9	2,4/2,5	0.07	0.06	0.27	0.04	0.20	0.07
6	2,3'	0.61	0.06	3.50	0.18	2.90	0.19
5/8	2,3/2,4'	0.78	0.06	2.92	0.15	2.14	0.16
26	2,3',5	1.90	0.10	5.49	0.28	3.59	0.30
25	2,3',4	1.16	0.06	2.28	0.12	1.12	0.13
31	2,4',5	4.43	0.23	9.83	0.50	5.40	0.55
28	2,4,4'	6.85	0.35	4.62	0.24	-2.23	0.42
20/33	2,3,3'/2',3,4	2.38	0.12	2.07	0.11	-0.31	0.16
22	2,3,4'	1.69	0.09	0.94	0.05	-0.75	0.10
67	2,3',4,5	0.27	0.05	0.17	0.03	-0.10	0.06
74	2,4,4',5	2.14	0.11	1.34	0.07	-0.80	0.13
70	2,3',4',5	3.25	0.17	1.21	0.06	-2.04	0.18
66	2,3',4,4'	1.96	0.10	0.89	0.05	-1.07	0.11
56/60	2,3,3',4/2,3,4,4'	3.35	0.17	1.27	0.07	-2.07	0.18
118	2,3',4,4',5	3.08	0.16	1.14	0.06	-1.94	0.17
107	2,3,3',4',5	0.70	0.04	0.13	0.01	-0.57	0.04
156	2,3,3',4,4',5	0.47	0.02	0.22	0.01	-0.25	0.02
Balance		**35.15**	**2.07**	**38.84**	**2.11**	**3.70**	**3.14**
						9.99%	

11.0506

91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963
Congeners Contributing to 2,2'/2,6' - dichlorobiphenyl

		Core 91.8 (24-28 cm)		Core 88.6 (32-36 cm)		88.6 - 91.8	
BZ #	**Structure**	**Mole Percent**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
4/10	2,2'/2,6	0.18	0.06	1.42	0.07	1.24	0.09
18	2,2',5	2.95	0.15	5.13	0.26	2.18	0.30
17	2,2',4	2.27	0.12	6.79	0.35	4.52	0.37
24/27	2,3,6/2,3',6	0.47	0.05	1.59	0.08	1.12	0.10
16/32	2,2',3/2,4',6	2.32	0.12	4.99	0.25	2.67	0.28
52	2,2',5,5'	3.07	0.16	4.33	0.22	1.27	0.27
49	2,2',4,5'	2.51	0.13	3.95	0.20	1.44	0.24
47	2,2',4,4'	1.67	0.09	2.61	0.13	0.94	0.16
48	2,2',4,5		0.65		0.50	Interference	0.82
44	2,2',3,5'	2.70	0.14	0.96	0.05	-1.74	0.15
40	2,2',3,3'	0.93	0.05	0.96	0.05	0.03	0.07
42/59	2,2',3,4'/2,3,3',6	5.40	0.28	3.60	0.18	-1.80	0.33
41/64	2,2',3,4/2,3,4',6	2.05	0.10	0.70	0.04	-1.34	0.11
82	2,2',3,3',4	0.33	0.04	0.10	0.03	-0.23	0.05
99	2,2',4,4',5	1.25	0.06	0.57	0.03	-0.68	0.07
90/101	2,2',3,4',5/2,2',4,5,5'	1.50	0.08	0.56	0.03	-0.93	0.08
110	2,3,3',4',6	4.16	0.21	1.77	0.09	-2.39	0.23
92	2,2',3,5,5'	0.59	0.04	0.38	0.03	-0.21	0.05
97	2,2',3',4,5	0.91	0.05	0.27	0.03	-0.64	0.06
87/115	2,2',3,4,5'/2,3,4,4',6	0.83	0.04	0.29	0.03	-0.54	0.05
153	2,2',4,4',5,5'	1.35	0.07	0.37	0.03	-0.98	0.07
138	2,2',3,4,4',5	2.78	0.14	0.72	0.04	-2.06	0.15
128	2,2',3,3',4,4'	0.62	0.04	0.14	0.03	-0.48	0.05
180	2,2',3,4,4',5,5'	0.76	0.04	0.22	0.02	-0.54	0.04
170/190	2,2',3,3',4,4',5/2,3,3',4,4',5,6	1.30	0.07	0.36	0.02	-0.94	0.07
Balance		**42.90**	**2.96**	**42.78**	**2.79**	**-0.12**	**4.26**
						0.29%	

91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963

Congeners Contributing to 2,2',6 - trichlorobiphenyl

		Core 91.8 (24-28 cm)		Core 88.6 (32-36 cm)		88.6 - 91.8	
BZ #	**Structure**	**Mole Percent**	**error**	**Mole Percent**	**error**	**Change (Mole Percent)**	**error**
19	2,2',6	0.30	0.05	1.08	0.06	0.79	0.08
53	2,2',5,6'	0.30	0.02	0.26	0.01	-0.04	0.02
95	2,2',3,5',6	3.40	0.17	1.54	0.08	-1.86	0.19
45	2,2',3,6	0.67	0.05	0.70	0.04	0.03	0.06
46	2,2',3,6'	0.42	0.05	0.70	0.04	0.28	0.06
51	2,2',4,6'	0.31	0.05	0.83	0.04	0.52	0.06
84	2,2',3,3',6	0.80	0.04	0.74	0.04	-0.06	0.06
91	2,2',3,4',6	0.47	0.04	0.50	0.03	0.04	0.05
132	2,2',3,3',4,6'	0.78	0.04	0.32	0.02	-0.47	0.04
149	2,2',3,4',5',6	1.62	0.08	0.56	0.03	-1.06	0.09
Balance		**9.06**	**0.59**	**7.23**	**0.37**	**-1.82**	**0.71**
						22.39%	

