Physical Geodesy: Errata

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1. Page 3, lines 8 to 9:
   Change "as attraction, of m" to "as attraction of m"

2. Page 5. Fig. 1.3 caption:
   Change "acceleration" to "attraction"

3. Page 26. Below eqn (1.85) and below eqn (1.88):
   Change "disc" to "disk"

4. Page 40, below eqn. (1.151):
   $(\Delta x^2 + \Delta z^2)^{1/2} = [1 + (dz/dx)^2]^{1/2}\Delta x$

5. Page 89. eqn (3.45):

$$\delta = \lim_{i\to\infty}\left|\frac{C_i}{C_{i+2}}\right| = \lim_{i\to\infty}\left|\frac{(i+2)(i+1)}{i(i+1)-\alpha}\right| = 1\,.$$

6. Page 91, eqn (3.58):

$$y_1^0(x) = \sum_{i=1}^{\infty}\frac{1}{2i}x^{2i} \qquad \text{and} \qquad y_2^0(x) = \sum_{i=0}^{\infty}\frac{1}{2i+1}x^{2i+1}$$

7. Page 91, add to the end of the paragraph of (3.58):
   The factor M in (3.57) is dropped, since it does not affect the convergence.

8. Page 91, eqn (3.60):

$$\begin{cases} \dfrac{1}{2}[\ln(1+x)+\ln(1-x)] = -\displaystyle\sum_{i=1}^{\infty}\frac{x^{2i}}{2i}\,, \\ \dfrac{1}{2}[\ln(1+x)-\ln(1-x)] = \displaystyle\sum_{i=0}^{\infty}\frac{x^{2i+1}}{2i+1}\,. \end{cases}$$

9. Page 105, eqn (3.132):

$$P_n^k(\pm 1) = 0\,, \qquad k \neq 0\,;$$

10. Page 105, eqn (3.134):
Replace the last "." by ";"

11. Page 136, in equation (3.285):
Change "C_1^0" to "C_1"

12. Page 142, eqn (3.314):

$$V = \frac{GM}{r} \sum_{n=0}^{\infty} \left(\frac{a}{r}\right)^n \sum_{k=0}^{n} (\bar{C}_n^k \cos k\lambda + \bar{S}_n^k \sin k\lambda) \bar{P}_n^k(\cos\theta)\,,$$

Remark: Including the degree 1 normalized coefficients is a better choice.

13. Page 153, below eqn (3.370):
Change "Here we ... be written as" to "On the equator, with $\theta = \pi/2$, this formula can be written as"

14. Page 159, last sentence of the Abstract:
Change "called Geodetic Reference System (GRS)" to "which are essential for a Geodetic Reference System (GRS)"

15. Page 199, line 7 from bottom:
Change "which are referred to as Geodetic Reference System" to "which are essential for a Geodetic Reference System"

16. Page 200, the line above eqn (4.180):
Change "are the Geodetic Reference System GRS80" to "are those of the Geodetic Reference System 1980 (GRS80)"

17. Page 204, the first line of the paragraph above the Section title 5.1.2:
Change "defers" to "differs"

18. Page 209, eqn (5.20):

$$\left(\frac{\partial U}{\partial n_\Sigma}\right)_\Sigma = \left(\frac{\partial U}{\partial n_S}\right)_S + N\left(\frac{\partial^2 U}{\partial n_S^2}\right)_S = \left(\frac{\partial U}{\partial n_S}\right)_S - N\left(\frac{\partial \gamma}{\partial n_S}\right)_S\,.$$

19. Page 246, Title of Sect. 5.5.2:
Change "Degree Power Spectrum" to "Degree Variance Power Spectrum"

20. Page 246, Title of Fig. 5.10:
Change "Degree power spectrum variance" to "Degree Variance Power Spectrum"

21. Page 247, eqn (5.172):

$$V_n = \frac{GM}{R}\left(\frac{R}{r}\right)^{n+1}\sum_{k=0}^{n}\left[\frac{2(2n+1)}{1+\delta_k}\frac{(n-k)!}{(n+k)!}\right]^{1/2} \times(\bar{C}_n^k\cos k\lambda + \bar{S}_n^k\sin k\lambda)P_n^k(\cos\theta)\,,$$

22. Page 247, eqn (5.174):

$$\frac{1}{4\pi}\int_\omega V^2 d\omega = \left(\frac{GM}{R}\right)^2\sum_{n=0}^{n_{\max}}\left(\frac{R}{r}\right)^{2n+2}\sum_{k=0}^{n}\left[\left(\bar{C}_n^k\right)^2+\left(\bar{S}_n^k\right)^2\right] = \sum_{n=0}^{n_{\max}}\left(\frac{1}{4\pi}\int_\omega (V_n)^2 d\omega\right).$$

23. Page 247, line 3 from bottom:
Delete the sentence "The correction $\Delta_1 g + \Delta_2 g$ is referred to as incomplete Bouguer correction"

