# APPENDIX K

# Soil Organic Carbon ($K_{oc}$) / Water ($K_{ow}$) Partition Coefficients

# Table K-1. Values Used for $K_{oc}$ / $K_{ow}$ Correlation

| Chemical | log $K_{ow}$ | Calculated log $K_{oc}$ | Calculated $K_{oc}$ | Measured log $K_{oc}$ | Measured $K_{oc}$ (geomean) |
|---|---|---|---|---|---|
| Benzene | 2.13 | 1.77 | 59 | 1.79 | 61.7 |
| Bromoform | 2.35 | 1.94 | 87 | 2.10 | 126 |
| Carbon tetrachloride | 2.73 | 2.24 | 174 | 2.18 | 152 |
| Chlorobenzene | 2.86 | 2.34 | 219 | 2.35 | 224 |
| Chloroform | 1.92 | 1.60 | 40 | 1.72 | 52.5 |
| Dichlorobenzene, 1,2- *(o)* | 3.43 | 2.79 | 617 | 2.58 | 379 |
| Dichlorobenzene, 1,4- *(p)* | 3.42 | 2.79 | 617 | 2.79 | 616 |
| Dichloroethane, 1,1- | 1.79 | 1.50 | 32 | 1.73 | 53.4 |
| Dichloroethane, 1,2- | 1.47 | 1.24 | 17 | 1.58 | 38.0 |
| Dichloroethylene, 1,1- | 2.13 | 1.77 | 59 | 1.81 | 65 |
| Dichloroethylene, *trans* -1,2- | 2.07 | 1.72 | 52 | 1.58 | 38 |
| Dichloropropane, 1,2- | 1.97 | 1.64 | 44 | 1.67 | 47.0 |
| Dieldrin | 5.37 | 4.33 | 21,380 | 4.41 | 25,546 |
| Endosulfan | 4.10 | 3.33 | 2,138 | 3.31 | 2,040 |
| Endrin | 5.06 | 4.09 | 12,303 | 4.03 | 10,811 |
| Ethylbenzene | 3.14 | 2.56 | 363 | 2.31 | 204 |
| Hexachlorobenzene | 5.89 | 4.74 | 54,954 | 4.90 | 80,000 |
| Methyl bromide | 1.19 | 1.02 | 10 | 0.95 | 9.0 |
| Methyl chloride | 0.91 | 0.80 | 6 | 0.78 | 6.0 |
| Methylene chloride | 1.25 | 1.07 | 12 | 1.00 | 10 |
| Pentachlorobenzene | 5.26 | 4.24 | 17,378 | 4.51 | 32,148 |
| Tetrachloroethane, 1,1,2,2- | 2.39 | 1.97 | 93 | 1.90 | 79.0 |
| Tetrachloroethylene | 2.67 | 2.19 | 155 | 2.42 | 265 |
| Toluene | 2.75 | 2.26 | 182 | 2.15 | 140 |
| Trichlorobenzene, 1,2,4- | 4.01 | 3.25 | 1,778 | 3.22 | 1,659 |
| Trichloroethane, 1,1,1- | 2.48 | 2.04 | 110 | 2.13 | 135 |
| Trichloroethane, 1,1,2- | 2.05 | 1.70 | 50 | 1.88 | 75.0 |
| Trichloroethylene | 2.71 | 2.22 | 166 | 1.97 | 94.3 |
| Xylene, *o*- | 3.13 | 2.56 | 363 | 2.38 | 241 |
| Xylene, *m*- | 3.20 | 2.61 | 407 | 2.29 | 196 |
| Xylene, *p*- | 3.17 | 2.59 | 389 | 2.49 | 311 |

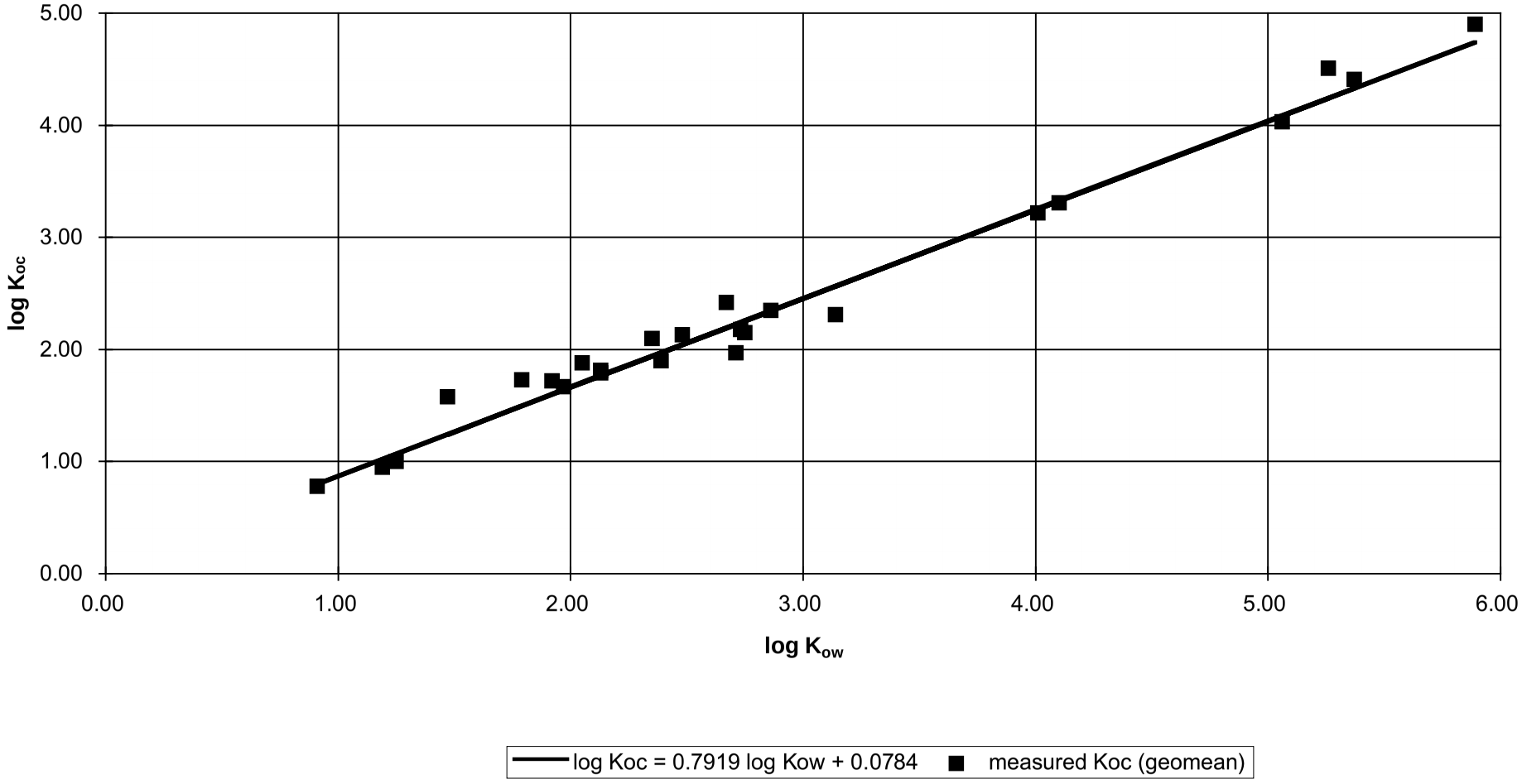
| *Regression Statistics* | |
|---|---|
| Multiple R | 0.9870 |
| R Square | 0.9742 |
| Adjusted R Square | 0.9733 |
| Standard Error | 0.1640 |
| Observations | 31 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1 | 29.4358 | 29.4358 | 1,094 | 1.4032E-24 |
| Residual | 29 | 0.7804 | 0.0269 | | |
| Total | 30 | 30.2161 | | | |

| | *Coefficients* | *Std. Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | 0.0784 | 0.0748 | 1.0481 | 0.3033 | -0.0746 | 0.2314 |
| X Variable 1 | 0.7919 | 0.0239 | 33.0742 | 0.0000 | 0.7430 | 0.8409 |

**Figure K-1. Correlation Plot: log $K_{ow}$ and log $K_{oc}$**



## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Acenaphthene** | 83-32-9 | | | | |
| | | 3,890 | 3.59 | Szabo (1990a) | RP-HPLC on PIHAC (humic acids) |
| | | 6,166 | 3.79 | Szabo (1990a) | RP-HPLC on CIHAC (humic acids) |
| **Average** | | ***5,028*** | 3.70 | | |
| **Geometric Mean** | | ***4,898*** | 3.69 | | |
| **Acetone** | 67-64-1 | | | | |
| **Aldrin** | 309-00-2 | | | | |
| | | 48,394 | 4.68 | Lord et al. (1980) | "Geescroft/Rothamsted Farm" soil; 2.6% OM; pH=5.1; suspect |
| | | 48,978 | 4.69 | Briggs (1981) | Batcombe silt loam (Gr. Br.); 2.05% OC; pH=6.1 |
| **Average** | | ***48,686*** | 4.69 | | |
| **Geometric Mean** | | ***48,685*** | 4.69 | | |
| **Anthracene** | 120-12-7 | | | | |
| | | 14,500 | 4.16 | McCarthy & Jimenez (1985) | humic acids |
| | | 15,849 | 4.20 | Karichkoff (1981) | soil/sediments average; shake-flask UV |
| | | 19,562 | 4.29 | Landrum et al. (1984) | surface water (geomean 5 values) |
| | | 23,988 | 4.38 | Hodson & Williams (1988) | cyanopropyl column; HPLC |
| | | 26,000 | 4.41 | Karickhoff et al. (1979) | avg. coarse silt fraction, Doe Run & Hickory Hill sediments |
| | | 26,303 | 4.42 | Szabo et al. (1990a) | RP-HPLC on PIHAC (humic acids) |
| | | 27,840 | 4.44 | Abdul & Gibson (1986) | Flint aquifer sample; 87% sand; foc = 0.0187 |
| | | 31,329 | 4.50 | Landrum et al. (1984) | humic acid (geomean 8 values) |
| | | 33,884 | 4.53 | Szabo et al. (1990a) | RP-HPLC on CIHAC (humic acids) |
| **Average** | | ***24,362*** | 4.39 | | |
| **Geometric Mean** | | ***23,493*** | 4.37 | | |
| **Benz(α)anthracene** | 56-55-3 | | | | |
| | | 150,000 | 5.18 | McCarthy & Jimenez (1985) | humic acid |
| | | 199,526 | 5.30 | Landrum et al. (1984) | humic acid |
| | | 650,000 | 5.81 | Karickhoff et al. (1979) | avg. coarse silt fraction, Doe Run & Hickory Hill seds. |
| | | 840,000 | 5.92 | Smith et al. (1978) as cited in Di Toro et al. (1985) | 40% OC |
| **Average** | | ***459,882*** | 5.66 | | |
| **Geometric Mean** | | ***357,537*** | 5.55 | | |
| **Benzene** | 71-43-2 | | | | |
| | | 31 | 1.50 | Chiou et al. (1983) | Woodburn silt loam; fom = 0.019; 21% clay |
| | | 38.2 | 1.58 | Seip et al. (1986) | forest soil with 0.2% OC; column study |
| | | 43.5 | 1.64 | Seip et al. (1986) | agricultural soil with 2.2% OC; column study |
| | | 49 | 1.69 | Abdul et al. (1987) | batch equilibrium experiments; aquifer material; foc = 0.0105 |
| | | 53.5 | 1.73 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| | | 60 | 1.78 | Karickhoff (1981) | soils/sediments average; shake flask UV |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Benzene** | 71-43-2 | | | | |
| (continued) | | 63 | 1.80 | Piwoni & Banerjee (1989) | 0.19 percent organic carbon |
| | | 66 | 1.82 | Szabo et al. (1990a) | RP-HPLC on PIHAC (humic acids) |
| | | 74 | 1.87 | Szabo et al. (1990a) | RP-HPLC on CIHAC (humic acids) |
| | | 83 | 1.92 | Karickhoff et al. (1979) | avg. coarse silt fraction, Doe Run & Hickory Hill seds. |
| | | 92 | 1.97 | Rogers et al. (1980) | Hastings silty clay loam with 2.6% OC |
| | | 98 | 1.99 | Pavlou (1987) as cited in Mackay et al. (1992) | |