320

11.0508

PARENT DAUGHTER ANALYSIS

Parent - Daughter Analysis
Cores 91.8 (2-4 cm) and 88.6 (16-20 cm); Sediment Deposited ~ 1975
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent	Possible Parents
1	2	0.31	0.23	All Listed Below
6	2,3'	1.55	0.18	2,3,3'; 2',3,4; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	1.69	0.23	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	1.35	0.29	2,3',4',5; 2,3',4,4',5
31	2,4',5	1.93	0.58	2,4,4',5; 2,3',4',5; 2,3',4,4',5; 2,3,3',4',5
		6.82	**1.51**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
28	2,4,4'	-2.04	0.47	2,4'; 2	--
20/33	2,3,3'/2',3,4	-1.60	0.14	2,4'; 2,3'; 2,3; 2	--
22	2,3,4'	-0.67	0.11	2,4'; 2,3; 2	--
74	2,4,4',5	-0.70	0.13	2,4',5; 2,4'; 2	2,3',4; 2,4,4';
70	2,3',4',5	-0.84	0.15	2,4',5; 2,3',5; 2,4'; 2,3'; 2	2',3,4;
66	2,3',4,4'	-0.36	0.09	2,4'; 2,3'; 2	2,3',4; 2',3,4; 2,4,4'
56/60	2,3,3',4/2,3,4,4'	-0.98	0.14	2,3; 2,4'; 2,3'; 2	2,3',4; 2,4,4'; 2,3,3'; 2,3,4';
118	2,3',4,4',5	-0.62	0.11	2,4',5; 2,3',5; 2,4'; 2,3'; 2	2,3',4,4'; 2,3',4',5; 2,4,4',5; 2',3,4; 2,4,4
		-7.81	**1.32**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
7/9	2,4/2,5	0.12	0.10
25	2,3',4	-0.02	0.12
67	2,3',4,5	-0.02	0.07

Cores 91.8 (2-4 cm) and 88.6 (16-20 cm); Sediment Deposited ~ 1975
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
4/10	2,2'/2,6	0.66	0.10	All decreasing peaks listed below.
18	2,2',5	1.57	0.33	2,2',3,5'; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
17	2,2',4	2.26	0.42	2,2',3,4'; 2,2',3,4; 2,2',3,3',4; 2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
24/27	2,3,6/2,3',6	0.52	0.11	2,3,3',6; 2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	1.55	0.32	2,2',3,3'; 2,2',3,5'; 2,2',3,4'; 2,2',3,4; 2,3,4',6; 2,2',3,3',4; 2,2',3,4',5; 2,3,3',4',6
52	2,2',5,5'	0.59	0.30	2,2',4,5,5'
49	2,2',4,5'	0.51	0.26	2,2',4,4',5; 2,2',3,4',5; 2,2',4,5,5'
47	2,2',4,4'	0.53	0.20	2,2',4,4',5
48	2,2',4,5			Interference
		8.20	**2.02**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
44	2,2',3,5'	-0.88	0.14	2,2',5; 2,2',3; 2,2'	--
40	2,2',3,3'	-0.36	0.08	2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-1.89	0.32	2,2',3; 2,2',4; 2,3,6; 2,3',6	--
41/64	2,2',3,4/2,3,4',6	-1.15	0.11	2,2',4; 2,2',3; 2,4',6; 2,3,6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.11	0.07	2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,4'; 2,2',3,3'
99	2,2',4,4',5	-0.21	0.07	2,2',4,4'; 2,2',4,5'; 2,2',4; 2,2',5; 2,2'	--
90/101	2,2',3,4',5/2,2',4,5,5'	-0.17	0.07	2,2',4,5'; 2,2',5,5'; 2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4'
110	2,3,3',4',6	-0.71	0.15	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,3',6; 2,3,4',6
		-5.48	**0.99**		

Cores 91.8 (2-4 cm) and 88.6 (16-20 cm); Sediment Deposited ~ 1975
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
46	2,2',3,6'	0.17	0.07	2,2',3,3',4,6'
51	2,2',4,6'	0.29	0.07	2,2',3,3',4,6'
		0.46	**0.15**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
19	2,2',6	-0.61	0.08	biphenyl??	?
53	2,2',5,6'	-0.20	0.02	?	2,2',6
95	2,2',3,5',6	-0.63	0.15	?	2,2',6
132	2,2',3,3',4,6'	-0.49	0.05	2,2',4,6'; 2,2',3,6'	2,2',6
		-1.93	**0.30**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
45	2,2',3,6	-0.04	0.08
84	2,2',3,3',6	0.00	0.07
91	2,2',3,4',6	-0.01	0.07
149	2,2',3,4',5',6	-0.08	0.07

