Geophysical Research Abstracts
Vol. 21, EGU2019-12951, 2019
EGU General Assembly 2019

Subsurface Fine-Scale Patterns in an Anticyclonic Eddy Off Cap-Vert Peninsula Observed From Glider Measurements

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Glider measurements acquired along four transects between Cap-Vert Peninsula and the Cape Verde archipelago in the eastern tropical North Atlantic during March–April 2014 were used to investigate fine-scale stirring in an anticyclonic eddy. The anticyclone was formed near 12°N off the continental shelf and propagated northwest toward the Cape Verde islands. At depth, between 100 and –400 m, the isolated anticyclone core contained relatively oxygenated, low-salinity South Atlantic Central Water, while the surrounding water masses were saltier and poorly oxygenated. The dynamical and thermohaline subsurface environment favored the generation of fine-scale horizontal and vertical temperature and salinity structures in and around the core of the anticyclone. These features exhibited horizontal scales of O(10–30 km) relatively small with respect to the eddy radius of O(150 km). The vertical scales of O(5–100 m) were associated to density-compensated gradient. Spectra of salinity and oxygen along isopycnals revealed a slope of around k-2 in the 10- to 100-km horizontal scale range. Further analyses suggest that the fine-scale structures are likely related to tracer stirring processes. Such mesoscale anticyclonic eddies and the embedded fine-scale tracers in and around them could play a major role in the transport of South Atlantic Central Water masses and ventilation of the North Atlantic Oxygen Minimum Zone.