Corrections and extensions to
Jonasz M and Fournier GR 2007 "Light scattering by particles in water"
related to pages 117, 118
7 January 2011

We thank Alina Gainusa Bogdan for bringing to our attention the errors on these pages.

Note first that by definition:

(1) the perpendicular reflectivity

$r_\perp = r_1$

is the reflectivity for the polarization perpendicular to the scattering plane (the polarization vector is normal to the scattering plane).

(2) the parallel reflectivity

$r_\| = r_2$

is the reflectivity for the polarization parallel to the scattering plane (the polarization vector is contained in the scattering plane). This is the reflection that has the Brewster angle null.

This implies that there is a mistake in equations (3.63) and (3.64) on page 117 which should now read

$$r_\perp = \frac{\cos\theta_i - n\cos\theta_t}{\cos\theta_i + n\cos\theta_t} \qquad (3.63)$$

$$r_\| = \frac{n\cos\theta_i - \cos\theta_t}{n\cos\theta_i + \cos\theta_t} \qquad (3.64)$$

The different integrated reflected terms have also been corrected and re-calculated and are now given by:

$$\omega_{\perp,0} = \frac{1}{3}\frac{(3n+1)(n-1)}{(n+1)^2} \qquad (3.70)$$

$$\omega_{||,0} = \frac{1}{(n^2+1)^3(n^2-1)^2} \times \Big\{ (n^4-1)\,(n^6 - 4n^5 - 7n^4 + 4n^3 - n^2 - 1) + 2n^2 \left[(n^2-1)^4 \ln\left(\frac{n-1}{n+1}\right) + 8n^2\,(n^4+1)\ln(n) \right] \Big\} \tag{3.71}$$

$$\omega_{\perp,2} = \frac{8}{35} \frac{\left[35n^3 + 21n^2 + 7n + 1\right](n-1)}{(n+1)^6} \tag{3.72}$$

$$\begin{aligned} \omega_{||,2} = -\frac{16}{15(n^2-1)^6(n^2+1)^7} \Big\{ & n^4\left(n^2+1\right)\left(n-1\right)\big(79n^{17} - 131n^{16} + 270n^{15} - 430n^{14} \\ & + 3094n^{13} - 2170n^{12} + 2626n^{11} - 3010n^{10} + 9784n^9 - 3460n^8 + 3010n^7 \\ & - 2626n^6 + 4674n^5 - 590n^4 + 430n^3 - 270n^2 + 225n + 15\big) \\ & + 120n^6\left(3n^{16} + 44n^{12} + 98n^8 + 44n^4 + 3\right)\ln\left(\frac{\sqrt{n^2-1}}{n-1}\right) \\ & + 15n^4\left(n^4+1\right)\left(n^{16} + 60n^{12} + 262n^8 + 60n^4 + 1\right)\ln\left(\frac{n-1}{n^2(n+1)}\right) \Big\} \end{aligned} \tag{3.73}$$

Note that the original approximate expression in 3.73 has been replaced by an exact integral.