11.0512

Parent - Daughter Analysis
Cores 91.8 (4-8 cm) and 88.6 (20-24 cm); Sediment Deposited ~ 1973
Peaks Contributing to 2-monochlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent	Possible Parents
1	2	0.32	0.14	All Listed Below
6	2,3'	0.87	0.20	2,3,3'; 2',3,4; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5
5/8	2,3/2,4'	0.66	0.18	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3,4,4'; 2,3',4,4',5
26	2,3',5	0.86	0.33	2,3',4',5; 2,3',4,4',5
31	2,4',5	0.96	0.64	2,4,4',5; 2,3',4',5; 2,3',4,4',5
		3.67	**1.48**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
28	2,4,4'	-0.88	0.43	2,4'; 2	--
20/33	2,3,3'/2',3,4	-0.41	0.08	2,4'; 2,3'; 2,3; 2	--
22	2,3,4'	-0.34	0.09	2,4'; 2,3; 2	--
74	2,4,4',5	-0.49	0.13	2,4',5; 2,4'; 2	2,4,4';
70	2,3',4',5	-0.39	0.12	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2	2',3,4;
66	2,3',4,4'	-0.19	0.08	2,3',4; 2,3'; 2,4'; 2	2',3,4; 2,4,4'
56/60	2,3,3',4/2,3,4,4'	-0.49	0.13	2,3',4; 2,3; 2,4'; 2,3'; 2	2,4,4'; 2,3,3'; 2,3,4';
118	2,3',4,4',5	-0.36	0.11	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2	2,3',4,4'; 2,3',4',5; 2,4,4',5; 2',3,4; 2,4,4
		-3.54	**1.18**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
7/9	2,4/2,5	0.08	0.06
25	2,3',4	0.19	0.15
67	2,3',4,5	-0.03	0.04

Cores 91.8 (4-8 cm) and 88.6 (20-24 cm); Sediment Deposited ~ 1973
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
4/10	2,2'/2,6	0.74	0.08	All decreasing peaks listed below.
18	2,2',5	0.42	0.36	2,2',3,5'; 2,2',4,4',5
17	2,2',4	1.16	0.42	2,2',3,4'; 2,2',3,4; 2,2',4,4',5
24/27	2,3,6/2,3',6	0.31	0.10	2,3,3',6; 2,3,4',6; 2,3,3',4',6
16/32	2,2',3/2,4',6	0.75	0.32	2,2',3,3'; 2,2',3,5'; 2,2',3,4'; 2,2',3,4; 2,3,4',6; 2,3,3',4',6
47	2,2',4,4'	0.24	0.19	2,2',4,4',5
		3.61	**1.46**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
40	2,2',3,3'	-0.12	0.07	2,2',3; 2,2'	--
44	2,2',3,5'	-0.37	0.09	2,2',5; 2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-1.19	0.32	2,2',3; 2,3,6; 2,3',6; 2,2',4	--
41/64	2,2',3,4/2,3,4',6	-0.57	0.09	2,2',3; 2,4',6; 2,3,6; 2,2',4; 2,2'; 2,6	--
99	2,2',4,4',5	-0.10	0.05	2,2',4,4'; 2,2',4; 2,2',5; 2,2'	--
110	2,3,3',4',6	-0.36	0.15	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,3',6; 2,3,4',6
		-2.72	**0.79**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
52	2,2',5,5'	0.20	0.31
49	2,2',4,5'	0.11	0.28
48	2,2',4,5	Int	Int
82	2,2',3,3',4	-0.05	0.04
90/101	2,2',3,4',5/2,2',4,5,5'	-0.05	0.05

Cores 91.8 (4-8 cm) and 88.6 (20-24 cm); Sediment Deposited ~ 1973
Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
19	2,2',6	0.41	0.07	All decreasing peaks listed below
51	2,2',4,6'	0.16	0.05	2,2',3,3',4,6'
		0.57	**0.12**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
53	2,2',5,6'	-0.05	0.01	2,2',6	--
95	2,2',3,5',6	-0.32	0.14	2,2',6	2,2',5,6'
132	2,2',3,3',4,6'	-0.34	0.04	2,2',4,6'	--
		-0.71	**0.19**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
46	2,2',3,6'	0.06	0.05
45	2,2',3,6	-0.07	0.05
84	2,2',3,3',6	-0.04	0.05
91	2,2',3,4',6	-0.02	0.04
149	2,2',3,4',5',6	0.00	0.05

11.0515

Parent - Daughter Analysis
Cores 91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963

