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Meeting Abstracts

Application of an idealized radial diffusion-advection model with eddy data.

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ABSTRACT

We present some buoy data from two quite different eddy types. The first type are deep eddies topographically-generated by the Canary Islands, and the second one are shallow frontal eddies found south of the Balearic Islands. For the Canary Islands we have examined a total of four buoys, all dragged at 100 m depth. Three buoys tracked one anticyclonic eddy in 1998 during 100 days while drifting 500 km with the mean southwestward Canary Current. The other buoy has been launched recently tracking a cyclonic eddy in the same area. We illustrate the track of the center of both eddies and examine the characteristics of the orbital motions. During their life-time the eddies interact strongly with other cyclonic and anticyclonic eddies, which modifies their mean trajectories as well as their orbital characteristics. For the Balearic Islands we analyze the trajectory of one buoy in 2003, dragged at 10 m. We examine the buoys' data to describe the evolution of the eddies and discuss their similarities and difference. Finally, we use an idealized model, with two active layers, to predict the relative motion of the buoys. The model assumes an axisymmetric eddy, each layer initially having constant angular velocity that evolves subject to radial advection and diffusion. The radial velocity of the surface layer is made proportional to the relative vorticity and for the lower layer it is obtained from continuity. The radial diffusion coefficient is obtained taking into consideration that the vortex must always remain inertially stable. From the angular velocity field we calculate the temporal evolution of both interfaces by assuming a gradient balance for each layer.