24. Page 247, Last line:
Change "Bouguer correction and anomaly" to "Bouguer anomaly"

25. Page 258, eqn (6.13):

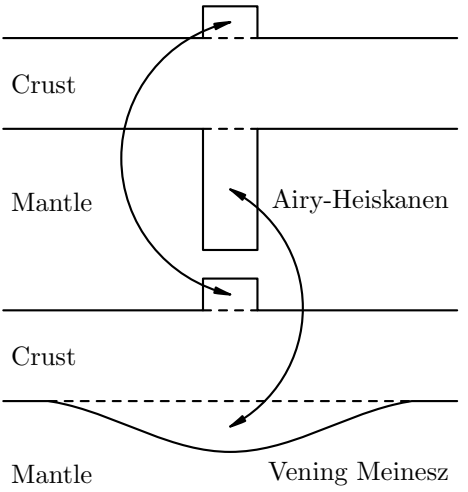
$$\Delta_3 g = G\rho\int_0^{2\pi} d\alpha\int_0^{a} dr\int_0^{\Delta H}\frac{zr}{(r^2+z^2)^{3/2}}dz\,,$$

26. Page 258:
Change the sentence above (6.15) to: "The gravity anomaly computed according to"

27. Page 263, eqn (6.27):

$$\Delta\rho = \rho - \rho' = -\frac{(\rho-\rho_w)P}{D-P}\,.$$

28. Page 265, Fig. 6.7 (It makes me feel embarrassed to have the one in the print! I went to replace it before the submission of the final version to Springer, but I have mistakenly replaced it in a different draft):



29. Page 301, Line 5:
Change "$\sim$ 10 m for the isostatic anomaly." to "$\sim$ 10 m for the isostatic anomaly (Heiskanen and Moritz, 1967)."

30. Page 313, eqn (6.223):

$$f_T(T,H',\psi) = \frac{R^2}{2}\left\{(x+3\cos\psi)(1+x^2-2x\cos\psi)^{1/2} + (3\cos^2\psi - 1) \times \ln\left[(1+x^2-2x\cos\psi)^{1/2} + x - \cos\psi\right]\right\}_{1-(T+H')/R}^{1-T/R}.$$

31. Page 319:
Add the following into the references:
Heiskanen, W.A., & Moritz,H. (1967). *Physical geodesy*. W.H. Freeman and Company.

32. Page 393 line 3 and page 493 line 7 from bottom (So embarrassed to misspell a colleague's name):

Change "Bgherbandi" to "Bagherbandi".

The same correction applies to Page 493, line 7 from the bottom.

33. Page 398, line 26 (or line 9 of the third paragraph):

Change "If not, the difference between the differences" to "If not, the sum of the two differences"

34. Page 410, line 6:
Change "$n_{\max}(n_{\max}+1)$" to "$(n_{\max}+1)^2$"

35. Page 415, line 2 of the last paragraph:

Add ", although the decrease may be oscillatory" after "β decreases with n"

36. Page 417, line 3 from bottom:

    Change "$\int_{-\sigma}^{\sigma} g(x)dx = 99.73$." to "$\int_{-3\sigma}^{3\sigma} g(x)dx = 99.73\%$."

37. Page 419:
    Add a "," after (8.75) just above eqn (8.78).

38. Page 424:
    Change the paragraph starting the 3rd line to

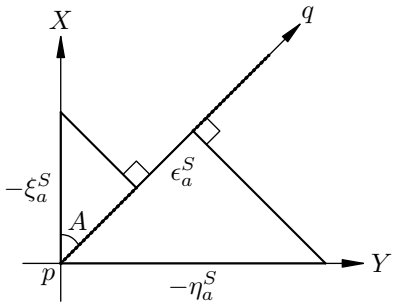
    "The second problem is the resolvability. In this approach, the coefficients $\bar{c}_n^k$ and $\bar{s}_n^k$ can be reliably solved only up to degree and order $N-1$ (Colombo, 1981). This could be demonstrated by examining the problem on the equator where $\theta = \pi/2$ and (8.32) degenerates to the Fourier series

$$\Delta g(\lambda) = \sum_{k=0}^{n_{\max}} (a_k \cos k\lambda + b_k \sin k\lambda) \,. \tag{8.99}$$

    Hence, there are $2n_{\max}+1$ coefficients to be determined. However, there are $2N$ values of Δg on the equator. The total number of coefficients to be determined cannot be more than the total number of data. As a result, the coefficients can only be solved up to order $n_{\max} = N-1$ at most. With $n_{\max} = N-1$ as chosen in (8.98), the total number of coefficients $\bar{c}_n^k$ and $\bar{s}_n^k$ is N^2, while the total number of data $\Delta\bar{g}_{ij}$ is $2N^2$."

39. Page 438, second line below 8.5.1:
    Change "base" to "based"

40. Page 439, Fig. 8.13:



41. Page 451. eqn (9.14):
    Change "$\frac{d}{\partial r}$" to "$\frac{d}{dr}$"

42. Page 452. eqn (9.19):
    Change "$Y_n^k(\theta,\lambda)$" to "$Y_n(\theta,\lambda)$"

43. Page 461, the line above (9.66):

    Change "We now assume" to "We now make the finer approximations"

44. Page 461, the line below (9.66):
    Change “this assumption” to ”these approximations”