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Internal waves and associated mixing in the Deep Western Boundary Current at 16°N

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Turbulent mixing contributes crucially to maintain the oceans stratification and to close the energy budget of the thermohaline circulation. The mixing is strongly correlated with internal wave activity, as their breaking provides a major source of mechanical energy for the turbulent mixing in the oceans interior.
The generation processes and the evolution of internal waves are analyzed in the region of the Deep Western Boundary Current at 16°N in the Atlantic. Previous results show that internal wave dissipation is possibly dependent on the background velocity, which makes the variable DWBC an excellent study region for internal waves.
Two different data sets are used to address the dependence of internal wave activity on the strength of the DWBC, tides, stratification, and wind forcing: shipboard measurements from five cruises and time series measurements of temperature and salinity from the MOVE array at 16°N. Both data sets cover the timespan from 2000 to 2005.
First results from shipboard measurements of velocity and density finestructure show enhanced internal wave activity in the region of the DWBC and the MAR. Here, diapycnal diffusivities are well above oceanic background values of $10^{-5}\,\mathrm{m^2\,s^{-1}}$ and reach magnitudes of up to $10^{-3}\,\mathrm{m^2\,s^{-1}}$.
The spectra of MOVE timeseries contain dominant spectral contributions from the major tidal constituents as well as from the inertial frequency. The high frequency variance shows long term variability at all depth, indicating possible relations between internal wave activity and background conditions.