Corrections to Fundamentals of Geophysical Fluid Dynamics by James C. McWilliams
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• Page 9, last line: replace clause "and mxa is momentum" with ', the time derivative of velocity v, and mv is momentum".

• Page 10, second line before (2.3): change "acceleration of a fluid parcel" to "time derivative"

• Page 20, Fig. 24: the sign symbol should be changed from "+" to "-" in the right panel and "positive χ" should be changed to "negative χ" in the caption.

• Page 28, line 5: the pressure unit is equal to 10^5 Pa not 1 Pa.

• Page 54, equation (3.17), last line, and equation (3.18): insert minus sign on right-hand side.

• Page 65, equation (3.60): the final right-hand parenthesis in the third line should be deleted to become:

$$\begin{aligned} \zeta(\mathbf{x}, t) &= \sum_{\alpha=1}^{N} C_\alpha \delta(\mathbf{x} - \mathbf{x}_\alpha) \\ \psi(\mathbf{x}, t) &= \frac{1}{2\pi} \sum_{\alpha=1}^{N} C_\alpha \ln |\mathbf{x} - \mathbf{x}_\alpha| \\ \mathbf{u}(\mathbf{x}, t) &= \frac{1}{2\pi} \sum_{\alpha=1}^{N} \frac{C_\alpha}{|\mathbf{x} - \mathbf{x}_\alpha|^2} [-(y - y_\alpha)\hat{\mathbf{x}} + (x - x_\alpha)\hat{\mathbf{y}}] \, . \end{aligned} \qquad (3.60)$$

• Page 66, equation (3.67): replace it with

$$p_\alpha = | C_\alpha |^{1/2} \, x_\alpha, \quad q_\alpha = | C_\alpha |^{-1/2} \, C_\alpha \, y_\alpha \, . \qquad (3.67)$$

• Page 73, first line after equation (3.72): the sentence should begin "Introducing (3.72) and (3.30) and ..."; i.e., the reference previously was (3.24), but should be (3.30).

• Page 74-75, bottom and top lines: replace parenthetical remark with "(since the point in x where $\partial_x \overline{\zeta} = 0$ in a parallel flow is an inflection point for the velocity profile, $\partial_{xx} \overline{v} = 0$)"

• Page 75, equation after (3.77): delete one of the r factors in the right-side integral:

$$\int_0^\infty g^* \partial_r [r \partial_r g] \, dr = - \int_0^\infty r (\partial_r g^*) \, (\partial_r g) \, dr$$

• Page 77, equation (3.91): there is a typographic error, and after its removal the formula is

$$s^2 = \left(\frac{kU}{2} \right)^2 \left(2 \, \frac{1 + (1 - [kD]^{-1}) \tanh[kD]}{kD(1 + \tanh[kD])} - 1 \right) \, . \qquad (3.91)$$

• Page 85, equation (3.106): a $\boldsymbol{\nabla}$ symbol needs to be inserted into the second left-side term to become:

$$\frac{\partial \overline{\tau}}{\partial t} + \overline{\mathbf{u}} \cdot \boldsymbol{\nabla} \overline{\tau} = - \boldsymbol{\nabla} \cdot (\overline{\mathbf{u}' \tau'}) \, .$$

• Page 85, equations (3.107)-(3.108): move last line in the former to start of latter and put a factor of 1/2 into the final line to become:

$$\begin{aligned}\overline{\mathbf{u}'\tau'} &\approx -\overline{\mathbf{u}'(\mathbf{r}'\cdot\boldsymbol{\nabla})}\overline{\tau} \\ &= -\overline{\frac{d\mathbf{r}'}{dt}(\mathbf{r}'\cdot\boldsymbol{\nabla})}\overline{\tau}\ .\end{aligned}$$

and

$$\overline{\frac{dr^{i\,\prime}}{dt}r^{j\,\prime}} \;=\; \frac{1}{2}\frac{d}{dt}\overline{r^{i\,\prime}r^{j\,\prime}} \;=\; \kappa_e\,\delta_{i,j}\ ,$$

• Page 124, Fig. 4.11: The two dotted sloping lines connecting the middle equal-height points on the front and rear side of the wave form have the same propagation velocity $V_+(\xi_+)$, hence the same slope. The revised figure below depicts this feature more accurately.

