Particulate backscattering from BB9
Darling Marine Center – Ocean Optics Summer 2013

Instrument Details

Name: Scattering Meter
Model: ECO BB-9

Contact Information

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Particulate VSF

To convert from raw data (counts) to the total Volume Scattering Function ($\beta_t(\theta)$ in $sr^{-1}m^{-1}$) at $\theta = 124°$, we use the following equation:

$$\beta_t(\lambda, \theta) = (signal\ measured - dark\ counts) * scale\ factor\ \left[\frac{1}{sr \cdot m}\right]$$

Where the dark counts and scale factor values were:

Channel	Dark counts	Scale Factor
407	49.0	4.533E-05
439	56.1	1.999E-05
485	52.1	1.946E-05
507	54.6	1.615E-05
527	54.0	1.682E-05
594	54.0	1.047E-05
651	51.7	9.738E-06
715	53.0	8.375E-06
878	51.5	8.375E-06

The effect of seawater was removed using the following equation (see Optics Express, 5698-5710):

$$\beta_p(\lambda, \theta) = \beta(\lambda, \theta) - \beta_{sw}(\lambda, \theta)\ \left[\frac{1}{sr \cdot m}\right]$$

The VSF of seawater was calculated using the "`betasw_ZHH2009.m`" Matlab function by Xiaodong Zhang, 2009. Also, to correct the VSF for absorption along the path we used:

$$\beta_p(\lambda,\theta) = \beta_p(\lambda,\theta)e^{L\cdot a(\lambda)} \left[\frac{1}{sr\cdot m}\right]$$

where *a* is the absorption coefficient and *L* is the path length of the instrument (see ECO BB9 User's Guide).

Particulate Backscattering (b_{bp})

To convert from particulate VSF to a particulate backscatter coefficient, we used:

$$b_{bp}(\lambda) = 2\pi\chi\beta_p(\theta,\lambda) \left[\frac{1}{m}\right]$$

with $\chi = 1.14$ and $\theta = 124^\circ$ (see Boss and Pegau, 2001).