

Global Transmissometer Database as a tool for basin-wide POC assessment

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A global data base on beam attenuation coefficient due to particles has been compiled from field data collected during WOCE, JGOFS, SAVE, and other field programs. Transmissometer data from 50 cruises were loaded into an intermediate data base and sections of Beam Attenuation Coefficient (Beam c) were constructed for all WOCE, SAVE, and others lines in the Atlantic, Pacific, Indian, and Southern Oceans. The relationship between Beam c_p (attenuation due to particles) and Particulate Organic Carbon (POC) was evaluated based on simultaneously acquired data sets localized in fixed area in the Atlantic, Indian, Pacific and Southern Oceans. Data sets for the Atlantic were obtained during the JGOFS NABE expedition and limited data from the Bermuda Atlantic Time Series. These two data sets contain about 800 data pairs and yield a high correlation ($r > 0.9$) between these two variables. This correlation allows us to calculate the POC values based on transmissometer data and build the sections and maps of the POC distribution for the Atlantic Ocean. Data for the Pacific Ocean are still being processed. Correlation between Beam c_p and POC in the Pacific will be assessed based on data sets from the Ross Sea, Antarctic Polar Front Zone and Hawaii Oceanographic Time (HOT) Series. Using the relationship between Beam c_p vs POC has been shown to be a reliable and cost-effective technique for basin-wide assessment of the standing stock of carbon. This approach would be even more successful on future hydrography cruises if POC measurements were collected simultaneously during each cruise. Moreover, concurrent ocean color observations would allow the further development of algorithms to predict POC from ocean color products.

The web-site of our SMP grant, "Global Synthesis of POC Using Satellite Data calibrated with Transmissometer and POC Data from JGOFS/WOCE" (<http://www-ocean.tamu.edu/~pdgroup/TAMU-SMP.html>) provides access to all sections and maps created from our existing data. The transmissometer data together with calculated POC concentration will be posted on this web-site as well as submitted to the appropriate archives during the coming year.