Peaks Contributing to 2-monochlorobiphenyl
Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent	Possible Parents
1	2	0.47	0.17	All Listed Below
7/9	2,4/2,5	0.20	0.07	2,4,4'; 2,3',4,5; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
6	2,3'	2.90	0.19	2,3,3'; 2',3,4; 2,3',4,5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
5/8	2,3/2,4'	2.14	0.16	2,4,4'; 2,3,3'; 2',3,4; 2,3,4'; 2,4,4',5; 2,3',4',5; 2,3',4,4'; 2,3,3',4; 2,3,4,4'; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
26	2,3',5	3.59	0.30	2,3',4,5; 2,3',4',5; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4,4',5
25	2,3',4	1.12	0.13	2,3',4,5; 2,3',4,4'; 2,3,3',4; 2,3,3',4,4',5
31	2,4',5	5.40	0.55	2,4,4',5; 2,3',4',5; 2,3',4,4',5; 2,3,3',4',5; 2,3,3',4',5; 2,3,3',4,4',5
		15.83	**1.58**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
28	2,4,4'	-2.23	0.42	2,4'; 2,4; 2	--
20/33	2,3,3'/2',3,4	-0.31	0.16	2,4'; 2,3'; 2,3; 2	--
22	2,3,4'	-0.75	0.10	2,4'; 2,3; 2	--
67	2,3',4,5	-0.10	0.06	2,3',5; 2,3',4; 2,3'; 2,4; 2,5; 2	--
74	2,4,4',5	-0.80	0.13	2,4',5; 2,4'; 2,4; 2,5; 2	2,4,4';
70	2,3',4',5	-2.04	0.18	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2,5; 2	2',3,4;
66	2,3',4,4'	-1.07	0.11	2,3',4; 2,4'; 2,3'; 2,4'; 2	2',3,4; 2,4,4'
56/60	2,3,3',4/2,3,4,4'	-2.07	0.18	2,3',4; 2,3; 2,4'; 2,3'; 2,4; 2	2,4,4'; 2,3,3'; 2,3,4';
118	2,3',4,4',5	-1.94	0.17	2,4',5; 2,3',4; 2,3',5; 2,4'; 2,3'; 2,4; 2,5; 2	2,3',4,4'; 2,3',4',5; 2,4,4',5; 2,3',4,5; 2',3,4; 2,4,4'
107	2,3,3',4',5	-0.57	0.04	2,4',5; 2,3',5; 2,3; 2,4'; 2,3'; 2,5; 2	2,3',4',5; 2,3,4'; 2,3,3'; 2',3,4
156	2,3,3',4,4',5	-0.25	0.02	2,4',5; 2,3',4'; 2,3',5; 2,3'; 2,4'; 2,3'; 2,4; 2,5; 2	All listed in this table.
		-12.13	**1.57**		

Cores 91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963
Peaks Contributing to 2,2'/2,6-dichlorobiphenyl
Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
4/10	2,2'/2,6	1.24	0.09	All decreasing peaks listed below.
18	2,2',5	2.18	0.30	2,2',3,3',4,4',5; 2,2',3,4,4',5,5'; 2,2',3,4,4',5; 2,2',4,4',5; 2,2',3,4,5'; 2,2',3',4,5; 2,2',3,5,5'; 2,2',3,4',5; 2,2',4,5,5'; 2,2',4,4',5; 2,2,3,5'; 2,2',4,5?
17	2,2',4	4.52	0.37	All decreasing peaks listed below, except BZ #'s 190, 115, 92, 110, 64, 59 and 44.
24/27	2,3,6/2,3',6	1.12	0.10	2,3,3',4,4',5,6; 2,3,4,4',6; 2,3,3',4',6; 2,3,4',6; 2,3,3',6
16/32	2,2',3/2,4',6	2.67	0.28	All decreasing peaks listed below, except BZ #'s 153, 10, 99, 59
52	2,2',5,5'	1.27	0.27	2,2',3,4,4',5,5'; 2,2',4,4',5,5'; 2,2',3,5,5'; 2,2',4,5,5'
49	2,2',4,5'	1.44	0.24	2,2',3,3',4,4',5; 2,2',3,4,4',5,5'; 2,2',3,4,4',5; 2,2',4,4',5,5'; 2,2',3,4,5'; 2,2',3,4',5; 2,2',4,5,5'; 2,2',4,4',5;
47	2,2',4,4'	0.94	0.16	2,2',3,3',4,4',5; 2,2',3,4,4',5,5'; 2,2',3,3',4,4'; 2,2',3,4,4',5; 2,2',4,4',5,5'; 2,2',4,4',5;
		15.36	**1.81**	

Decreasing Peaks

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
44	2,2',3,5'	-1.74	0.15	2,2',5; 2,2',3; 2,2'	--
42/59	2,2',3,4'/2,3,3',6	-1.80	0.33	2,2',3; 2,2',4; 2,3,6; 2,3',6	--
41/64	2,2',3,4/2,3,4',6	-1.34	0.11	2,2',4; 2,2',3; 2,4',6; 2,3,6; 2,2'; 2,6	--
82	2,2',3,3',4	-0.23	0.05	2,2',3,3'; 2,2',3; 2,2',4; 2,2'	2,2',3,4; 2,2',3,4'
99	2,2',4,4',5	-0.68	0.07	2,2',4,4'; 2,2',4,5; 2,2',4,5'; 2,2',4; 2,2',5; 2,2'	--
90/101	2,2',3,4',5/2,2',4,5,5'	-0.93	0.08	2,2',4,5; 2,2',4,5'; 2,2',5,5'; 2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4'
110	2,3,3',4',6	-2.39	0.23	2,4',6; 2,3,6; 2,3',6; 2,6	2,3,3',6; 2,3,4',6
92	2,2',3,5,5'	-0.21	0.05	2,2',5,5'; 2,2',3; 2,2',5; 2,2'	2,2',3,4'; 2,2',3,5'
97	2,2',3',4,5	-0.64	0.06	2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4'; 2,2',3,5'
87/115	2,2',3,4,5'/2,3,4,4',6	-0.54	0.05	2,2',4,5'; 2,2',3; 2,4',6; 2,3,6; 2,2',4; 2,2',5; 2,2'; 2,6	2,2',3,4; 2,3,4',6; 2,2',3,5'
153	2,2',4,4',5,5'	-0.98	0.07	2,2',4,4'; 2,2',4,5'; 2,2',5,5'; 2,2',4; 2,2',5; 2,2'	--
138	2,2',3,4,4',5	-2.06	0.15	2,2',4,4'; 2,2',4,5'; 2,2',3; 2,2',4; 2,2',5; 2,2'	2,2',3,4; 2,2',3,4'
128	2,2',3,3',4,4'	-0.48	0.05	2,2',4,4'; 2,2',4; 2,2'	2,2',3,4; 2,2',3,4'; 2,2',3,3'

