The following are errata for "Multimedia Environmental Modelling: The Fugacity Approach" 3rd edition by J. Mark Parnis and Donald Mackay (2020). These errors have been corrected and will be incorporated into future printings of the book.

Page 11, Eq 9: $k \rightarrow k_W^{Deg}$

Page 14, Eq 2: $C_W^t \rightarrow C_W^\infty$

Page 19: (i) Eqs 4, 5, 6, and 8 plus text between Eqs 5 and 6: $k_W^{Loss} \rightarrow k_W^{Outf}$ (ii) Text between Eqs 5 and 6: (i) $0.693t \rightarrow 0.693\tau_F$ (ii) $0.693/k \rightarrow 0.693/k_W^{Outf}$ (iii) Eq 5 and text between Eqs 5 and 6: $\tau_{Loss} \rightarrow \tau_F$ (iv) Text between Eq 5 and Eq 6: "k_W^{Loss}" *should read* "k_W^{Outf}" (v) Eq 6: "k_W^{Loss}" *should read* "k_W^{Outf}"

Page 20: Eq 1: $\tau_{Loss} \rightarrow \tau_F$

Page 30: Line 2 in shaded box: "Partition Ratio Fugacity" should read "Partition Ratio"

Page 33: Line 8: Section 2.4 should read Section 2.3

Page 34: Eqs 5 and 6: "-0.679" should read "-6.79"

Page 35: (i) Eq 1: 0.679 should read 6.79 (ii) Eq 1 first bracket denominator: "T" should read "298 K"

Page 37: (i) Line 10: "x" should read "x_i" (ii) Last paragraph: Two instances of $C_L^{Sat} \rightarrow C_W^{Sat}$ Line 6: "x" should read "x_i"

Page 38: (i) 5 instances where $C_L^{Sat} \rightarrow C_W^{Sat}$ (ii) 10 instances of $P_L^{Sat} or\ P_S^{Sat} \rightarrow P^{Sat}$ (iii) Eqs 2 and 3 (Two instances in Eq 3): $C_S^{Sat} \rightarrow C_W^{Sat}$

Page 42: (i) Line 11: $\gamma_W \rightarrow \gamma_W^i$ (ii) Line 11, Equation 3 and Line 16: $\gamma_O \rightarrow \gamma_O^i$ (iii) Line 12: $\gamma_{iW} \rightarrow \gamma_W^i$ (iv) Line 16 $1/\gamma_i v_O P_O^{Sat} \rightarrow 1/\gamma_O^i v_O P_O^{Sat}$ (v) Line 21: $S_A/S_W \rightarrow C_A^{Sat}/C_W^{Sat}$ (vi) Line 23: $S_W \rightarrow C_W^{Sat}$

Page 44: Worked example 2.2 line 3: $P^{Sat} \rightarrow P_{Bz}^{Sat}$

Page 46: Section 2.4.7. Line 1 and Eqs 1 and 2: $P_L^{Sat} \rightarrow P^{Sat}$

Page 48: Eq 1: "1.13" should read "4.87"

Page 52: (i) Line 3 $P_L^{Sat} \rightarrow P^{Sat}$ (ii) Eq 4: $P_A^{Bz} \rightarrow P^{Sat}$ (iii) Eqs 2, 3, and 4: $C_W^{Bz} \rightarrow C^{Sat}$