| | | 100 | 2.00 | Rogers et al. (1980) | Overton silty clay loam with 1.8% OC |
| **Average** | | ***66*** | 1.82 | | |
| **Geometric Mean** | | ***62*** | 1.79 | | |
| | | | | | |
| **Benzo(*a* )pyrene** | 50-32-8 | | | | |
| | | 478,947 | 5.68 | Smith et al. (1978) as cited in Di Toro (1985) | 3.8% OC |
| | | 891,251 | 5.95 | Landrum et al. (1984) | humic acids |
| | | 2,130,000 | 6.33 | McCarthy & Jimenez (1985) | humic acids (average 8 values) |
| **Average** | | ***1,166,733*** | 6.07 | | |
| **Geometric Mean** | | ***968,774*** | 5.99 | | |
| | | | | | |
| **Benzo(*b* )fluoranthene** | 205-99-2 | | | | |
| | | | | | |
| **Benzo(*k* )fluoranthene** | 207-08-9 | | | | |
| | | | | | |
| **Bis(2-chlorethyl)ether** | 111-44-4 | | | | |
| | | 75.9 | 1.88 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| **Average** | | ***76*** | 1.88 | | |
| **Geometric Mean** | | ***76*** | 1.88 | | |
| | | | | | |
| **Bis(2-ethylhexyl)phthalate** | 117-81-7 | | | | |
| (Bis(2-ethylhexyl)ester) | | 87,420 | 4.94 | Russell & McDuffie (1986) | Broome Co., NY, composite soil; 1.59% OC; column study |
| | | 141,254 | 5.15 | Carter & Suffet (1983) | measured change in sorption in presence of humic acids |
| **Average** | | ***114,337*** | 5.06 | | |
| **Geometric Mean** | | ***111,123*** | 5.05 | | |
| | | | | | |
| **Bromodichloromethane** | 75-27-4 | | | | |
| | | | | | |
| **Bromoform** | 75-25-2 | | | | |
| (Tribromomethane) | | 126 | 2.10 | Hutzler et al. (1986) | column, Keweenaw 7 soil; 0.85% OC |
| **Average** | | ***126*** | 2.10 | | |
| **Geometric Mean** | | ***126*** | 2.10 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Butyl benzyl phthalate** | 85-68-7 | | | | |
| | | 16,981 | 4.23 | Russell & McDuffie (1986) | Broome County, NY, composite soil with 1.59% OC; column |
| | | 11,128 | 4.05 | Gledhill (1980) | 3 soils; 1.2-3.4% OC - geomean value calculated from range |
| **Average** | | ***14,055*** | 4.15 | | |
| **Geometric Mean** | | ***13,746*** | 4.14 | | |
| **Carbazole** | 86-74-8 | | | | |
| **Carbon disulfide** | 75-15-0 | | | | |
| **Carbon tetrachloride** | 56-23-5 | | | | |
| | | 123 | 2.09 | Koch (1983) | sorption coefficient (assume Kom) from unpublished source |
| | | 127 | 2.10 | Rutherford et al. (1992) | extracted peat; 64% OC |
| | | 224 | 2.35 | Abdul et al. (1987) | from MS thesis |
| **Average** | | ***158*** | 2.20 | | |
| **Geometric Mean** | | ***152*** | 2.18 | | |
| **Chlordane** | 57-74-9 | | | | |
| | | 44,711 | 4.65 | Johnson-Logan et al. (1992) | geologic material, N. Hollywood dump (avg. 14 values) |
| | | 58,884 | 4.77 | Chin & Weber (1989) | humic acid polymers |
| **Average** | | ***51,798*** | 4.71 | | |
| **Geometric Mean** | | ***51,310*** | 4.71 | | |
| **Chlorobenzene** | 108-90-7 | | | | |
| | | 83 | 1.92 | Chiou et al. (1983) | Woodburn silt loam; fom = 0.019; 21% clay |
| | | 117 | 2.07 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 164 | 2.22 | Schwarzenbach & Westall (1981) | KS1 collected from field site location; foc = 0.0073 |
| | | 200 | 2.30 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not given |
| | | 219 | 2.34 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not given |
| | | 260 | 2.41 | Schwarzenbach & Westall (1981) | average of six measurements;foc = 0.0015 |
| | | 389 | 2.59 | Roberts et al. (1980) | calculated from field data assuming foc = 0.0099 |
| | | 407 | 2.61 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not given |
| | | 500 | 2.70 | Schwarzenbach & Westall (1981) | field sample; 0.08% OC |
| **Average** | | ***260*** | 2.41 | | |
| **Geometric Mean** | | ***224*** | 2.35 | | |
| **Chlorodibromomethane** | 124-48-1 | | | | |
| **Chloroform** | 67-66-3 | | | | |
| | | 28 | 1.44 | Grathwohl (1990) | 20 C; soil, sand & loess |
| | | 40 | 1.60 | Hutzler et al. (1983) | average of two soils |
| | | 76 | 1.88 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 59 | 1.77 | Loch et al. (1986) | top 20 cm, Eerd soil; 4.06% OC (from unpublished work) |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Chloroform** | 67-66-3 | | | | |
| (continued) | | 81 | 1.91 | Loch et al. (1986) | top 20 cm, peat soil ; 11.6% OC (from unpublished work) |
| **Average** | | ***57*** | 1.75 | | |
| **Geometric Mean** | | ***53*** | 1.72 | | |
| | | | | | |
| **Chrysene** | 218-01-9 | | | | |
| | | | | | |
| **DDD** | 72-54-8 | | | | |
| | | 45,800 | 4.66 | Gustafson (1989) | average value from collected measured values |
| **Average** | | ***45,800*** | 4.66 | | |
| **Geometric Mean** | | ***45,800*** | 4.66 | | |
| | | | | | |
| **DDE** | 72-55-9 | | | | |
| | | 86,405 | 4.94 | Koch (1983) | sorption coefficient (assume Kom) from unpublished source |
| **Average** | | ***86,405*** | 4.94 | | |
| **Geometric Mean** | | ***86,405*** | 4.94 | | |
| | | | | | |
| **DDT** | 50-29-3 | | | | |
| | | 285,467 | 5.46 | Gerstl & Mingelgrin (1984) | Malkiya soil; 5.82% OM |
| | | 496,476 | 5.70 | Gerstl & Mingelgrin (1984) | Neve Yaar soil; 2.82% OM |
| | | 589,537 | 5.77 | Gerstl & Mingelgrin (1984) | Kinneret G sediment; 4.39% OM |
| | | 747,887 | 5.87 | Gerstl & Mingelgrin (1984) | Kinneret A sediment; 7.85% OM |
| | | 892,067 | 5.95 | Gerstl & Mingelgrin (1984) | Gilat soil; 1.25% OM |
| | | 1,741,516 | 6.24 | Gerstl & Mingelgrin (1984) | Mivtahim soil; 0.45% OM |
| **Average** | | ***792,158*** | 5.90 | | |
| **Geometric Mean** | | ***677,934*** | 5.83 | | |
| | | | | | |
| **Dibenz(*a,h* )anthracene** | 53-70-3 | | | | |
| | | 565,014 | 5.75 | Means et al. (1980); Hasset et al. (1980) | IL soil; 1.30% OC (EPA-20) |
| | | 805,292 | 5.91 | Means et al. (1980); Hasset et al. (1980) | ND sediment; 2.28% OC (EPA-5) |
| | | 808,991 | 5.91 | Means et al. (1980); Hasset et al. (1980) | IL sediment; 2.38% OC (EPA-23) |
| | | 1,172,847 | 6.07 | Means et al. (1980); Hasset et al. (1980) | IA sediment; 0.15% OC (EPA-8) |