11.0517

Decreasing Peaks (Continued)

BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
180	2,2',3,4,4',5,5'	-0.54	0.04	2,2',4,5; 2,2',4,4'; 2,2',4,5'; 2,2',5,5'; 2,2',4; 2,2',5; 2,2'	2,2',3,4; 2,2',3,4'; 2,2',3,5'
170/190	2,2',3,3',4,4',5/ 2,3,3',4,4',5,6	-0.94	0.07	All Increasing Peaks listed above	All decreasing peaks except BZ 92, 101, 153, and 180
		-15.51	**1.56**		

No Significant Change

BZ #	Structure	Change (mole percent)	Error (mole percent)
48	2,2',4,5	Int	Int
40	2,2',3,3'	0.03	0.07

Cores 91.8 (24-28 cm) and 88.6 (32-36 cm); Sediment Deposited ~ 1963

Peaks Contributing to 2,2',6-trichlorobiphenyl

Increasing Peaks

BZ #	Structure	Increase (mole percent)	Error (mole percent)	Possible Parents
19	2,2',6	0.79	0.08	All decreasing peaks listed below
46	2,2',3,6'	0.28	0.06	2,2',3,3',4,6'
51	2,2',4,6'	0.52	0.06	2,2',3,4',5',6; 2,2',3,3',4,6'
		1.59	**0.20**	

Decreasing Peaks

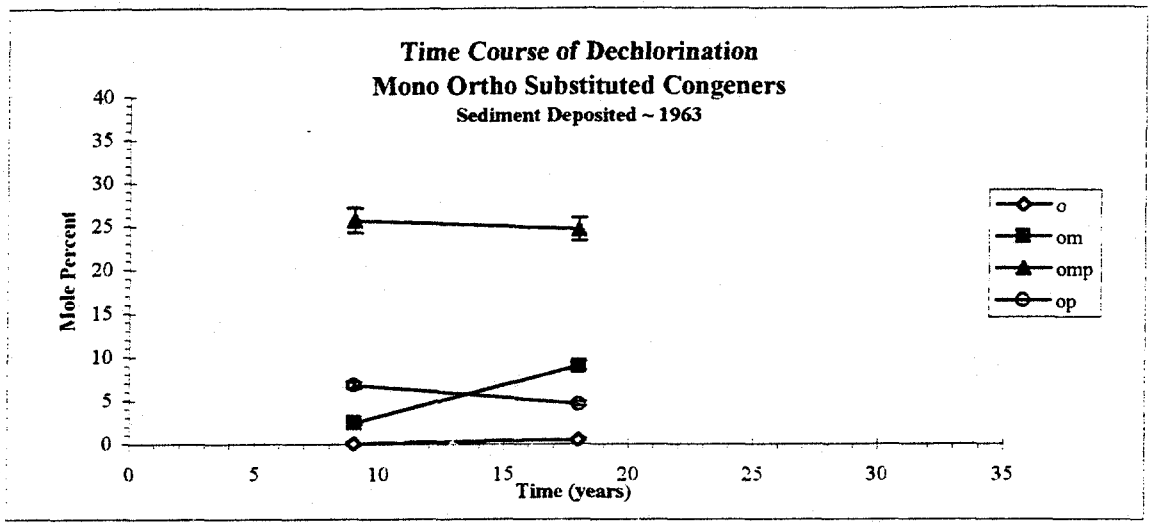
BZ #	Structure	Decrease (mole percent)	Error (mole percent)	Possible Daughters	Possible Intermediates
95	2,2',3,5',6	-1.86	0.19	2,2',6	2,2',5,6
132	2,2',3,3',4,6'	-0.47	0.04	2,2',4,6'; 2,2',3,6'; 2,2',6	2,2',3,3',6
149	2,2',3,4',5',6	-1.06	0.09	2,2',4,6'; 2,2',6	2,2',3,5',6; 2,2',5,6'
		-3.39	**0.32**		

