



Tracing the Mediterranean Outflow back into the Alboran Sea: A numerical modeling study

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The Eulerian mean circulation in the Alboran Sea is studied with a climatologically forced primitive equation model featuring realistic topography, with a focus on water that eventually exits the Mediterranean through the Strait of Gibraltar (Mediterranean Outflow water). Pathways, volume transport, transformation of water properties and residence time of the Mediterranean Outflow water in the Alboran Sea are described from a Lagrangian perspective.

At 1W, the bulk of water that later forms the Mediterranean Outflow enters the domain of interest at depths between 400m to 1000m, and then generally flows counterclockwise along the Iberian continental slope. A significant fraction of the trajectories, corresponding to a volume transport on the order of 0.1-0.2 Sv., detours and follows the spatial pattern of the Alboran Gyres before reattaching to the continental slope. About 3 % of the outflow originates of Atlantic inflow water, which is transformed in the two Alboran Gyres and the Almeria-Oran front. This indicates that in our Eulerian mean flow field, the baroclinic structure of the Alboran Gyres and Almeria-Oran front determines the pathway of a significant part of Mediterranean outflow water.