Page 53: Eq 4; $C_W^{Np} \rightarrow C_{W-S}^{Np}$

Page 53: Eq 2: $P_{A-SCL}^{Np} \rightarrow P_{SCL}^{Sat}$ Eq 2: $P_{Np}^{0} \rightarrow P^{Sat}$ Eq 3: $C_{W-S}^{Np} \rightarrow C^{Sat}$ Eq 4: $C_{W-SCL}^{Np} \rightarrow C_{SCL}^{Sat}$ Eq 4: $C_{W-S}^{Np} \rightarrow C^{Sat}$ Eq 5: $C_{W-SCL}^{Np} \rightarrow C_{SCL}^{Sat}$ Eq 6: $P_{A-SCL}^{Np} \rightarrow P_{SCL}^{Sat}$ Eq 6: $C_{W-SCL}^{Np} \rightarrow C_{SCL}^{Sat}$ Eq 6: $P_{Np}^{0} \rightarrow P^{Sat}$ Eq 6: $C_{W-S}^{Np} \rightarrow C^{Sat}$ Eq 6 Delete "NOT" in exponent after mol^{-1} Eq 7: $P_{Np}^{Sat} \rightarrow P^{Sat}$

Page 54: Line after Eq 2: $K_P \rightarrow K_{Soil-W}$

Page 55: (i) Line 10, three instances: $r \rightarrow \rho$ (ii) Eq 7: $K_{Soil}^{Bz} \rightarrow K_{Soil-W}^{Bz}$

Page 63: Eq 3: (i) $C_S \rightarrow C_{Sed}$ (ii) $Z_S \rightarrow Z_{Sed}$

Page 64: Third line from bottom: $v_B \rightarrow v_B^f$

Page 65: Line 7 and Eqs 3 and 4: $Z_T \rightarrow Z^{Bulk}$

Page 66: Eq 6: $K_{FW}^{Bz} * \rightarrow K_{FW}^{DDT} \times$

Page 70: Last line: $\sigma \rightarrow \sum_{i=1}^{3}$

Page 72: Fourth paragraph and Eq 1: Four instances of $M \rightarrow m$

Page 75: Line after Eq 4: (i) $m \rightarrow m_i$ (ii) $M \rightarrow m$

Page 77: (i) Line after Eq 14: $M \rightarrow m$ (ii) Line after Eq 10: $C_S \rightarrow C_{Sed}$

Page 78: Eq 1: $M \rightarrow m$

Page 82: (i) Worked example 3.2 line 4: $K_{SW} \rightarrow K_{Sed-W}$ (ii) Eq 5: $K_{Sed} \rightarrow K_{Sed-W}$ Eq 2: $k_{Sed-W} \rightarrow k_{Sed}$ Eq 3: $K_{Sed} \rightarrow K_{Sed-W}$

Page 83: (i) Line after Eq 4: $D_A \rightarrow D^{Adv}$ (ii) Line after Eq 5: $M \rightarrow m$

Page 87a: (i) Eq 1: Delete everything before and including the left arrow

$$I = E + \left[\sum_{i=1}^{All\ Inf} D_i^{Inf} + \sum_{i=1}^{All\ Adv} D_i^{Adv} + \sum_{i=1}^{All\ Deg} D_i^{Deg} \right] f_{Sys} \rightarrow I = \left[\sum_{i=1}^{All\ Adv} D_i^{Adv} + \sum_{i=1}^{All\ Deg} D_i^{Deg} \right] f_{Sys}$$

(ii) Line after Eq 2: $f \rightarrow f_{Sys}$

Page 87b: Eq 2: Delete everything before and including the left arrow

$$\sum V_i Z_i f_{Sys} \text{ or } f_{Sys} \sum V_i Z_i \rightarrow \sum_{i=1}^{n} V_i Z_i f_{Sys} \text{ or } f_{Sys} \sum_{i=1}^{n} V_i Z_i$$

Page 89: Worked example line 4: $m_{Sys} \rightarrow m$

Page 93 Left side Eq 2: $k_M \rightarrow k^M$

Page 100: Eq 3: $1.33 \rightarrow 10/3$

Page 101: Eq 1: $1.33 \rightarrow 10/3$

Page 102: 2nd line after Eq 1: $k_A \rightarrow k_A^M$

Page 105: Line 6: $P^S \rightarrow P^{Sat}$

Page 108b: Worked example 4.4 Line 7: "water" should read "liquid"