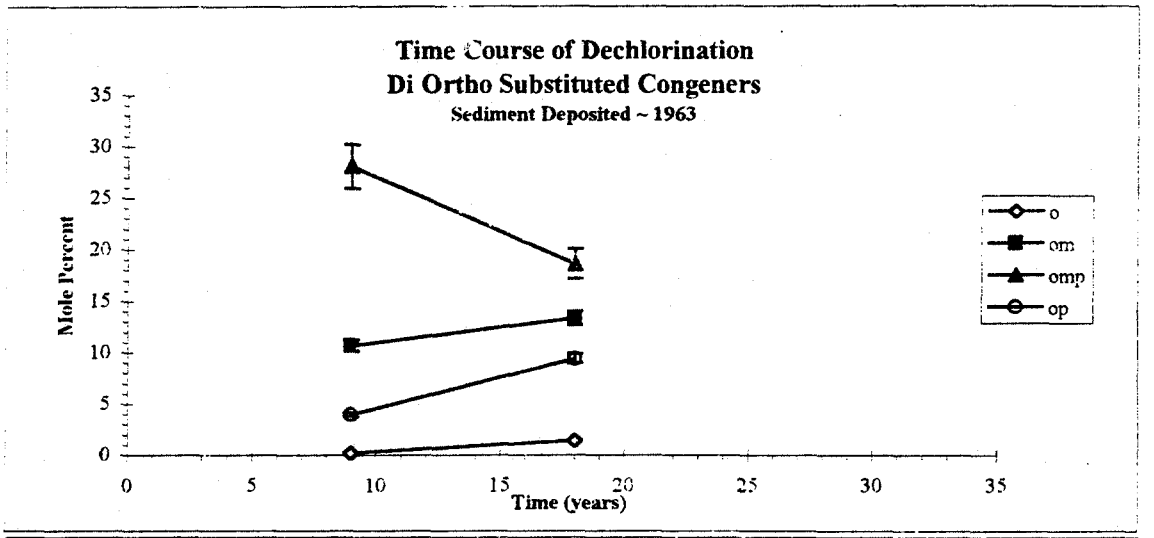
No Significant Change

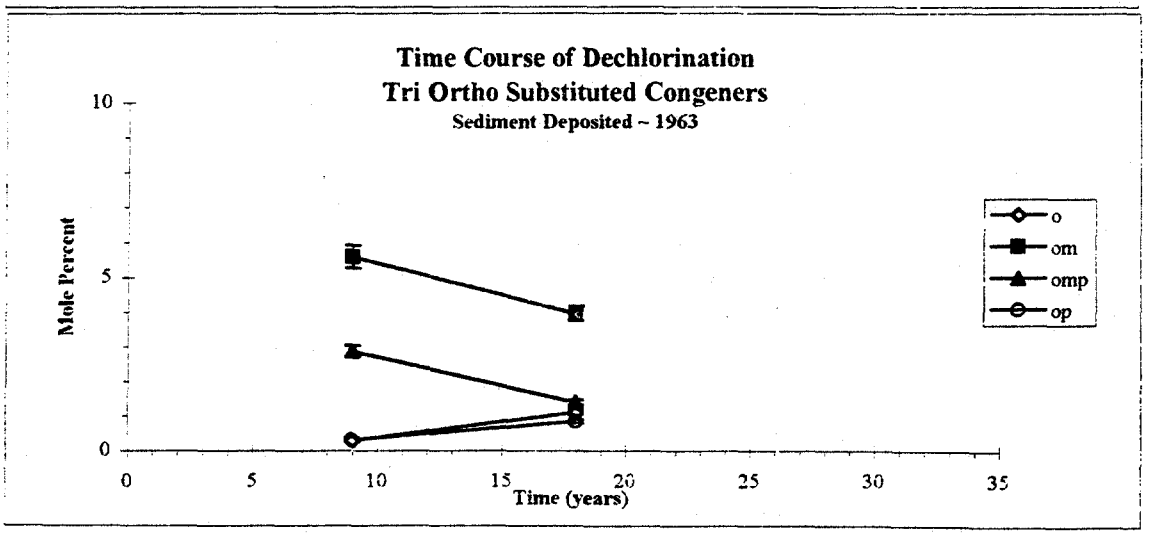
BZ #	Structure	Change (mole percent)	Error (mole percent)
45	2,2',3,6	0.03	0.06
91	2,2',3,4,6	0.04	0.05
53	2,2',5,6'	-0.04	0.02
84	2,2',3,3',6	-0.06	0.06

