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Multiplatform observation of cyclonic eddies during the REEBUS experiment

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During the collaborative project "Role of Eddies in the Carbon Pump of Eastern Boundary Upwelling Systems" (REEBUS), that took place in the eastern tropical North Atlantic in 2019, three cyclonic mesoscale eddies were intensely surveyed by ship and autonomous systems. The three eddies were located at different distances to the coast, the most intense of them (vorticity about 0.5 times f) was found in lee of the Cabo Verdian island of Fogo. Here we present the reconstruction of the 3-D structure for the three eddies from ship ADCP and hydrographic sections. Divergence estimates suggest the existence of a downwelling cell in the center of all three eddies. This cell extends from below the thermocline down to some hundred meters, at a diameter of about 10 nautical miles. Surface signatures of the eddies indicate elliptic and oscillating behavior which is further investigated using the interior ocean data.
In this work we also explore the limitations of section-based ocean mesoscale eddy reconstructions.