AMT28 (Sep-Oct 2018) ACS and AC9 Processing Report V1

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**Measurement3**

Hyperspectral absorption and attenuation were measured continuously on board the RRS James Clark Ross during the *AMT28* expedition in the Atlantic September from 25th, 2018, to October 28th, 2018. A WetLabs ACS spectrophotometer (serial number 122) was used from September 25th – October 19th and a (backup) WetLabs AC9 spectrophotometer was used from October 19th- October 28th. The AC spectrophotometers were set after a switching system running 0.2 um filtered sea water through the instrument the first 10 minutes of every hour and bulk (“normal”) seawater was flowing the rest of the time. This setup allows to retrieve particulate absorption and attenuation independently from the instrument drift and the biofouling effect (Slade et al., 2010). The 0.2µm filter was changed approximately every 7 days and the AC spectrophotometers were cleaned every other day.

**Processing notes**

Data were processed following Dall'Olmo et al. (2009, 2012), using a custom software for in-line optical data processing (https://github.com/tjor/AMT28\_underway).

All in-line instruments were logged on the same computer which was synchronized with the ship’s GPS date/time and latitude/longitude. Total and filtered data were first separated according to the time stamp.

For each minute of the total seawater measurement, the median signal was computed. Particulate spectra are computed as the difference between total and interpolated dissolved spectra from the periods before and after the ‘total’ measurement periods (e.g. Dall'Olmo et al., 2009; Slade et al. 2010).

Scattering (ACS and AC9) and temperature/salinity (ACS) corrections are done as in Slade et al. (2010) and are based on Zaneveld et al., (1994)’s proportional scattering correction (method 3) and on the AC-specific temperature/salinity tables of Sullivan et al. (2006).

**Figure 2:** Example of dissolved absorption spectra between 2021/05/02and 2021/06/01 measured with the ACS091

**References**

Dall’Olmo, G., Westberry, T. K., Behrenfeld, M. J., Boss, E. & Slade, W. H. Significant contribution of large particles to optical backscattering in the open ocean. BIOGEOSCIENCES 6, 947–967 (2009).

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