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Use of multiple sensor technologies for quality control of in situ biogeochemical measurements: A SeaCycler case study

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Over the last two decades observing capacity for the global ocean has increased dramatically. Emerging sensor technologies for dissolved gases, nutrients and bio-optical properties in seawater are allowing extension of in situ observations beyond the traditionally measured salinity, temperature and pressure (CTD). However the effort to extend observations using autonomous instruments and platforms carries the risk of losing the level of data quality achievable through conventional water sampling techniques.

We will present results from a case study with the SeaCycler profiling winch focusing on quality control of the in-situ measurements. A total of 13 sensors were deployed from May 2016 to early 2017 on SeaCycler's profiling sensor float, including CTD, dissolved oxygen (O_2, 3 sensors), carbon dioxide (pCO_2, 2 sensors), nutrients, velocity sensors, fluorometer, transmissometer, single channel PAR sensor, and others. We will highlight how multiple measurement technologies (e.g. for O_2 and CO_2) complement each other and result in a high quality data product. We will also present an initial assessment of the bio-optical data, their implications for seasonal phytoplankton dynamics and comparisons to climatologies and ocean-color data products obtained from the MODIS satellite.