## OC3D Errata

# Errata List for Ocean Circulation in Three Dimensions by Barry A. Klinger and Thomas W. N. Haine

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## Acknowledgments

Page xx:	Missing name: Under the list of people Tom thanks, Tushar Mittal's name is missing.
Chapter 1	
Page 7: Page 33:	Wrong units: "accuracies of a few cm $\{-1\}$ " should read "accuracies of a few cm s $\{-1\}$ ". Wrong units: On the final line the units for c_p should read "J kg $\{-1\}$ K $\{-1\}$ " not "J m $\{-3\}$ K $\{-1\}$ ".
Chapter 2 Page 63:	Typo: Cut the comma at the end of equation (2.46).
Chapter 3	
Page 97:	Missing definition: In the caption to Fig. 3.12, the parameter $X_0$ is undefined. It is the characteristic magnitude of the wind stress
Page 110:	Equation error: In the second line of eq. (3.38) the pressure derivative with respect to y should have capital P, as it does on the first line, not lowercase p.
Chapter 4	
Page 146:	Wrong units: The units for \lambda after (4.18) should be Wm^{-2}K^{-1}, not Wm^{-2}.
Chapter 5 Page 183:	Typo: $\pm 1 = 38^{5} \text{ should read } \pm 1 = 38^{\rm o}$ .
Chapter 6	
Page 228: Page 228:	Inconsistency: Replace \theta_n with \$\theta_N\$ to be consistent with \phi_E and \phi_W. Missing definition: After "(6.66)in the left panels of Figure 6.23" insert: "The latitude parameters \$\theta_1 = \theta_2 - \$30\degrees control the southern (northern) edges of the subtropical gyre, and the northernmost latitude is \$\theta N\$."
Page 228:	Equation error: In (6.66) the minus sign in the middle formula is wrong and should be deleted.
Page 229:	Figure issue: In Figure 6.23 replace \theta_D labels with \theta_d.

## Chapter 7

- Page 253: Typo: In the penultimate paragraph "0 < B < L" should be 0 < B < 2 L.
- Page 253: Typo: In the final paragraph "0 < B/L < 1/2" should be 0 < B/L < 1 L.
- Page 260: Typo: In the penultimate paragraph "0 < B < L" should be 0 < B < 2 L.
- Page 261: Typo: The final sentence in section 7.3.1 says "Thus \$Q\_{\Psi}\$ but it should read "Thus \$Q\_{\chi}\$.

## Chapter 8

- Page 277: Figure issue: The Figure 8.1 grayscale colorbar for (a)–(c) is inconsistent with the colorbar on the color version in the plates. Specifically, the salinity numbers are inconsistent: the color version looks labeled wrong.
- Page 279: Typo: "The subpolar Atlantic is slightly less dense...then the deep water" should have "then" replaced with "than".
- Page 297: Equation error: It says "V proportional to \$\kappa\_v ( \Delta \rho^2 )^{1/3}\$..." but the \kappa\_v should be inside, not outside, the parentheses.
- Page 297: Text error: The penultimate sentence states: "These different measures of flow have different dependence on the parameters because \$V\$, \$W\$, and \$\Psi\$ all differ by factors of \$D..." This isn't exactly right because \$W\$ and \$\Psi\$ have the same dependence on the parameters. Replace this sentence with: "The different dependence of these measures of flow on the parameters arises from different factors of \$D..."
- Page 314: Figure issue: In Figure 8.21 the aspect ratio is different for (b) and (c) compared to (a). (a) has an aspect ratio of one, which is correct: (b) and (c) are stretched vertically and should be corrected.
- Page 316: Equation error: In equation (8.43) the units of kappa are unorthodox. The \rho c\_p on the left hand side should be deleted.
- Page 318: Missing definition: In Exercises 8.8(b) and 8.9, M means the meridional extent of the basin.

### Chapter 9

Page 338: Equation error: Equation (9.3) is missing a denominator of L = E - W in the first term on the left hand side (the u^2 term) and the first term on the right hand side (the p term), where L is the zonal width of the channel.

### Chapter 11

Page 385: Enhancement/clarification: The paragraph "Nonzero meridional mass flux.....thermodynamically irrelevant" can be clarified/enhanced with the figure below, which contrasts an open control volume (top) with a closed control volume (bottom). In the closed case, for which mass flux M=0, knowledge of advective heat flux E(t) at the left hand edge implies knowledge of air/sea heat flux Q(t) (integrated over the surface, assuming no storage of heat). That isn't true in the open case. In this sense "A nonzero M weakens the connection between E and Q."

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- Page 386: Typo in Figure 11.2c: "NECP" should read "NCEP".
- Page 397: Sign inconsistency in Figure 11.11: The relation between the streamfunctions in (b) (and similarly (c)) and the meridional volume fluxes is opposite to the definition of (6.43). I.e., in Figure 11.11(b) *positive* d Psi / d z means *negative* V\_z, i.e., *southward* flow, unlike in (6.43).
- Page 403: Typo: "reasonabke" should be "reasonable".
- Page 404: Textual error: In the middle paragraph "we specify freshwater fluxes rather than S" is wrong. It should read "we specify salt fluxes rather than F" instead.
- Page 407: Typo: The first line should say "then the two hemispheres" not "than the two hemispheres".
- P. 410 & 417: Inconsistent notation: T\_O is used for ocean temperature in some places, and T in other places. Fix as follows:
  - (i) Change T\_O to T in Figure 11.17 (one place).
  - (ii) On page 410 insert \$T\$ after "ocean temperature" before "with C\_O T".
  - (iii) Change T\_O to T in Exercise 11.8 on page 417 (three places).
- Page 411: Typo: "is is" five lines from the end of subsection 11.3.1.
- Page 415: Textual error: Exercise 11.1d says in parentheses "use Figure 11.2a to estimate the average solar insolation at equator and poles", but this is wrong. Figure 11.2a shows the average net top of the atmosphere vertical energy flux for the Earth, including shortwave and longwave radiation. That quantity isn't what's needed for Exercise 11.1d. Instead replace the text in parentheses quoted above with "assume the average top of the atmosphere solar flux is 420 (175) W/m<sup>2</sup> at the equator (poles)".
- Page 415: Clarification: Exercise 11.3b, and c refer to the "total net heat flux" as a function of latitude, which is somewhat misleading. Replace "total" with "zonal average" to clarify.