Errata — to version 2.0 of DOE Handbook

Corrections added since the previous printed errata sheet was prepared (December 12, 1995) are marked with a vertical line.

Acknowledgments

Dr. Douglas M. Campbell

Chapter 2

p. 8 — Equation (24) should be

$$[CO_3^{2-}] = \frac{C_T K_1 K_2}{[H^+]^2 + K_1[H^+] + K_1 K_2}$$

p. 11 — In 2 places (1st paragraph & last paragraph on page) delete the phrase "—which is a quartic equation in $[H^+]$—".

Chapter 4

SOP 1

p. 5 — Add the phrase "indicated temperature was 1 atm." at the end of the legend to Figure 1.

SOP 2

p.2 — The telefax number for the University of Rhode Island, Graduate School of Oceanography, Equipment Development Laboratory is:

1-401-874-6755

p. 9 — Delete the word “iteratively” in the line above (9).
(*Eqn 9 is a quadratic form and can be solved explicitly.)*

p. 14 — Add the bibliographic reference:
“Dickson A. G. (1992) The determination of total dissolved inorganic carbon in sea water. The first stage of a collaborative study. U. S. Department of Energy No. DOE/RL/01830T-H14.”

SOP 3

p. 15 — Equation (A.27) should be

$$[CO_3^{2-}] = \frac{C_T K_1 K_2}{[H^+]^2 + K_1[H^+] + K_1 K_2}$$

p. 28 — the ionic strength should be calculated using

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IS = 19.924*S/(1000 - 1.005*S)
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p. 28 — The citation to K1 should be to

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Roy et al. (1993) Mar. Chem. 44, 249.
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p. 28 — The citations to K1P, K2P & K3P should be to

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Millero (1995) Geochim. Cosmochim. Acta. 59, 661.
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p. 28 — The citation to KSi should be to

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Millero (1995) Geochim. Cosmochim. Acta. 59, 661.
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p. 28 — The citation to KW should be to

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Millero (1995) Geochim. Cosmochim. Acta. 59, 661.
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SOP 4

p. 10 — The citation to Wanninkhof & Thoning should be
Marine Chemistry **44**, 189–204.

SOP 5

p. 11 — The citation to Wanninkhof & Thoning should be
Marine Chemistry **44**, 189–204.

SOP 7

p. 5 — Table 1. The wavelength for λ_2 = 434 nm.

p. 6 — There is a sign error in the last equation on the page:

$$\frac{\Delta(A_1/A_2)}{V} = 0.125 - 0.147(A_1/A_2)$$

p. 7 — The first equation on this page also has errors in the signs, the example calculation should thus read:

Then after addition of dye:

$$A_1/A_2 = \frac{0.84574 - 0.01936 - (0.08298 - 0.08365)}{0.45123 - 0.02433 - (0.08298 - 0.08365)} = 1.93430 \ ;$$

corrected to zero dye addition ($V = 0.08$ cm^3),

$$(A_1/A_2)_{corr} = 1.93430 - 0.08(0.125 - 0.147(1.93430))$$
$$= 1.94705$$

and thus

$$pH = 8.0056 + \log\left(\frac{1.94705 - 0.00691}{2.2220 - 1.94705 \times 0.1331}\right) = 8.0005 \ .$$

SOP 21

p. 2 — Equation (2) should read

$$e_s = \underline{\underline{1.7526}} \times 10^8 \exp\left(-5315.56 / (t + 273.15)\right)$$

p. 3 — The sample calculations should give

$$e_s = 2.3\underline{\underline{38}} \text{ kPa} \ ,$$
$$\rho(\text{air}) = 0.0012013 \text{ g·cm}^{-3} \ .$$

SOP 23

p. 5 — In §4.2, change the last phrase to

"the standard deviation calculated using (3) is 0.93.

SOP 24

p. 1 — Equation (1) should read

$$RT \ln f_B = \mu_B - \lim_{p \to 0} (\mu_B - RT \ln(x_B p / p^\circ)) \qquad (1)$$

p. 2 — Section 3.1 should start:

The simplest equation of state is the expression for a perfect gas mixture

$$V = (\sum_B n_B)RT/p \qquad (6)$$

p. 3 — Equation (16) should read

$$\delta_{B-C} = B_{BC} - \tfrac{1}{2}(B_{BB} + B_{CC}) \qquad (16)$$

Chapter 5

p. 3 — Table 2.1

the atomic weight of Strontium is 87.62

p. 8 — Equations (4.4.4) and (4.4.5) should be written as

$$\varphi_{HCl} = 17.854 + 1.460\sqrt{m} - 0.307\,m, \qquad (4.4.4)$$

$$\varphi_{NaCl} = 16.613 + 1.811\sqrt{m} + 0.094\,m, \qquad (4.4.5)$$

where $m = m(\mathrm{HCl}) + m(\mathrm{NaCl})$.

p. 11 — Add the following clarification to the footnote beneath Table 6.1:

"Thus the total sulfate (molar mass 96.062 g) at a salinity . . ."

p. 13 — Section 7.1 last line should read:

"At S = 35 and t = 25 °C . . ."

p. 13 — The last line of the page should read:

At S = 35 and t = 25 °C (298.15K), $\ln (K_S/k^\circ) = -2.30$.

p. 15 — The coefficient in $S^{1/2}$ in equation (7.2.13) should be

0.106901773

p. 16 — The citation for the phosphoric acid dissociation constants should be to

Millero (1995)

p. 16 — The citation in the footnote should be to

Millero (1995)

p. 17 — Equation (7.2.25) should be

$$K_{3P} = [H^+][PO_4^{3-}]/[HPO_4^{2-}]$$

p. 17 — The citation for the silicic acid dissociation constant should be to

Millero (1995)

p. 18 — The citation for the water dissociation constant should be to

Millero (1995)

p. 18 — Equation (7.2.33) should begin

$$\ln(K_W/(k°)^2) = \ldots$$

p. 18 — The constant term in equation (7.2.33) should be 148.9652 .

p. 18 — The test value given for the water dissociation constant should read:

$$\ln(K_W/(k°)^2) = -30.434 .$$

p. 19 — Equation (7.3.12) should read:

$$\ln(K_W/(k°)^2) = -31.71 .$$

p. 19 — Add the bibliographic reference:

"Carpenter J. H. & M. E. Manella (1973) Magnesium to chlorinity ratios in sea water. *Journal of Geophysical Research* **78**, 3621–3626."

p. 20 — Add the bibliographic reference:

"IUPAC (1994) Atomic weights of the elements. *Pure & Applied Chemistry* **66**, 2423–2444."

p. 21 — Replace the bibliographic reference to Millero (1994) with the following amended reference:

"Millero F. J. (1995) Thermodynamics of the carbon dioxide system in the oceans. *Geochimica et Cosmochimica Acta* **59**, 661–677."

p. 22 — Correct the second bibliographic reference to Roy & co-workers as follows:

". . . carbonic acid in seawater in salinities 5 to 45 and temperatures 0 to 45 °C. *Marine Chemistry* **44**, 249–267."

I should like to take this opportunity to thank the numerous people who have drawn my attention to these errors. If you should happen to notice additional errors — minor or egregious — please let me know. Thank you.

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