| | | 1,690,971 | 6.23 | Means et al. (1980); Hasset et al. (1980) | GA sediment; 1.21% OC (EPA-B2) |
| | | 1,687,404 | 6.23 | Means et al. (1980); Hasset et al. (1980) | MO sediment; 2.07% OC (EPA-4) |
| | | 2,277,875 | 6.36 | Means et al. (1980); Hasset et al. (1980) | IA loess; 0.11% OC (EPA-9) |
| | | 2,383,765 | 6.38 | Means et al. (1980); Hasset et al. (1980) | IL sediment; 1.67% OC (EPA-22) |
| | | 2,622,453 | 6.42 | Means et al. (1980); Hasset et al. (1980) | SD sediment; 0.72% OC (EPA-6) |
| | | 2,663,317 | 6.43 | Means et al. (1980); Hasset et al. (1980) | IN sediment; 0.95% OC (EPA-15) |
| | | 2,691,870 | 6.43 | Means et al. (1980); Hasset et al. (1980) | IL sediment; 1.48% OC (EPA-26) |
| | | 2,962,603 | 6.47 | Means et al. (1980); Hasset et al. (1980) | IL sediment; 1.88% OC (EPA-21) |
| | | 3,020,262 | 6.48 | Means et al. (1980); Hasset et al. (1980) | WV soil; 0.48% OC (EPA-14) |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Dibenz(*a,h* )anthracene** | 53-70-3 | | | | |
| (continued) | | 3,059,425 | 6.49 | Means et al. (1980); Hasset et al. (1980) | KY sediment; 0.66% OC (EPA-18) |
| **Average** | | ***2,029,435*** | 6.31 | | |
| **Geometric Mean** | | ***1,789,101*** | 6.25 | | |
| | | | | | |
| **1,2-Dichlorobenzene (*o* )** | 95-50-1 | | | | |
| | | 267 | 2.43 | Lee et al. (1989) | untreated Marlette soil, B+ horizon; 0.3% OC |
| | | 280 | 2.45 | Lee et al. (1989) | untreated Marlette soil, A horizon; 2.59% OC |
| | | 310 | 2.49 | Chiou et al. (1979) | Willamette silt loam; 0.928% OC; 3.5 degrees Celsius |
| | | 321 | 2.51 | Chiou et al. (1983) | Woodburn silt loam; 1.9% OM; 9% sand; 68% silt; 21% clay |
| | | 386 | 2.59 | Stauffer & MacIntyre (1986) | Appalachee sorbent; 1.4% OC; pH = 6.3 |
| | | 438 | 2.64 | Stauffer & MacIntyre (1986) | Appalachee sorbent; 1.4% OC; pH = 4.1 |
| | | 485 | 2.69 | Friesel et al. (1984) | peaty soil; 29% OM |
| | | 497 | 2.70 | Piwoni & Banerjee (1989) | sediment, 0.19% OC; avg. 2 values |
| | | 529 | 2.72 | Friesel et al. (1984) | foc reported as a range; avg. of several exper. |
| **Average** | | ***390*** | 2.59 | | |
| **Geometric Mean** | | ***379*** | 2.58 | | |
| | | | | | |
| **1,4-Dichlorobenzene (*p* )** | 106-46-7 | | | | |
| | | 273 | 2.44 | Chiou et al. (1983) | Woodburn silt loam; fom = 0.019; 21% clay |
| | | 280 | 2.45 | Southworth & Keller (1986) | Dormont soil with 1.2% OC; 60% clay |
| | | 300 | 2.48 | Hutzler et al. (1983) | column; Grayling soil; 1.52% OC; B21 horizon |
| | | 398 | 2.60 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 429 | 2.63 | Friesel et al. (1984) | reported as Kom; foc given as a range |
| | | 603 | 2.78 | Schwarzenbach & Westall (1981) | KS1 field sample; 0.73% OC |
| | | 665 | 2.82 | Southworth & Keller (1986) | Apison soil with 0.11% OC; 86% clay |
| | | 700 | 2.85 | Hutzler et al. (1983) | batch; average of five soils |
| | | 724 | 2.86 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not provided |
| | | 733 | 2.87 | Schwarzenbach & Westall (1981) | average of six measurements; aquifer material; foc = 0.0015 |
| | | 832 | 2.92 | Chin & Weber (1989) | humic acid polymers |
| | | 850 | 2.93 | Southworth & Keller (1986) | Fullerton soil with 0.06% OC |
| | | 911 | 2.96 | Loch et al. (1986) | top 20 cm of Eerd soil; 0.06% OC; column |
| | | 1,024 | 3.01 | Wu & Gschwend (1986) | Charles River sediment; 8.5% OC |
| | | 1,259 | 3.10 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not provided |
| | | 1,375 | 3.14 | Schwarzenbach & Westall (1981) | field sample; 0.08% OC |
| **Average** | | ***687*** | 2.84 | | |
| **Geometric Mean** | | ***616*** | 2.79 | | |
| | | | | | |
| **3,3-Dichlorobenzidine** | 91-94-1 | | | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **1,1-Dichloroethane** | 75-34-3 | | | | |
| | | 46 | 1.66 | Jury et al. (1990) | soil; selected |
| | | 62 | 1.79 | Roy et al. (1987) | computed from an isotherm; 4.04% OC |
| **Average** | | ***54*** | 1.73 | | |
| **Geometric Mean** | | ***53*** | 1.73 | | |
| **1,2-Dichloroethane** | 107-06-2 | | | | |
| | | 22 | 1.34 | Jury et al. (1990) | soil; selected |
| | | 33 | 1.52 | Chiou et al. (1979) | Willamette silt loam; 0.928% OC; 20 degrees Celsius |
| | | 76 | 1.88 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| **Average** | | ***44*** | 1.64 | | |
| **Geometric Mean** | | ***38*** | 1.58 | | |
| **1,1-Dichloroethylene** | 75-35-4 | | | | |
| | | 65 | 1.81 | Schwille (1988) (secondary) | |
| **Average** | | ***65*** | 1.81 | | |
| **Geometric Mean** | | ***65*** | 1.81 | | |
| ***cis* -1,2-Dichloroethylene** | 156-59-2 | | | | |
| ***trans* -1,2-Dichloroethylene** | 156-60-5 | | | | |
| | | 38 | 1.58 | Brusseau & Rao (1991) | Tampa sandy aquifer material; 0.13% OC; < 2mm |
| **Average** | | ***38*** | 1.58 | | |
| **Geometric Mean** | | ***38*** | 1.58 | | |
| **1,2-Dichloropropane** | 78-87-5 | | | | |
| | | 47 | 1.67 | Chiou et al. (1979) | Willamette silt loam; 0.928% OC; 20 degrees Celsius |
| **Average** | | ***47*** | 1.67 | | |
| **Geometric Mean** | | ***47*** | 1.67 | | |
| **1,3-Dichloropropene** | 542-75-6 | | | | |
| | | 24 | 1.38 | Leistra (1970) | cis- , avg. 3 soils; computed from vapor phase sorption |
| | | 26 | 1.41 | Leistra (1970) | trans- , avg. 3 soils; computed from vapor phase sorption |
| | | 32 | 1.51 | Wauchope et al. (1992) | trans-, personal comm. (unpublished source, Dow Chemical) |
| **Average** | | ***27*** | 1.44 | | |
| **Geometric Mean** | | ***27*** | 1.43 | | |
| **Dieldrin** | 60-57-1 | | | | |
| | | 23,308 | 4.37 | Sharom et al. (1980) | Beverly sandy loam; 2.5% OM |
| | | 26,106 | 4.42 | Sharom et al. (1980) | Plainfield sand; 0.7% OM |
| | | 27,399 | 4.44 | Sharom et al. (1980) | Big Creek sediment; 2.8% OM |
| **Average** | | ***25,604*** | 4.41 | | |