Page 110: (i) Figure caption line 2: $\left(k_{OW} = k_W^{Ov}\right) \rightarrow \left(k_W^{Ov}\right)$ (ii) Line 1: $D_W \rightarrow D_W^{Diff}$ (iii) Lines 2 and 3: $D_A \rightarrow D_A^{Diff}$

Page 111: Eq 3: $\frac{1}{K_{AW}} \rightarrow \frac{1}{K_{AW} k_A^M}$

Page 116: D-values list: (i) lines 8-11: Four instances of subscript "S" should read "Soil" (ii) Line 10: $D_{SW}^{Tot} \rightarrow D_{Soil-W}^{Tot}$

Page 116: Eq 1: $k_{AS}^{Soil} \rightarrow k_{A-Soil}^M$ Eq 1 first denom term: $A_{AS} \rightarrow A_{A-Soil}$ Eq 1: $Z_S \rightarrow Z_{Soil}$ Eq 1 second denom term: $A_{AS} \rightarrow A_{A-Soil}$ Eq 2: $A_{AS} \rightarrow A_{A-Soil}$ Eq 3: $A_{AS} \rightarrow A_{A-Soil}$ Eq 4: $A_{AS} \rightarrow A_{A-Soil}$ Eq 5: $D_{AS}^{Tot} \rightarrow D_{A-Soil}^{Tot}$ Eq 5: $D_{AS}^{Ov} \rightarrow D_{A-Soil}^{Ov}$ Eq 6: $D_{AS}^{Tot} \rightarrow D_{A-Soil}^{Tot}$ Eq 6: $D_{AS}^{Ov} \rightarrow D_{A-Soil}^{Ov}$ Eq 10: $D_{WS}^{Tot} \rightarrow D_{W-Soil}^{Tot}$ Eq 11: $k_{Sed-W} \rightarrow k_{Sed-W}^M$ Eq 12: $U_{RSed} \rightarrow U_{Sed}^{Dep}$ Eq 13: $U_{RSed} \rightarrow U_{Sed}^{Resusp}$

Please see end for additional changes to equations on pages 117-120.

Page 120: Symbol list entry 15: $M \rightarrow m$

Page 125: (i) Eq 2 and line 2: $C_W^{Sat} \rightarrow C^{Sat}$ (ii) Eqs 2, 6, and line 2: $P_L^{Sat} \rightarrow P^{Sat}$ (iii) Eq 4: $P_P^{Sat} \rightarrow P^{Sat}$ (iv) Eq 5; Z_S should read Z_{Soil} (v) Eq 5: $\rho_S \rightarrow \rho_{Soil}$ (vi) Eq 7: $Z_B \rightarrow Z_{Biota}$ Eq 6: $P_L^S \rightarrow P^{Sat}$

Page 126: (i) Eqs 2, 3, 4, and line 6: $f \rightarrow f_{Sys}$ (ii) Eq 2: $M \rightarrow m$

Page 141: Table 5.3 (i) Entry 4: $U_R \rightarrow U_{Rain}$ (ii) Entry 7: $U_Q \rightarrow U_{Dry}$ (iii) Entry 14: $k_{SW}^M \rightarrow k_{Sed-W}^M$ (iv) Entry 16: $U_{DP} \rightarrow U_{Dep}$ (v) Entry 17: $U_{RS} \rightarrow U_{Resusp}$ (vi) Entry 18: $U_{BS} \rightarrow U_{Burial}$

Page 143: (i) Fourth last line of text: delete the word "total" (ii) Last three lines of text: Delete "(total)" in each line. (iii) Insert the word "overall" between "following" and "D-values" in the last line of text.