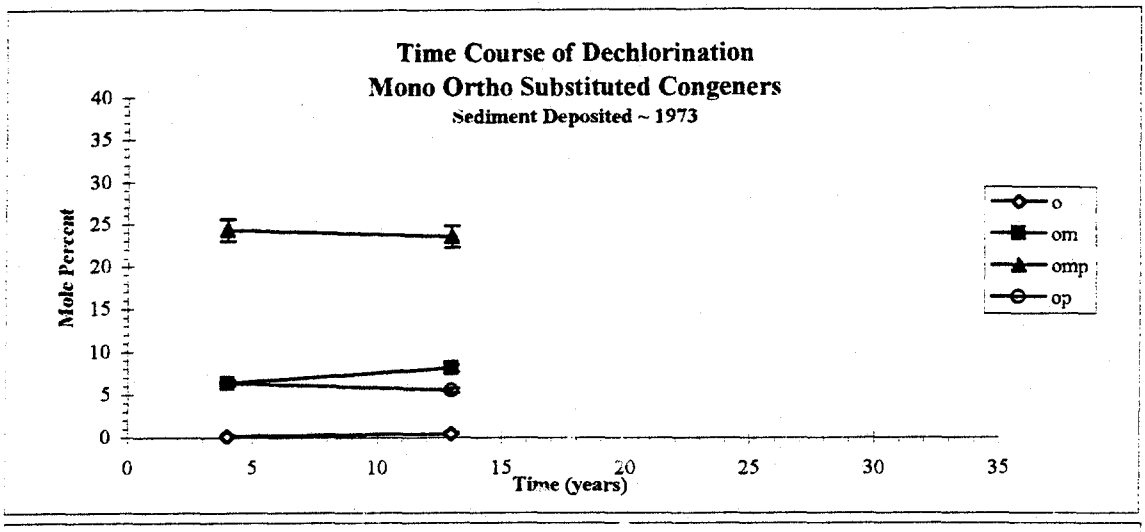
11.0518

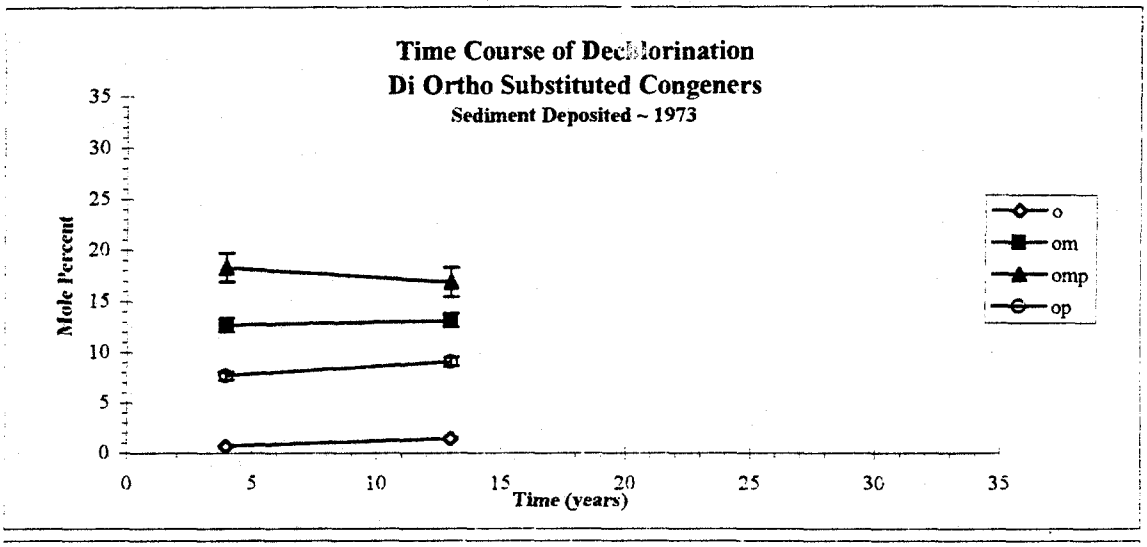
TIME COURSE OF DECHLORINATION

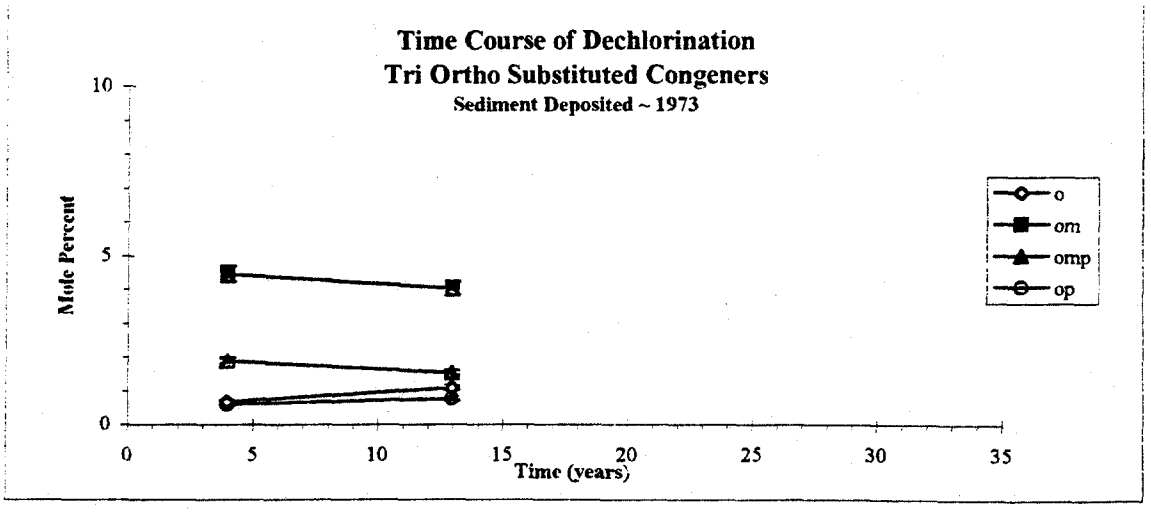

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1963
Mole Percent
Time (years)
o
om
omp
op

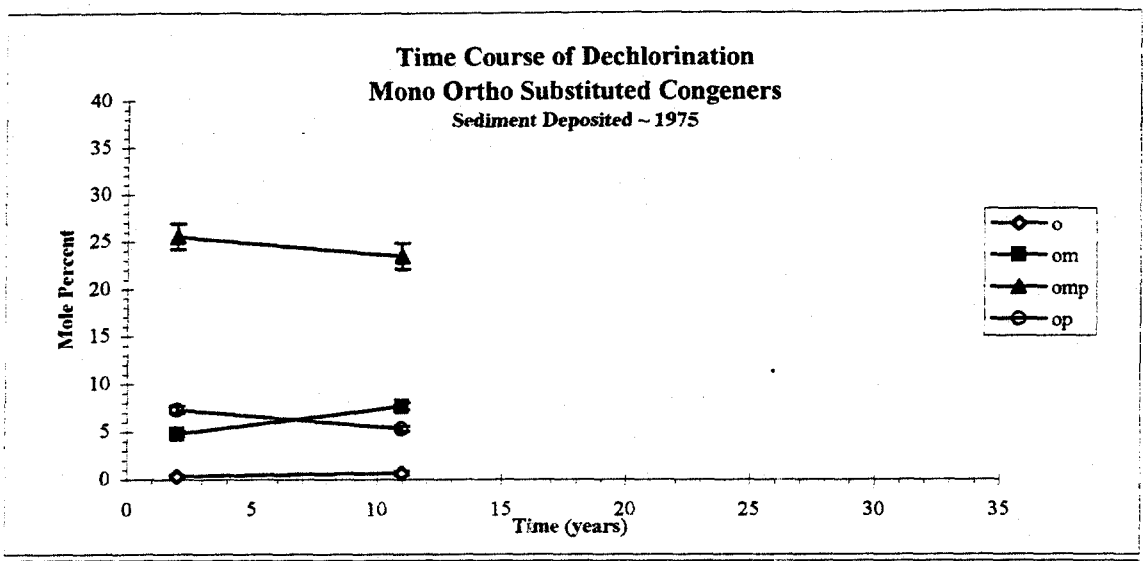

Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1963
Mole Percent
Time (years)
o
om
omp
op