| **Geometric Mean** | | ***25,546*** | 4.41 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Diethyl phthalate** | 84-66-2 | | | | |
| | | 69 | 1.84 | Russell & McDuffie (1986) | Broome County, NY, composite soil with 1.59% OC; column |
| | | 98 | 1.99 | Russell & McDuffie (1986) | Conklin, NY, sand; 0.26% OC; column; avg. 4 values |
| **Average** | | ***84*** | 1.92 | | |
| **Geometric Mean** | | ***82*** | 1.92 | | |
| | | | | | |
| **Dimethyl phthalate** | 131-11-3 | | | | |
| | | 7.6 | 0.88 | Seip et al. (1986) | forest soil with 0.2% OC; column study |
| | | 42.8 | 1.63 | Seip et al. (1986) | agricultural soil with 2.2% OC; column study |
| | | 72.7 | 1.86 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| **Average** | | ***41*** | 1.61 | | |
| **Geometric Mean** | | ***29*** | 1.46 | | |
| | | | | | |
| **Di-*n* -butyl phthalate** | 84-74-2 | | | | |
| | | 1,384 | 3.14 | Russell & McDuffie (1986) | Broome County, NY, composite soil with 1.59% OC; column |
| | | 1,775 | 3.25 | Russell & McDuffie (1986) | Conklin, NY, sand; 0.26% OC; adsorp.; avg. 4 values; column |
| **Average** | | ***1,580*** | 3.20 | | |
| **Geometric Mean** | | ***1,567*** | 3.20 | | |
| | | | | | |
| **2,4-Dinitrotoluene** | 121-14-2 | | | | |
| | | | | | |
| **2,6-Dinitrotoluene** | 606-20-2 | | | | |
| | | | | | |
| **Di-*n* -octyl phthalate** | 117-84-0 | | | | |
| | | | | | |
| **Endosulfan** | 115-29-7 | | | | |
| | | 2,040 | 3.31 | Gustafson (1989) | average value from collected measured values |
| **Average** | | ***2,040*** | 3.31 | | |
| **Geometric Mean** | | ***2,040*** | 3.31 | | |
| | | | | | |
| **Endrin** | 72-20-8 | | | | |
| | | 7,724 | 3.89 | Sharom et al. (1980) | Beverly sandy loam; 2.5% OM |
| | | 7,793 | 3.89 | Sharom et al. (1980) | organic soil; 75.3% OM |
| | | 14,285 | 4.15 | Sharom et al. (1980) | Plainfield sand; 0.7% OM |
| | | 15,885 | 4.20 | Sharom et al. (1980) | Big Creek sediment; 2.8% OM |
| **Average** | | ***11,422*** | 4.06 | | |
| **Geometric Mean** | | ***10,811*** | 4.03 | | |
| | | | | | |
| **Ethylbenzene** | 100-41-4 | | | | |
| | | 165 | 2.22 | Chiou et al. (1983) | Woodburn silt loam; fom = 0.019; 21% clay |
| | | 184 | 2.27 | Lee et al. (1989) | untreated St. Clair soil; 0.44% OC; 44% clay; B+ horizon |
| | | 191 | 2.28 | Lee et al. (1989) | untreated Oshtemo soil; 0.11% OC; 6.3% clay; B+ horizon |
| | | 240 | 2.38 | Hodson & Williams (1988) | HPLC; cyanopropyl column |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Ethylbenzene** | 100-41-4 | | | | |
| (continued) | | 255 | 2.41 | Vowles & Mantoura (1987) | Tamar estuary sediment; 4.02% OC; 0.2% synth. sea salt |
| **Average** | | ***207*** | 2.32 | | |
| **Geometric Mean** | | ***204*** | 2.31 | | |
| | | | | | |
| **Fluoranthene** | 206-44-0 | | | | |
| | | 41,687 | 4.62 | Szabo et al. (1990a) | RP & HPLC on PIHAC (humic acids) |
| | | 51,658 | 4.71 | Abdul & Gibson (1986) | Flint aquifer sample; 87% sand; foc = 0.0187 |
| | | 54,954 | 4.74 | Szabo et al. (1990a) | RP & HPLC on CIHAC (humic acids) |
| **Average** | | ***49,433*** | 4.69 | | |
| **Geometric Mean** | | ***49,096*** | 4.69 | | |
| | | | | | |
| **Fluorene** | 86-73-7 | | | | |
| | | 3,989 | 3.60 | Abdul et al. (1986) | Borden aquifer material (avg. 2 values, foc = 0.0091,0.0121) |
| | | 4,615 | 3.66 | Abdul et al. (1986) | Flint aquifer material (avg. 8 values) |
| | | 5,576 | 3.75 | Abdul et al. (1986) | Warren aquifer material (avg. 8 values) |
| | | 8,913 | 3.95 | Carter & Suffet (1983) | humic materials (DOC) |
| | | 14,125 | 4.15 | Szabo et al. (1990a) | RP-HPLC on CIHAC (humic acids) |
| | | 16,218 | 4.21 | Szabo et al. (1990a) | RP-HPLC on PIHAC (humic acids) |
| **Average** | | ***8,906*** | 3.95 | | |
| **Geometric Mean** | | ***7,707*** | 3.89 | | |
| | | | | | |
| **Heptachlor** | 76-44-8 | | | | |
| | | 6,810 | 3.83 | Jury et al. (1990) | selected |
| | | 13,330 | 4.12 | Gustafson (1989) | average value from collected measured values |
| **Average** | | ***10,070*** | 4.00 | | |
| **Geometric Mean** | | ***9,528*** | 3.98 | | |
| | | | | | |
| **Heptachlor epoxide** | 1024-57-3 | | | | |
| | | | | | |
| **Hexachlorobenzene** | 118-74-1 | | | | |
| | | 80,000 | 4.90 | Karickhoff & Morris (1985a) | GA sediments; 0.5-1.5% OC |
| **Average** | | ***80,000*** | 4.90 | | |
| **Geometric Mean** | | ***80,000*** | 4.90 | | |
| | | | | | |
| **Hexachloro-1,3-butadiene** | 87-68-3 | | | | |
| | | | | | |
| **α-Hexachlorocyclohexane** | 319-84-6 | | | | |
| (alpha-BHC) | | 1,022 | 3.01 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.62% OM |
| | | 1,253 | 3.10 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.27% OM |
| | | 1,330 | 3.12 | Wahid & Sethunathan (1979) | single measurement; Kari soil; 24.6% OM |
| | | 1,386 | 3.14 | Wahid & Sethunathan (1979) | single measurement; sandy soil; 12.6% OM |
| | | 1,532 | 3.19 | Wahid & Sethunathan (1979) | single measurement; alluvial soil; 0.75% OM |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **α-Hexachlorocyclohexane** | 319-84-6 | | | | |
| (continued) | | 2,004 | 3.30 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 2.88% OM |
| | | 2,024 | 3.31 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.00% OM |
| | | 2,090 | 3.32 | Wahid & Sethunathan (1979) | single measurement; Pokkali soil; 5.52% OM |
| | | 2,123 | 3.33 | Wahid & Sethunathan (1979) | single measurement; Kari soil; 8.21% OM |
| | | 2,168 | 3.34 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 0.60% OM |
| | | 2,200 | 3.34 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 0.92% OM |
| | | 2,891 | 3.46 | Wahid & Sethunathan (1979) | single measurement; alluvial soil; 0.70% OM |
| **Average** | | ***1,835*** | 3.26 | | |
| **Geometric Mean** | | ***1,762*** | 3.25 | | |
| | | | | | |
| **β-Hexachlorocyclohexane** | 319-85-7 | | | | |
| (beta-BHC) | | 1,156 | 3.06 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.27% OM |