Page 145: Eq 7 (two instances): $D_{A-Soil}^{Ov} \rightarrow D_{Soil-A}^{Ov}$

Page 147: (i) Eq 7 (soil): Three instances of subscript "Sed" should read "Soil"

Page 168: (i) Eq 3: $K_{Solid}^{Bulk} \rightarrow K_{Solid-W}$ (ii) Comment list entry 8: "OM" should read "OC" (iii) Comments list entry 9: $\rho_{OC} \rightarrow \rho_{MM}$

Page 169: Comments list, last term: "V(dV/dt)" should read "(dV/dt)/V"

Page 172: (i) Eqs 2 and 3: $P_A^{Sat} \rightarrow P^{Sat}$ (ii) Eq 4: $\rho_W \rightarrow 1000$ (iii) Eqs 5 and 11: $Z_A^{Tot} \rightarrow Z_A^{Bulk}$ (iv) Eqs 8 and 12: $Z_W^{Tot} \rightarrow Z_W^{Bulk}$ (v) Eq 11: $f_A^{Tot} \rightarrow f_A$ (vi) Eq 12: $f_W^{Tot} \rightarrow f_W$

Page 173: (i) Eqs 1 and 3: $D_{AW}^{Diff} \rightarrow D_A^{Diff}$ (ii) Eqs 2 and 3: $D_{WA}^{Diff} \rightarrow D_W^{Diff}$

Page 174: (i) Eq 1: $D_{AW}^{Diff} \rightarrow D_A^{Diff}$ (ii) Eq 1: $D_{WA}^{Diff} \rightarrow D_W^{Diff}$ (iii) Eq 1: $k_{WA}^M \rightarrow k_W^M$ (iv) Eq 1: $k_{AW}^M \rightarrow k_A^M$

Page 175: Last Eq: $Z_A^{Tot} \rightarrow Z_A^{Bulk}$

Page 176: (i) Eq 2: $Z_W^{Tot} \rightarrow Z_W^{Bulk}$ (ii) Concentration list: Remove all "tot" superscripts from six fugacity "f" terms. For example, in the first equation: $f_A^{Tot} \rightarrow f_A$

Page 184: (i) Eqs 1, 2, 3, and 5: $V_T \rightarrow V_{Soil}$ (ii) Eq 5: $Z_T \rightarrow Z_{Soil}^{Bulk}$

Page 186: (i) Eqs 3, 4, and 6 (two instances in Eq 4): "1000 kg m^{-3}" should read "1000" (ii) Eq 5: $\rho_M \rightarrow \rho_{MM}$ (iii) Eq 5: $\rho_W\,(kg\,m^{-3}) \rightarrow 1000$

Page 188: Eq 2: $m^{Tot} \rightarrow m$

Page 191: Eqs 4-11 and line after Eq 7: $V_T \rightarrow V_{Soil}$

Page 195: D-Value list entry 1: Z_P should read Z_{TSP}

Page 197: (i) Last equation: $\rho_W \rightarrow 1000$ (ii) Last equation (two instances): $1000\,g\,m^{-3} \rightarrow 1000$

Page 198: (i) Eq 1: $\rho_W \rightarrow 1000$ (ii) Eq 2: $1000\,g\,m^{-3} \rightarrow 1000$ (iii) Eq 2: $2500\,g\,m^{-3} \rightarrow 2500$

Page 201: (i) Eqs 1 and 10: $n_{Sed}^{1g} \rightarrow m_{Sed}^{1g}$ (ii) Eq 1: $m_{Sed}^{1g} \rightarrow mass_{Sed}^{1g}$

Page 203: Eq 7: $V_{Sed} \rightarrow V_{Sed}^{Bulk}$

Page 204: Eqs 5 and 11: "g m^{-3} kg m^{-3}" should read "kg m^{-3}"

Page 205: Eq 5: "g m^{-3} kg m^{-3}" should read "kg m^{-3}"

Page 206: Eq 7 and 10 (two instances in Eq 10): "n_{Sed}" should read "m_{Sed}"

