Geophysical Research Abstracts
Vol. 13, EGU2011-3478, 2011
EGU General Assembly 2011

A numerical study on the collision of a Meddy with a seamount

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Mediterranean water eddies (Meddies) are prominent hydrological structures of the North Atlantic with significant salinity and temperature anomalies. Meddies can travel far into the ocean interior and interact with abrupt topography.
The purpose of this study is to examine the dynamics and the processes involved in the collision of a Meddy with a seamount. The high resolution numerical study of this interaction has been conducted with the Regional Ocean Modeling System (ROMS).
First, an experiment without seamount was carried out in order to understand the evolution and the structure of the Meddy without disturbance. The movement of this vortice is caused by the β effect but also by a hetonic interaction, which takes effect gradually.
Second, a sensitivity analysis of the interaction was made by varying the seamount characteristics. In all the simulations, the Meddy survives the encounter and bifurcates into two separate vortices : a main Meddy and a secondary Meddy. The organization of the vorticity structure of the main Meddy quickly evolves toward a hetonic structure. The main Meddy continues to propagate south-westward. In one simulation, the change into a hetonic structure is so important that a stable structure emerges and propagates eastward. Processes of erosion, aggregation and filamentation were also analyzed.