| | | 1,470 | 3.17 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.62% OM |
| | | 1,681 | 3.23 | Wahid & Sethunathan (1979) | single measurement; Kari soil; 24.6% OM |
| | | 1,794 | 3.25 | Mills & Biggar (1969b) | Venado clay; 3.5% OC; 50% montmorillonite; 20° C; 1/n=0.861 |
| | | 1,821 | 3.26 | Wahid & Sethunathan (1979) | single measurement; sandy soil; 12.6% OM |
| | | 1,868 | 3.27 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.00% OM |
| | | 1,958 | 3.29 | Wahid & Sethunathan (1979) | single measurement; alluvial soil; 0.75% OM |
| | | 2,098 | 3.32 | Wahid & Sethunathan (1979) | single measurement; alluvial soil; 0.70% OM |
| | | 2,415 | 3.38 | Wahid & Sethunathan (1979) | single measurement; Kari soil; 8.21% OM |
| | | 2,548 | 3.41 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 0.60% OM |
| | | 2,697 | 3.43 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 0.92% OM |
| | | 3,143 | 3.50 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 2.88% OM |
| | | 3,158 | 3.50 | Wahid & Sethunathan (1979) | single measurement; Pokkali soil; 5.52% OM |
| | | 3,563 | 3.55 | Mills & Biggar (1969b) | Staten peaty muck, 12.8% OC; 20° C; 1/n = 0.950 |
| **Average** | | ***2,241*** | 3.35 | | |
| **Geometric Mean** | | ***2,139*** | 3.33 | | |
| | | | | | |
| **γ-Hexachlorocyclohexane** | 58-89-9 | | | | |
| (Lindane) | | 731 | 2.86 | Adams & Li (1971) | Svea sil, A horizon ; foc = 0.031 |
| | | 735 | 2.87 | McCall et al. (1980) | average for three soils, 0.68-2.01% OC |
| | | 757 | 2.88 | Huggenberger et al. (1972) | Gila silt loam; foc = 0.0038; coulmn study |
| | | 760 | 2.88 | Kishi et al. (1990) | clay loam (allophane); soil pH = 4.89; foc = 0.104 |
| | | 760 | 2.88 | Wahid & Sethunathan (1980) | latertic soil; 2.88% OM; 1:1 |
| | | 764 | 2.88 | Adams & Li (1971) | Hegne sic, A horizon ; foc = 0.043 |
| | | 764 | 2.88 | Adams & Li (1971) | Hegne sic, B horizon ; foc = 0.006 |
| | | 769 | 2.89 | Adams & Li (1971) | Fargo sic, A horizon ; foc = 0.052 |
| | | 812 | 2.91 | Adams & Li (1971) | Hubbard ls, A horizon ; foc = 0.012 |
| | | 814 | 2.91 | Adams & Li (1971) | Ontonagon c, A horizon ; foc = 0.035 |
| | | 826 | 2.92 | Adams & Li (1971) | Milaca sl, A horizon ; foc = 0.017 |
| | | 852 | 2.93 | Mills & Biggar (1969a) | 1.1% OC; Ca Columbia silt loam |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **γ-Hexachlorocyclohexane** | 58-89-9 | | | | |
| (continued) | | 855 | 2.93 | Adams & Li (1971) | Kranzburg sicl, B horizon ; foc = 0.01 |
| | | 878 | 2.94 | Adams & Li (1971) | Svea sil, B horizon ; foc = 0.008 |
| | | 960 | 2.98 | Kishi et al. (1990) | sandy loam (allophane); soil pH = 5.41; foc = 0.0791 |
| | | 968 | 2.99 | Kay & Elrick (1967) | Muck (38% OC) |
| | | 985 | 2.99 | Adams & Li (1971) | Fayette sil, A horizon ; foc = 0.023 |
| | | 986 | 2.99 | Kay & Elrick (1967) | Honeywood loam (2.1% OC) |
| | | 1,005 | 3.00 | Adams & Li (1971) | Canisteo cl, B horizon ; foc = 0.006 |
| | | 1,010 | 3.00 | Rippen et al. (1982) | Alfisol; Udalf, Para brown earth; 0.76% OC; soil pH = 7.45 |
| | | 1,030 | 3.01 | Kay & Elrick (1967) | Fox loamy sand (1.7% OC) |
| | | 1,079 | 3.03 | Adams & Li (1971) | Lester fsl, A horizon ; foc = 0.023 |
| | | 1,103 | 3.04 | Huggenberger et al. (1972) | Pachappa sandy loam; foc = 0.005 |
| | | 1,103 | 3.04 | Sharom et al. (1980) | Beverly sand loam; 2.5% OM |
| | | 1,109 | 3.04 | Wahid & Sethunathan (1979) | single measurement; sandy soil; 12.6% OC |
| | | 1,125 | 3.05 | Adams & Li (1971) | Zimmerman s, A horizon ; foc = 0.007 |
| | | 1,130 | 3.05 | Huggenberger et al. (1972) | Kentwood sandy loam; foc = 0.0093 |
| | | 1,200 | 3.08 | Kishi et al. (1990) | light clay (montmorillonite - illite); pH = 5.26; foc = 0.0323 |
| | | 1,204 | 3.08 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.27% OM |
| | | 1,227 | 3.09 | Kay & Elrick (1967) | Brookstone sandy loam (1.9% OC) |
| | | 1,263 | 3.10 | Adams & Li (1971) | Brainerd fsl, A horizon ; foc = 0.026 |
| | | 1,274 | 3.11 | Adams & Li (1971) | Bearden sil, B horizon ; foc = 0.002 |
| | | 1,300 | 3.11 | Kishi et al. (1990) | light clay (montmorillonite); soil pH = 5.18; foc = 0.0151 |
| | | 1,300 | 3.11 | McCall et al. (1983) | Not stated if these are original data |
| | | 1,318 | 3.12 | Miller & Weber (1986) | Ann Arbor soil; 1.14% OC |
| | | 1,322 | 3.12 | Moreale & van Bladel (1978) | Lubbeek II soil; 0.53% OC; 10% clay |
| | | 1,335 | 3.13 | Moreale & van Bladel (1978) | Lubbeek I soil; 0.07% OC; 2% clay |
| | | 1,452 | 3.16 | Mills & Biggar (1969a) | 3.1% OC; Ca Venado clay |
| | | 1,455 | 3.16 | Adams & Li (1971) | Brainerd sl, B horizon ; foc = 0.001 |
| | | 1,458 | 3.16 | Miller & Weber (1986) | Delta soil; 0.12% TOC |
| | | 1,478 | 3.17 | Sharom et al. (1980) | Big Creek sediment; 2.8% OM |
| | | 1,525 | 3.18 | Wahid & Sethunathan (1978) | Pokkali soil; 5.52% OM; 1:10; 5 min eq. |
| | | 1,580 | 3.20 | Wahid & Sethunathan (1980) | Pokkali soil; 5.52% OM; 1:1 |
| | | 1,681 | 3.23 | Wahid & Sethunathan (1979) | single measurement; Kari soil; 24.6% OM |
| | | 1,724 | 3.24 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.00% OM |
| | | 1,830 | 3.26 | Adams & Li (1971) | Blue Earth sil, A horizon ; foc = 0.11 |
| | | 1,859 | 3.27 | Caron et al. (1985) | Powerville sediment (NJ); 2-4% OC |
| | | 1,896 | 3.28 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 2.88% OM |
| | | 1,935 | 3.29 | Wahid & Sethunathan (1979) | single measurement; alluvial soil; 0.70% OM |
| | | 1,970 | 3.29 | Sharom et al. (1980) | Plainfield sand; 0.7% OM |
| | | 1,976 | 3.30 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 1.62% OM |
| | | 2,058 | 3.31 | Sharom et al. (1980) | organic soil; 75.3% OM |
| | | 2,090 | 3.32 | Wahid & Sethunathan (1979) | single measurement; Pokkali soil; 5.52% OM |