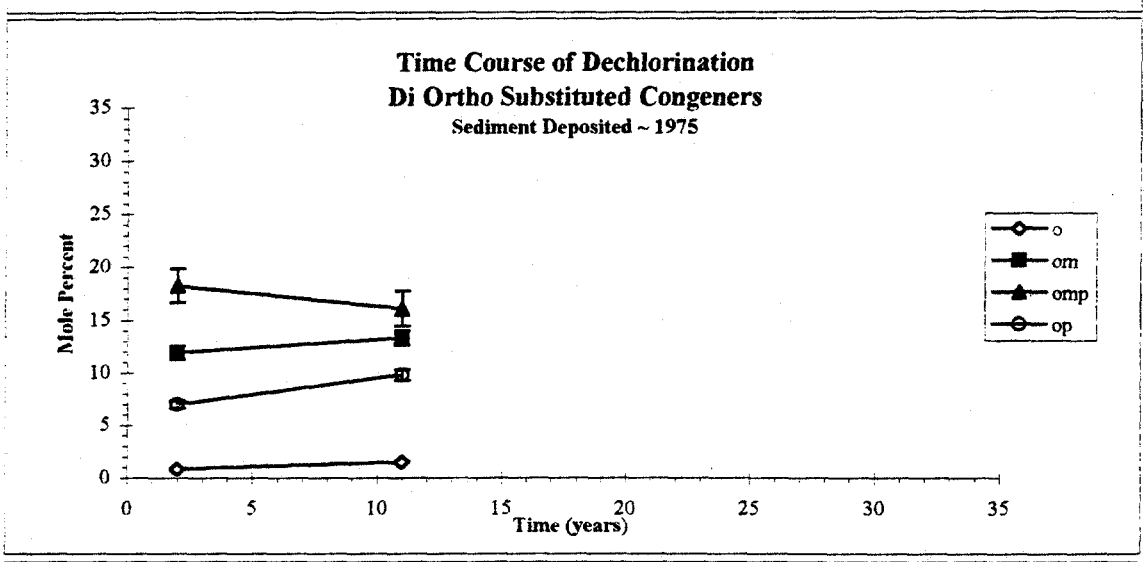

Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1963
Mole Percent
Time (years)
o
om
omp
op

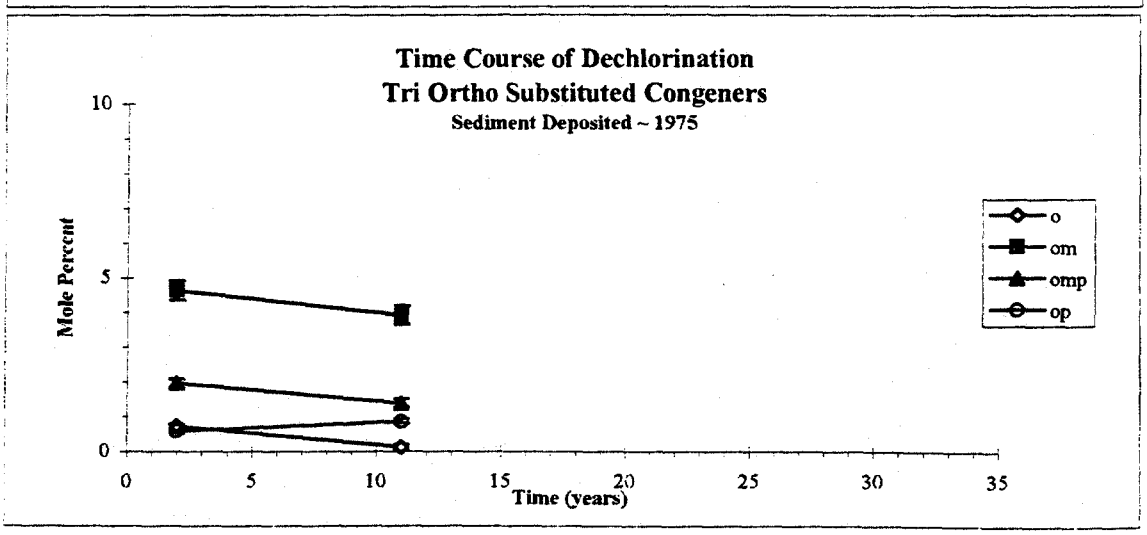

Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1973
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1973
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1973
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Mono Ortho Substituted Congeners
Sediment Deposited ~ 1975
Mole Percent
Time (years)
o
om
omp
op


Time Course of Dechlorination
Di Ortho Substituted Congeners
Sediment Deposited ~ 1975
Mole Percent
Time (years)
o
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omp
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Time Course of Dechlorination
Tri Ortho Substituted Congeners
Sediment Deposited ~ 1975
Mole Percent
Time (years)
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11.0522