Page 212: Definition of D-values list (i) item 7: "Z_{Sed}" should read "Z_{TSP}" (ii) Item 10: $k_W^{Ov} \rightarrow D_{AW}^{Ov}$ Definition of D-values list item 8: $D_{AW}^{Ov} \rightarrow k_{AW}^{Ov}$ Line 3: Delete "(water-side)"

Page 214: (i) Line 2: "f_W" should read "f_{Sed}" (ii) Eq 3, first term in denominator: Delete $D_W^{Dep} + D_{W-Sed}^{Ov}$ (ii) Change sign between two bracketed terms in denominator from minus sign to plus sign

Page 215: (i) Last equation: $D_{AW}^{ov} \rightarrow D_{AW}^{Ov}$ (ii) Eqs 3 and 5: $D_{W-Sed}^{Ov} \rightarrow D_{Sed-W}^{Ov}$

Page 216: Eqs 2 and 3: $D_{W-Sed}^{Ov} \rightarrow D_{Sed-W}^{Ov}$

Page 219: Eqs 1, 4 and 7: $\rho_W \rightarrow 1000$

Page 220: (i) Process list fifth entry: "Volatilization-absorption" should read "Volatilization" (ii) Z-value for medium list, fourth entry: "Z_{Sed}" should read "Z_{TSP}" D-value for Process list, third item: $D_{W-Sed}^{Ov} \rightarrow D_{Sed-W}^{Ov}$

Page 222: (i) Eq 9: $m^{Tot} \rightarrow m$ (ii) Eq 11: $m_W^{Tot} \rightarrow m_W$ (iii) Eq 11: $m_w \rightarrow m_W$

Page 223: Eq 1: $m_{Sed}^{Tot} \rightarrow m_{Sed}$

Page 242: Table Common Units list, three instances: $M \rightarrow m$

Page 252: Units list (two instances): "mol m^{-3} Pa" should read "mol Pa^{-1} m^{-3}"

The equations on pages 117-120 have many errors in transcription. The corrected equations for Pages 117-120 Section 4.3.3 are given below:

(Page 117-118: Eqs 6 and 7 (117) and Eqs 1 and 2 (118))

Air

$$E_A + G_A^{Adv} C_A^{Inf} + f_W D_{WA} + f_{Soil} D_{Soil-A} = f_A \left(D_{AW} + D_{A-Soil} + D_A^{Deg} + D_A^{Adv} \right) = f_A D_A^{Tot}$$

Water

$$E_W + G_W^{Adv} C_W^{Inf} + f_A D_{AW} + f_{Soil} D_{Soil-W} + f_{Sed} D_{Sed-W} = f_W \left(D_{WA} + D_{W-Sed} + D_W^{Deg} + D_W^{Adv} \right) = f_W D_W^{Tot}$$

Soil

$$E_{Soil} + f_A D_{A-Soil} = f_{Soil} \left(D_{Soil-A} + D_{Soil-W} + D_{Soil}^{Deg} \right) = f_{Soil} D_{Soil}^{Tot}$$

Sediment

$$E_{Sed} + f_W D_{W-Sed} = f_{Sed} \left(D_{Sed-W} + D_{Sed}^{Deg} + D_{Sed}^{Adv} \right) = f_{Sed} D_{Sed}^{Tot}$$

(Page 118 Eqs 3-6)

$$f_A = \frac{I_A + f_W D_{WA} + f_{Soil} D_{Soil-A}}{D_A^{Tot}}$$

$$f_W = \frac{I_W + f_A D_{AW} + f_{Soil} D_{Soil-W} + f_{Sed} D_{Sed-W}}{D_W^{Tot}}$$

$$f_{Soil} = \frac{I_{Soil} + f_A D_{A-Soil}}{D_{Soil}^{Tot}}$$

$$f_{Sed} = \frac{I_{Sed} + f_W D_{W-Sed}}{D_{Sed}^{Tot}}$$

(Page 118 Eqs 7-9)