| | | 2,122 | 3.33 | Wahid & Sethunathan (1979) | single measurement; alluvial soil; 0.75% OM |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **γ-Hexachlorocyclohexane** | 58-89-9 | | | | |
| (continued) | | 2,123 | 3.33 | Wahid & Sethunathan (1979) | single measurement; Kari soil; 8.21% OM |
| | | 2,260 | 3.35 | Spencer & Cliath (1970) | Gila silt loam; 0.35% OC; from vapor phase desorp.; 30° C |
| | | 2,268 | 3.36 | Adams & Li (1971) | Blue Earth sil, B horizon ; foc = 0.083 |
| | | 2,290 | 3.36 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 0.92% OM |
| | | 2,448 | 3.39 | Wahid & Sethunathan (1979) | single measurement; lateritic soil; 0.60% OM |
| | | 2,584 | 3.41 | Mills & Biggar (1969a) | 11.9% OC; Staten peaty muck |
| | | 2,646 | 3.42 | Miller & Weber (1986) | Michaywe soil; 0.13% TOC |
| | | 2,710 | 3.43 | Moreale & van Bladel (1978) | Zolder soil; 0.19% OC; 1% clay |
| | | 2,926 | 3.47 | Wahid & Sethunathan (1978) | alluvial soil; 0.75% OM; 1:20; 5 min equlibration |
| | | 2,983 | 3.47 | Chiou et al. (1979) | Willamette silt loam; 1.6% OM; 26% clay |
| | | 3,249 | 3.51 | Adams & Li (1971) | Ulen sl, B horizon ; foc = 0.003 |
| **Average** | | ***1,477*** | 3.17 | | |
| **Geometric Mean** | | ***1,352*** | 3.13 | | |
| **Hexachlorocyclopentadiene** | 77-47-4 | | | | |
| **Hexachloroethane** | 67-72-1 | | | | |
| **Indeno(1,2,3-*cd* )pyrene** | 193-39-5 | | | | |
| **Isophorone** | 78-59-1 | | | | |
| (Isooctaphenone) | | | | | |
| **Methoxychlor** | 72-43-5 | | | | |
| | | 80,000 | 4.90 | Karickhoff et al. (1979) | avg. Doe Run and Hickory Hill coarse silt sed. fractions |
| **Average** | | ***80,000*** | 4.90 | | |
| **Geometric Mean** | | ***80,000*** | 4.90 | | |
| **Methyl bromide** | 74-83-9 | | | | |
| (Bromomethane) | | 9 | 0.95 | Briggs (1981) | presented as a value for several chemicals |
| **Average** | | ***9*** | 0.95 | | |
| **Geometric Mean** | | ***9*** | 0.95 | | |
| **Methyl chloride** | 75-09-2 | | | | |
| (chloromethane) | | 6 | 0.78 | Jury et al. (1990) | soil; selected |
| **Average** | | ***6*** | 0.78 | | |
| **Geometric Mean** | | ***6*** | 0.78 | | |
| **Methylene chloride** | 75-09-2 | | | | |
| (Dichloromethane) | | 10 | 1.00 | Daniels et al. (1985) | selected |
| **Average** | | ***10*** | 1.00 | | |
| **Geometric Mean** | | ***10*** | 1.00 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Naphthalene** | 91-20-3 | | | | |
| | | 830 | 2.92 | Kishi et al. (1990) | light clay; 1.51% OC |
| | | 843 | 2.93 | Vowles & Mantoura (1987) | Tamar estuary sediment; 4.02% OC; 0.2% synth. sea salt |
| | | 871 | 2.94 | Karickhoff (1981) | soils/sediments average; shake flask UV |
| | | 907 | 2.96 | Stauffer & MacIntyre (1986) | Appalachee soil; 1.4% OC; pH = 3.1 |
| | | 912 | 2.96 | Hodson & Williams (1988) | unpublished experimental results by same authors |
| | | 960 | 2.98 | Southworth & Keller (1986) | Fullerton soil; 0.06% OC |
| | | 1,000 | 3.00 | Southworth & Keller (1986) | Apison soil; 0.11% OC |
| | | 1,000 | 3.00 | Kan & Tomson (1990) | DOM |
| | | 1,096 | 3.04 | McCarthy & Jiminez (1985) | humic acid polymers |
| | | 1,161 | 3.06 | Lokke (1984) | avg. 10 values |
| | | 1,290 | 3.11 | Rippen et al. (1982) | Alfisol; 0.76% OC |
| | | 1,300 | 3.11 | Karickhoff et al. (1979) | average of Doe Run & Hickory Hill sediments |
| | | 1,333 | 3.12 | Karickhoff (1982) | Mississippi River sediment; foc = 0.015 |
| | | 1,400 | 3.15 | Podoll et al. (1989) | Menlo Park soil; 1.6% OC |
| | | 1,413 | 3.15 | Szabo et al. (1990a) | RP-HPLC on CIHAC (humic acids) |
| | | 1,440 | 3.16 | Rippen et al. (1982) | Entisol; 1.11% OC |
| | | 1,445 | 3.16 | Szabo et al. (1990a) | RP-HPLC on PIHAC (humic acids) |
| | | 1,610 | 3.21 | Rippen et al. (1982) | Speyer soil, 0.15-0.5 mm; 1.12% OC |
| | | 1,861 | 3.27 | Barrett et al. (1994) | soil; 0.13% OC |
| | | 1,950 | 3.29 | Wood et al. (1990) | Eustis sand; 0.74% OC; batch & column data |
| **Average** | | ***1,231*** | 3.09 | | |
| **Geometric Mean** | | ***1,191*** | 3.08 | | |
| | | | | | |
| **Nitrobenzene** | 98-95-3 | | | | |
| | | 30.6 | 1.49 | Seip et al. (1986) | forest soil with 0.2% OC; column study |
| | | 76 | 1.88 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 86 | 1.93 | Briggs (1981) | average for four soils; 0.6-2.5% OC |
| | | 88.8 | 1.95 | Seip et al. (1986) | agricultural soil with 2.2% OC; column study |
| | | 103 | 2.01 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| | | 142 | 2.15 | Miller & Weber (1986) | Delta soil with foc = 0.0012 |
| | | 190 | 2.28 | Lokke (1984) | Gribskov B horizon soil; 2.58%OC; avg. 2 values |
| | | 191 | 2.28 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 229 | 2.36 | Hodson & Williams (1988) | unpublished experimental results by same authors |
| | | 270 | 2.43 | Lokke (1984) | Gribskov C horizon soil; 1.82%OC; avg. 2 values |
| **Average** | | ***141*** | 2.15 | | |
| **Geometric Mean** | | ***119*** | 2.08 | | |
| | | | | | |
| **Pentachlorobenzene** | 608-93-5 | | | | |
| | | 11,381 | 4.06 | Wu & Gschwend (1986) | Iowa soil; 2.1% OC |
| | | 35,455 | 4.55 | Wu & Gschwend (1986) | North River sediments; approx. 4.4% OC |
| | | 38,560 | 4.59 | Barber et al. (1992) | sand/gravel aquifer; avg, 2 measurements; 0.054, 0.062% OC |
| | | 40,000 | 4.60 | Karickhoff & Morris (1985a) | GA sediments; 0.5-1.5% OC |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Pentachlorobenzene** | 608-93-5 | | | | |
| (continued) | | 55,176 | 4.74 | Wu & Gschwend (1986) | Charles River sediments; approx. 8.5% OC |
| **Average** | | ***36,114*** | 4.56 | | |
| **Geometric Mean** | | ***32,148*** | 4.51 | | |
| | | | | | |
| **Pyrene** | 129-00-0 | | | | |
| | | 43,807 | 4.64 | Means et al. (1980) | IL sediment with 2.38% OC (EPA-23) |
| | | 45,709 | 4.66 | Abdul et al. (1987) | aquifer material, 1.05% OC |
| | | 48,236 | 4.68 | Means et al. (1980) | IL sediment with 1.67% OC (EPA-22) |
