Processing HS-6 EXPORTS RRSCook (EXPORTS 02)

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HS6 was deployed from the starboard side of the RRS James Cook.

Data was processed with manufacturer software using no sigma correction.

Darks:

In two instances, it was deployed with black tape to obtain darks.

Darks were de-spiked using a 5pt running median.

No significant trends with temperature or pressure were observed and hence a mean over the whole profile was taken, and the two profiles were averaged.

Values of darks for wl= [405 440 486 532 594 700] were:

[-0.78 -0.32 0 0 1.21 0] x 10e-6 m^-1 sr^-1

The difference between the two is considered indicative of the uncertainty due to calibration and was [0.0067 0.0178 0.0305 0.0419 0.0494 0.2276] x 10e-5 m^-1 sr^-1

Salt correction:

A value of salt-water beta was subtracted using Zhang et al., 2009 assuming a using salinity and temperature profiles from the closest CTD file and a =0.039.

Particulate backscattering was computed from:

bbp=(beta\_uc(140)-betasw(T, S, 140) )\*2\*pi\*1.18

The latter chi factor is from Boss and Pegau, 2001, also used in Boss et al., 2004 where closure between Eco-VSF and HS-6 was achieved.

Attenuation along the path:

As in Boss et al., 2004, we used a sigma correction based on s(l)=*a*(l)+0.4b(l), with absorption and scattering based on water + dissolved + particulate values. The last two were obtained from the AC-S for the nominal wavelength +/-10nm while for salts and Zhang et al., 2009 correcting absorption for T based on Sullivan et al., 2006 (this is negligible <0.003%, even though instrument calibration T was 28.6C). Since the instrument is calibrated in DIW water, there was no need to include water absorption in the correction.

We then multiplied bbp(l) by exp(s(l) x pathlength) with pathlength = [0.148,0.148,0.146,0.149,0.148,0.148]m for each wavelength.

AC-S data was based on closest SlowDROP profile and closest data to the depth where we had good HS6 data. Maximal correction for attenuation along path was 4.7% with typical values ~2%).

Since AC-S and HS-6 were not measured on the same package we use the AC-S data closest in time and depth to that of the HS-6 measurement.

Uncertainties were computed based on variability in each bin and was typically < 10%. This is by far the largest contribution to uncertainty. When the variability was zero it was replaced by the median value for uncertainty of the full cast.

Products: we computed several products from the hydroscat BBP:

1. Slope of exponential fit of spectral data. Fit was computed by minimizing the sum of the absolute differences between the spectra and a power-law function weighted by the uncertainties at each wavelength.
2. Cphyto based on Graff et al., 2015

References:

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