$$f_A = \frac{I_A + f_W D_{WA} + f_{Soil} D_{Soil-A}}{D_A^{Tot}} = \frac{I_A + f_W D_{WA} + \left(\frac{I_{Soil} + f_A D_{A-Soil}}{D_{Soil}^{Tot}} \right) D_{Soil-A}}{D_A^{Tot}}$$

$$f_A \left(1 - \frac{D_{A-Soil} D_{Soil-A}}{D_{Soil}^{Tot} D_A^{Tot}} \right) = f_W \left(\frac{D_{WA}}{D_A^{Tot}} \right) + \left(\frac{I_A}{D_A^{Tot}} + \frac{I_{Soil} D_{Soil-A}}{D_{Soil}^{Tot} D_A^{Tot}} \right)$$

$$J_1 = \left(\frac{I_A}{D_A^{Tot}} + \frac{I_{Soil} D_{Soil-A}}{D_{Soil}^{Tot} D_A^{Tot}} \right)$$

(Page 119 Eqs 1-3)

$$J_2 = \left(\frac{D_{WA}}{D_A^{Tot}} \right)$$

$$J_3 = \left(1 - \frac{D_{Soil-A} D_{A-Soil}}{D_{Soil}^{Tot} D_A^{Tot}} \right)$$

$$J_4 = \left(D_{AW} + \frac{D_{A-Soil} D_{Soil-W}}{D_{Soil}^{Tot}} \right)$$

(Page 119 Eqs 4-9)

$$f_A = f_W \left(\frac{J_2}{J_3} \right) + \left(\frac{J_1}{J_3} \right)$$

$$f_W = \frac{I_W + f_A D_{AW} + f_{Soil} D_{Soil-W} + f_{Sed} D_{Sed-W}}{D_W^{Tot}}$$

$$= \frac{I_W + f_A D_{AW} + \left(\frac{I_{Soil} + f_A D_{A-Soil}}{D_{Soil}^{Tot}} \right) D_{Soil-W} + \left(\frac{I_{Sed} + f_W D_{W-Sed}}{D_{Sed}^{Tot}} \right) D_{Sed-W}}{D_W^{Tot}}$$

$$f_W\left\{1-\left(\frac{D_{W-Sed}D_{Sed-W}}{D_{Sed}^{Tot}D_W^{Tot}}\right)\right\}=\frac{I_W+f_A\left\{D_{AW}+\frac{D_{A-Soil}D_{Soil-W}}{D_{Soil}^{Tot}}\right\}+\left[\frac{I_{Soil}D_{Soil-W}}{D_{Soil}^{Tot}}\right]+\left[\frac{I_{Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right]}{D_W^{Tot}}$$

$$f_W=\frac{I_W+f_AJ_4+\left[\frac{I_{Soil}D_{Soil-W}}{D_{Soil}^{Tot}}\right]+\left[\frac{I_{Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right]}{\left\{D_W^{Tot}-\left(\frac{D_{W-Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right)\right\}}$$

$$f_W=\frac{I_W+\left(f_W\left(\frac{J_2}{J_3}\right)+\left(\frac{J_1}{J_3}\right)\right)J_4+\left[\frac{I_{Soil}D_{Soil-W}}{D_{Soil}^{Tot}}\right]+\left[\frac{I_{Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right]}{\left\{D_W^{Tot}-\left(\frac{D_{W-Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right)\right\}}$$

(Page 120 Eqs 1, 3, and 4:)

$$f_W=\frac{\left(I_W+\left[\frac{J_1J_4}{J_3}\right]+\left[\frac{I_{Soil}D_{Soil-W}}{D_{Soil}^{Tot}}\right]+\left[\frac{I_{Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right]\right)}{\left(D_W^{Tot}-\left[\frac{J_2J_4}{J_3}\right]-\left(\frac{D_{W-Sed}D_{Sed-W}}{D_{Sed}^{Tot}}\right)\right)}$$