| | | 50,650 | 4.70 | Means et al. (1980) | ND sediment with 2.28% OC (EPA-5) |
| | | 51,469 | 4.71 | Means et al. (1980) | ND sediment with 2.07% OC (EPA-4) |
| | | 54,767 | 4.74 | Woodburn et al. (1989) | Webster soil; 2.23% OC; 14 C; 30:70 methanol:water |
| | | 57,763 | 4.76 | Means et al. (1980) | WV soil with 0.48% OC (EPA-14) |
| | | 58,884 | 4.77 | Szabo et al. (1990a) | RP-HPLC on PIHAC (humic acids) |
| | | 59,515 | 4.77 | Means et al. (1980) | IL sediment with 1.88% OC (EPA-21) |
| | | 59,646 | 4.78 | Means et al. (1980) | IL soil with 1.30% OC (EPA-20) |
| | | 61,936 | 4.79 | Abdul & Gibson (1986) | Flint aquifer sample; 87% sand; foc = 0.0187 |
| | | 62,860 | 4.80 | Means et al. (1980) | GA sediment with 1.21% OC (EPA-B2) |
| | | 63,400 | 4.80 | Hassett et al. (1980) | from regression of 14 sediments/soil samples |
| | | 64,706 | 4.81 | Means et al. (1980) | IA loess with 0.11% OC (EPA-9) |
| | | 66,069 | 4.82 | Szabo et al. (1990a) | RP-HPLC on CIHAC (humic acids) |
| | | 67,189 | 4.83 | Means et al. (1980) | IL sediment with 1.48% OC (EPA-26) |
| | | 67,467 | 4.83 | Means et al. (1980) | IA sediment with 0.15% OC (EPA-8) |
| | | 67,608 | 4.83 | Karickhoff (1981) | soils/sediments average |
| | | 76,316 | 4.88 | Means et al. (1980) | KY sediment with 0.66% OC (EPA-18) |
| | | 82,421 | 4.92 | Means et al. (1980) | IN sediment with 0.95% OC (EPA-15) |
| | | 84,000 | 4.92 | Karickhoff et al. (1979) | avg. Doe Run, Hickory Hill coarse silt sediment fractions |
| | | 84,000 | 4.92 | Karickhoff (1982) | Mississippi R. sediment, 1.5% OC |
| | | 85,256 | 4.93 | Means et al. (1980) | SD sediment with 0.72% OC (EPA-6) |
| | | 87,833 | 4.94 | Karickhoff & Morris (1985b) | Mississippi R. sediment, 1.48% OC (desorption) |
| | | 95,395 | 4.98 | Karickhoff & Morris (1985b) | Ohio R. sediment; 3.04% OC (desorption) |
| | | 131,325 | 5.12 | Gauthier et al. (1986) | fluoresc. quench. tech.; 13 soil humic & fulvic acids (avg.) |
| | | 133,590 | 5.13 | Vowles & Mantoura (1987) | Tamar estuary sediment; 4.02% OC; 0.2% synth. sea salt |
| **Average** | | ***70,808*** | 4.85 | | |
| **Geometric Mean** | | ***67,992*** | 4.83 | | |
| | | | | | |
| **Stryene** | 100-42-5 | | | | |
| | | 912 | 2.96 | Bedient et al. (1983) as cited in Meylan et al. (1992) | experimental measurement |
| **Average** | | ***912*** | 2.96 | | |
| **Geometric Mean** | | ***912*** | 2.96 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **1,1,2,2-Tetrachloroethane** | 79-34-5 | | | | |
| | | 79 | 1.90 | Chiou et al. (1979) | Willamette silt loam; 0.928% OC; 20 degrees Celsius |
| **Average** | | ***79*** | 1.90 | | |
| **Geometric Mean** | | ***79*** | 1.90 | | |
| | | | | | |
| **Tetrachloroethylene** | 127-18-4 | | | | |
| | | 177 | 2.25 | Seip et al. (1986) | forest soil with 0.2% OC; column stufy |
| | | 205 | 2.31 | Seip et al. (1986) | agricultural soil wtih 2.2% OC; column study |
| | | 224 | 2.35 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | specific system information not provided |
| | | 224 | 2.35 | Piwoni & Banerjee (1989) | n-core sediment; foc = 0.0133 |
| | | 225 | 2.35 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 235 | 2.37 | Piwoni & Banerjee (1989) | avg. 8 values; J-core sed.; foc = 0.0015 - 0.0089; avg. 1/n>0.94 |
| | | 237 | 2.38 | Friesel et al. (1984) | reported as Ksom; foc reported as a range; 32 soils |
| | | 263 | 2.42 | Abdul et al. (1987) | equilibrium batch experiments; aquifer material; foc = 0.0105 |
| | | 268 | 2.43 | Pignatello (1990) | Agawam fine sandy loam soil; 2.57% OC; avg. 2 values |
| | | 269 | 2.43 | Brusseau & Rao (1991) | Tampa sandy aquifer material; 0.13% OC; < 2mm |
| | | 311 | 2.49 | Loch et al. (1986) | top 20 cm of Podzol soil; 0.87% OC |
| | | 348 | 2.54 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| | | 356 | 2.55 | Paviostathis & Mathavan (1992) | coarse sand with 0.09% OC |
| | | 362 | 2.56 | Chiou et al. (1979) | Willamette silt loam; 0.93% OC; 20 degrees Celsius |
| | | 373 | 2.57 | Schwarzenbach & Westall (1981) | avg. of 6 meas. w/ different Co & sorbents; 0.15% OC |
| **Average** | | ***272*** | 2.43 | | |
| **Geometric Mean** | | ***265*** | 2.42 | | |
| | | | | | |
| **Toluene** | 108-88-3 | | | | |
| | | 94.4 | 1.97 | Seip et al. (1986) | agricultural soil wtih 2.2% OC; column study |
| | | 99 | 2.00 | Vowles & Mantoura (1987) | Tamar estuary sediment; 4.02% OC; 0.2% synth. sea salt |
| | | 115 | 2.06 | Abdul et al. (1987) | equilibrium batch experiments, aquifer material; foc = 0.0105 |
| | | 123 | 2.09 | Garbarini & Lion (1986) | zein; 57% OC |
| | | 126 | 2.10 | Szabo et al. (1990a) | RP-HPLC on PIHAC (avg., humic acids) |
| | | 134 | 2.13 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| | | 150 | 2.18 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 151 | 2.18 | Garbarini & Lion (1986) | Sapsucker Woods soil with 7.51%C |
| | | 151 | 2.18 | Garbarini & Lion (1986) | lignin; 65% OC |
| | | 164 | 2.21 | Garbarini & Lion (1986) | Sapsucker Woods ether extracted soil with 7.05%C |
| | | 182 | 2.26 | Szabo et al. (1990a) | RP-HPLC on CIHAC (avg., humic acids) |
| | | 247 | 2.39 | Schwarzenbach & Westall (1981) | avg. of 6 meas. w/ different Co & sorbents; 0.15% OC |
| **Average** | | ***145*** | 2.16 | | |
| **Geometric Mean** | | ***140*** | 2.15 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Toxaphene** | 8001-35-2 | | | | |
| | | 95,816 | 4.98 | Gustafson (1989) | average value from collected measured values |
| **Average** | | ***95,816*** | 4.98 | | |
| **Geometric Mean** | | ***95,816*** | 4.98 | | |
| | | | | | |
| **1,2,4-Trichlorobenzene** | 120-82-1 | | | | |
| | | 864 | 2.94 | Chiou et al. (1983) | Woodburn silt loam; fom = 0.019; 21% clay |
| | | 885 | 2.95 | Southworth & Keller (1986) | Dormont soil; 1.2% OC |