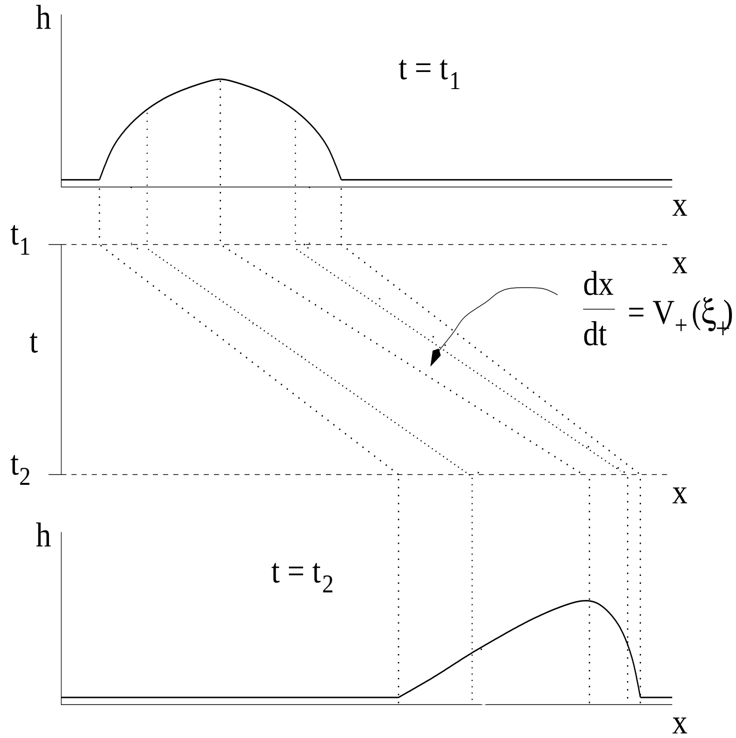

Fig. 4.11. Nonlinear evolution for an isolated, shallow-water, gravity wave of elevation. The wave shape at the earlier time ($t = t_1$; top) evolves into the shape at a later time ($t = t_2$; bottom) that has a shallower slope on its backward face and a steeper slope on its forward face. This example is for a rightward propagating wave. The characteristic coordinate, ξ_+, remains constant for each point on the wave, but its associated velocity, V_+, is larger where the elevation is higher (shown by the line slopes in the middle diagram).

• Page 125, top line: The coordinate relations are $x_1 < X < x_2$.

• Page 126-127, equations (4.92) and (4.97): In the expressions for $\mathbf{u}_h$ and $\mathbf{r}'_h$, cancel the g factors in numerator and denominator, and change the sign of the term $\propto f$.

• Page 128, first unnumbered equation: The expression to the right of the arrow has a factor of 1/2, *i.e.*,

$$\mathbf{u}^{St} \rightarrow \sqrt{\frac{g}{H}}\,\frac{\eta_0^2}{2H}\left(\frac{\mathbf{k}}{K}\right) = \frac{u_{h0}^2}{2\sqrt{gH}}\left(\frac{\mathbf{k}}{K}\right) ,$$

• Page 129, first line of equation (4.103): There are two horizontal gradient operators, *i.e.*,

$$\begin{aligned} -\overline{\mathbf{u}_h' \cdot \boldsymbol{\nabla}_h \tau'} &= \overline{(\mathbf{u}_h' \cdot \boldsymbol{\nabla}_h)\left(\int^t \mathbf{u}_h'\, dt\right) \cdot \boldsymbol{\nabla}_h \overline{\tau}} \\ &\approx -\overline{\left((\int^t \mathbf{u}_h'\, dt) \cdot \boldsymbol{\nabla}_h\right) \mathbf{u}_h'} \cdot \boldsymbol{\nabla}_h \overline{\tau} \\ &= -\mathbf{u}^{St} \cdot \boldsymbol{\nabla}_h \overline{\tau} \, . \qquad (4.103) \end{aligned}$$

• Page 135, second line following equation (4.124): The symbol R should be formatted the same as the first symbol in (4.124) and as on the fifth line following equation (4.124), i.e., approximately drawn as $\mathcal{R}$.

• Page 151, equation (5.37): the prefactors for $\tilde{\psi}_1$ should have square roots:

$$\begin{aligned} \psi_1 &= \tilde{\psi}_0 + \sqrt{\frac{H_2}{H_1}}\,\tilde{\psi}_1 \\ \psi_2 &= \tilde{\psi}_0 - \sqrt{\frac{H_1}{H_2}}\,\tilde{\psi}_1 \, . \qquad (5.37) \end{aligned}$$

• Page 156, first line in equation (5.52): The exponent should be n, not $n + 1$:

$$\overline{\psi}_n = (-1)^n U y$$

• Page 181, equation (5.103): The sign convention here for $\mathbf{E}$ is the opposite of that used in Andrews, D.G., J.R. Holton, and C.B. Leovy, 1987: *Middle Atmosphere Dynamics.* Academic Press.

• Page 161, Fig. 5.6: remove the tilde symbols from the layer streamfunctions at the bottom of the figure.

• Pages 198 (equation (6.30)), 199 (equation (6.33)), and 202 (equation (6.38), first line): the symbol f should be replaced by $|f|$ in these specific formulas.

• Page 202, equation (6.38): the equation for $\overline{v}(z)$ should swap $\cos[\lambda z]$ and $\sin[\lambda z]$.

• Page 238, Rotating shallow-water and wave dynamics, problem 7, fourth line: insert "zonal" before "velocity patch" so it becomes "; (c) a zonal velocity patch".

• Page 239, Baroclinic and jet dynamics, problem 5, second line: insert "quasigeostrophic," before "baroclinic instability" so it becomes "quasigeostrophic, baroclinic instability of a mean flow."

• Page 239-240, problem 8: We rotate the flow orientation to be consistent with the Answers. The equation in the third line should be changed from

$$\mathbf{u} = Sz\hat{\mathbf{y}}, \qquad b = N^2 z + fSx \ ,$$

to

$$\mathbf{u} = Sz\hat{\mathbf{x}}, \qquad b = N^2 z - fSy \ ,$$

The mean advection in the top two equations on p. 240 should be changed from $V\partial_y$ to $Sz\partial_x$, and the factor in the last term in the vertical boundary condition should be changed from $\partial_y\psi'$ to $\partial_x\psi'$.

• Page 243, reference Holland, W.R. (1986), second line: The editor's name should be J.J. O'Brien.