

A multidisciplinary glider survey of an open ocean dead-zone eddy

Johannes Karstensen (1), Florian Schütte (1), Alice Pietri (2), Gerd Krahnmann (1), Björn Fiedler (1), Carolin Löscher (1), Damian Grundle (1), Helena Hauss (1), Arne Körtzinger (1), Pierre Testor (2), and Nuno Viera (3)
(1) Helmholtz Centre for Ocean Research Kiel, Kiel, Germany, (2) LOCEAN - UPMC, Paris, France, (3) INDP, Mindelo, Cape Verde

The physical (temperature, salinity) and biogeochemical (oxygen, nitrate, chlorophyll fluorescence, turbidity) structure of an anticyclonic medowater eddy, hosting an open ocean dead zone, is investigated using observational data sampled in high temporal and spatial resolution with autonomous gliders in March and April 2014. The core of the eddy is identified in the glider data as a volume of fresher (on isopycnals) water in the depth range from the mixed layer base (about 70m) to about 200m depth. The width is about 80km. The core aligns well with the $40 \mu\text{mol kg}^{-1}$ oxygen contour. From two surveys about 1 month apart, changes in the minimal oxygen concentrations (below $5 \mu\text{mol kg}^{-1}$) are observed that indicate that small scale processes are in operation. Several scales of coherent variability of physical and biogeochemical variable are identified – from a few meters to the mesoscale. One of the gliders carried an autonomous Nitrate (N) sensor and the data is used to analyse the possible nitrogen pathways within the eddy. Also the highest N is accompanied by lowest oxygen concentrations, the AOU:N ratio reveals a preferred oxygen cycling per N.