

# INVITED SPEAKERS' ABSTRACTS

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**IS3**

## **Quantifying biogeochemical fluxes with inverse models: current status and future perspectives**

R. Schlitzer

Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

Email: [rschlitzer@awi-bremerhaven.de](mailto:rschlitzer@awi-bremerhaven.de)

In recent years large, globally integrated datasets related to marine biogeochemical cycles have been released to the public and are now in wide use. Large observational programmes such as WOCE or JGOFS will provide more data resources of unprecedented quality and extent in the near future. Availability and easy access to large, global databases is an opportunity for a more extensive use of inverse methods that attempt to estimate physical transports and biogeochemical fluxes and reaction rates from the available data. However, it is commonly understood that even the large datasets of the future will be inadequate to fully determine biogeochemical fluxes on a global scale. Heterogeneity of the different data types and uneven and incomplete spatial and temporal data coverage are additional challenges demanding rather complex mathematical methods and simplified models.

As an example, an inverse model approach that uses water-column distributions of hydrographic parameters, oxygen, dissolved nutrients, carbon and transient as well as steady-state tracers to determine the underlying production, sinking and remineralization of particulate and dissolved organic carbon (POC and DOC) is described. A comparison with satellite-derived productivity estimates shows large discrepancies in the Southern Ocean south of 50°S, where model export of POC are about a factor of 2 larger than satellite estimates. Possible explanations for this discrepancy are a potentially poor calibration of satellite sensors and productivity algorithms in this region and the difficulties to detect and/or parameterize frequently observed sub-surface chlorophyll patches.