



Surface circulation in the Gulf of Cadiz: The different processes at play in a modelling study

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The Gulf of Cadiz in the North Eastern Atlantic is one of the most complex circulation spots in the world ocean. In what concerns the extra-coastal dynamics it is affected by the eastern end of the cross-Atlantic zonal jet (Azores current). It also represents an abrupt change in coastline orientation in a region of strong summer upwelling with the consequent generation of heterogenous wind field. Finally, it constitutes the zone of exchange with the Mediterranean sea through the Strait of Gibraltar and the inflow/outflow strongly influences the slope circulation particularly due to the generation of the Mediterranean Undercurrent and Meddies. We show results of a regional modelling study using ROMS with mesh refinement (AGRIF) to achieve resolutions order of 3km. Different initialisation processes were compared with both climatology and basin or global scale models to attain the extra-coastal dynamics. For the atmospheric forcing we use and compare data from different sources (NCEP, QuickScat) and higher resolution (higher frequency) outputs of WRF especially developed for this experiment. The model reproduces all the major features known in the area. Meddies are generated at the proper depths off the southwest tip of the Iberian slope. The meandering and recirculation of the eastern branch of the Azores current is also present. The model reproduces the filaments at the Cape of S. Vincent, upwelling jet separation, eastward advection of cold waters, the cold filament at the southern edge of the strait, and the warm counter-current during relaxation periods.