ANTICYCLONIC RINGS IN THE GULF OF MEXICO

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The Gulf of Mexico is a semi-closed sea that displays great variability in its circulation. The dynamics of this sea has been intensively studied not only by the scientific community but also by the oil industry, because of the presence of intense rings that may affect the offshore oils structures. A numerical model, the Colorado University Princeton Ocean Model (CUPOM), was develop and has been used during the last decades (Kantha and Clayson, 1994). Here we have used this model, with a 1/12 degree resolution in 24 sigma-layers, to obtain the temporal evolution of temperature and salinity vertical sections across an anticyclonic eddy that develops within the Gulf, and to analyze the behaviour of simulated parcel trajectories within this eddy.

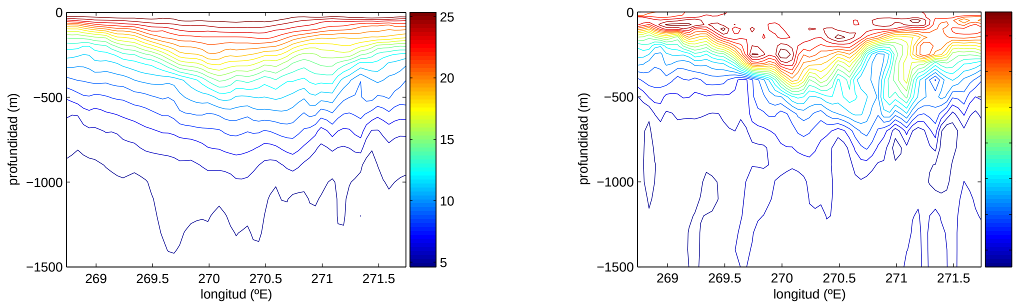

Fig. 1 – Vertical section of temperature (left) and salinity (right) 10 days after the eddy's formation.

The velocity fields at three depths (10 m, 50 m, and 100 m) have been used to calculate the trajectory of nine particles inside the eddy, initially deployed at different distances from its center. These trajectories have been used to compute the dominating eddy's period and the characteristics of the orbital motion.

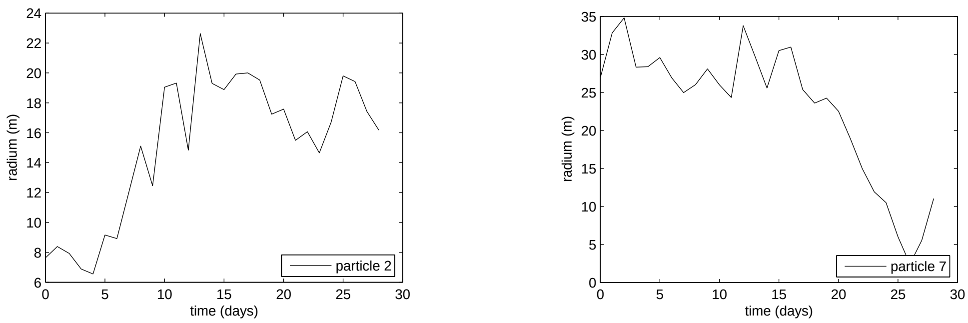

Fig. 2 – Temporal evolution of the radial position for two particles at 100 m depth, initially located at different distances from the eddy center.

The numerical data for the Gulf of Mexico corresponds to only the first 30 days of the eddy's life, due to the interactions with other structures that make the eddy signal difficult to track. The eddy parcels' behaviour is finally compared with that of an anticyclonic eddy located south of the Canary Islands, for which buoys' data is available(Sangrà et al. 2005). Despite the differences in forcing we appreciate similarities in the behaviour of both numerical and real parcels.

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