| | | 1,033 | 3.01 | Scheunert et al. (1994) | soil; 2.06% OC |
| | | 1,300 | 3.11 | Southworth & Keller (1986) | Fullerton soil; 0.06% OC |
| | | 1,303 | 3.11 | Banerjee et al. (1985) | average of 21 values; subsurface alluvial soil |
| | | 1,389 | 3.14 | Wilson et al. (1981) | average of two values |
| | | 1,435 | 3.16 | Friesel et al. (1984) | peaty soil; 0.29% OM |
| | | 1,441 | 3.16 | Friesel et al. (1984) | reported as Ksom; foc reported as a range |
| | | 1,554 | 3.19 | Lee et al. (1989) | untreated Marlette soil, A horizon; 2.59% OC |
| | | 1,867 | 3.27 | Lee et al. (1989) | untreated Marlette soil, Bt horizon; 0.3% OC |
| | | 1,986 | 3.30 | Schwarzenbach & Westall (1981) | KS1 field material; foc = 0.0073 |
| | | 1,995 | 3.30 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not provided |
| | | 2,100 | 3.32 | Southworth & Keller (1986) | Apison soil with 0.11% OC |
| | | 2,347 | 3.37 | Schwarzenbach & Westall (1981) | avg. of 6 meas. w/ different Co & sorbents; 0.15% OC |
| | | 2,570 | 3.41 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not provided |
| | | 3,118 | 3.49 | Wu & Gschwend (1986) | Charles River sediment with approximately 8.8% OC |
| | | 3,125 | 3.49 | Schwarzenbach & Westall (1981) | field sample; 0.8% OC |
| **Average** | | ***1,783*** | 3.25 | | |
| **Geometric Mean** | | ***1,659*** | 3.22 | | |
| | | | | | |
| **1,1,1-Trichloroethane** | 71-55-6 | | | | |
| | | 105.9 | 2.02 | Loch et al. (1986) | top 20 cm of Eerd soil; 4% OC |
| | | 107 | 2.03 | Friesel et al. (1984) | reported as Ksom; foc reported as a range |
| | | 129 | 2.11 | Hodson & Williams (1988) | cyanopropyl column, HPLC |
| | | 172 | 2.24 | Loch et al. (1986) | top 20 cm of Podzol soil; 0.87% OC |
| | | 179 | 2.25 | Chiou et al. (1979) | Willamette silt loam; 0.93% OC; 3.5 degrees Celsius |
| **Average** | | ***139*** | 2.14 | | |
| **Geometric Mean** | | ***135*** | 2.13 | | |
| | | | | | |
| **1,1,2-Trichloroethane** | 79-00-5 | | | | |
| | | 60.0 | 1.78 | Seip et al. (1986) | forest soil with 0.2% OC; column study |
| | | 63.7 | 1.80 | Seip et al. (1986) | agricultural soil wtih 2.2% OC; column study |
| | | 76 | 1.88 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 108 | 2.03 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| **Average** | | ***77*** | 1.89 | | |
| **Geometric Mean** | | ***75*** | 1.87 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| **Trichloroethylene** | 79-01-6 | | | | |
| | | 57 | 1.76 | Rutherford & Chiou (1992) | peat; 57% OC |
| | | 63 | 1.80 | Smith et al. (1990) | soil; 4.02% OC (from vapor phase experiments) |
| | | 65 | 1.81 | Abdul et al. (1987) | equilibrium batch experiments; aquifer material; foc = 0.0105 |
| | | 69 | 1.84 | Brusseau & Rao (1991) | Tampa sandy aquifer material; 0.13% OC; < 2mm |
| | | 72.5 | 1.86 | Seip et al. (1986) | forest soil with 0.2% OC; column study |
| | | 84 | 1.92 | Stauffer & MacIntyre (1986) | Appalachee soil; 1.4% OC; pH = 3.2 |
| | | 84 | 1.93 | Piwoni & Banerjee (1989) | aquifer solid; 0.19% OC |
| | | 87 | 1.94 | Rogers & McFarlane (1981) | Overton silty clay loam; foc=0.018; 1/n=0.93 |
| | | 92 | 1.96 | Wilson et al. (1981) | Lincoln sand; 0.087% OC |
| | | 95.8 | 1.98 | Seip et al. (1986) | agricultural soil wtih 2.2% OC; column study |
| | | 99 | 2.00 | Pignatello (1990a) | Agawam soil; 2.57% OC (2 values) |
| | | 100 | 2.00 | Doust & Huang (1992) as cited in Mackay et al. (1993) | organic carbon soil |
| | | 101 | 2.00 | Friesel et al. (1984) | reported as Kom; foc reported as a range; 32 soils |
| | | 103 | 2.01 | Loch et al. (1986) | top 20 cm of Eerd soil; 4% OC |
| | | 106 | 2.03 | Garbarini & Lion (1986) | Sapsucker Woods soil with 7.51%C |
| | | 111 | 2.05 | Garbarini & Lion (1986) | zein; 57% OC |
| | | 120 | 2.08 | Garbarini & Lion (1986) | lignin; 65% OC |
| | | 122 | 2.09 | Garbarini & Lion (1986) | sapsucker woods ether extracted soil; 7.05% OC |
| | | 123 | 2.09 | Hutzler et al. (1986) | column; Keweenaw 7 soil; 0.85% OC (avg. 3 values) |
| | | 142 | 2.15 | Seip et al. (1986) | forest soil with 3.7% OC; column study |
| | | 150 | 2.17 | Rogers & McFarlane (1981) | Hastings silty clay loam; foc = 0.026; Freundlich; 1/n = 0.82 |
| **Average** | | ***97*** | 1.99 | | |
| **Geometric Mean** | | ***94*** | 1.97 | | |
| **Vinyl chloride** | 75-01-4 | | | | |
| ***o* -Xylene** | 95-47-6 | | | | |
| | | 222 | 2.35 | Vowles & Mantoura (1987) | Tamar estuary sediment; 4.02% OC; 0.2% synth. sea salt |
| | | 234 | 2.37 | Szabo et al. (1990a) | RP-HPLC, CIHAC (humic acids) |
| | | 251 | 2.40 | Szabo et al. (1990a) | RP-HPLC, PIHAC (humic acids) |
| | | 258 | 2.41 | Roy et al. (1987) | Catlin sorbent at 23 degrees Celsius; 4.04% OC |
| **Average** | | ***241*** | 2.38 | | |
| **Geometric Mean** | | ***241*** | 2.38 | | |
| ***m* -Xylene** | 108-38-3 | | | | |
| | | 158 | 2.20 | Seip et al. (1986) | agricultural soil with 2.2% OC; column study |
| | | 166 | 2.22 | Abdul et al. (1987) | equilibrium batch experiments; aquifer material; foc = 0.0105 |
| | | 289 | 2.46 | Seip et al. (1986) | forest soil; 3.7% OC; column study |
| **Average** | | ***204*** | 2.31 | | |
| **Geometric Mean** | | ***196*** | 2.29 | | |

## Table K-2. Collected $K_{oc}$ Values (Hydrophobic Organics)

| Chemical | CAS No. | $K_{oc}$ (L/kg) | Log $K_{oc}$ | Source | Comments |
|---|---|---|---|---|---|
| ***p*** **-Xylene** | 106-42-3 | | | | |
| | | 260 | 2.41 | Vowles & Mantoura (1987) | Tamar estuary sed.; 4.02% OC; 0.2% synthetic sea salt |
| | | 333 | 2.52 | Schwarzenbach & Westall (1984) | soil; 0.15% OC; avg. 6 values |
| | | 347 | 2.54 | Schwarzenbach & Giger (1982) as cited in Gerstl (1990) | system specific information not provided |
| **Average** | | ***313*** | 2.50 | | |
| **Geometric Mean** | | ***311*** | 2.49 | | |

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