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Meddy dynamics and interaction with neighboring eddies southwest of Portugal : observations and modeling

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During the Semane2000 experiment southwest of Portugal, two meddies were found in near contact. These meddies had hydrological radii of about 20 and 30 km, thickness of 900 m, maximum temperatures of 12.45ºC and 13.45ºC, and maximum salinities of 36.52 and 36.78. The smaller meddy with more pronounced thermohaline anomalies was clearly double-cored (at 750 and 1300 m depths) while the wider one was more diffuse and more homogeneous. The associated geostrophic velocities (referenced at 2000 m) locally reached 0.5 m/s in the smaller meddy, and 0.2m/s in the wider one.

Three RAFOS floats and two deep-drogued surface drifters, seeded in the two meddies, rapidly gathered in the more intense meddy. This meddy trajectory, revealed by the float motion, was first eastward, then southward. Maps of sea-level anomaly indicate that this motion did not correspond to the longterm evolution of the initial positive SLA signature of the meddies, and that neighboring cyclones must have played a role in the meddy evolution. To determine the role of each eddy in the observed evolution, several scenarios were studied with a three-layer quasi-geostrophic numerical model. The interaction of two meddies in isolation did not result in the observed meddy trajectories on the long term. The interaction of these two meddies with successive neighboring cyclones provided a more realistic trajectory of the meddy containing the floats.