



On the Mediterranean Sea inter-basin exchanges and nutrient dynamics

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The Mediterranean Sea is an evaporative basin in which the deficit of water is supplied by the inflow from the Gibraltar Strait of Atlantic Water. The net result of the air sea interactions in the entire basin is an outflow at Gibraltar of a salty water that is mainly constituted by the Levantine Intermediate Water, formed in the eastern part of the basin. Despite this simplified pattern, the circulation in the Mediterranean is rather complex. Most of the Mediterranean sub-basins are characterized by water mass formation processes and the presence of sills and straits strongly influence both the spreading and the mixing of intermediate and deep waters. In this context a Lagrangian diagnostics applied to numerical results was used to quantify mass transport in the main pathways of the upper and lower cells of the Mediterranean thermohaline circulation as they results from OGCM simulations. Lagrangian diagnostics reveals to be very useful to quantify both transports between different regions and the associated spectrum of transit times by means of pdf distribution of particles transit times between the different regions of the basin. This method is very effective to estimate the contribution of different water masses in isopycnal and diapycnal transformation processes and in reconstructing the fate of tracers. We use here these previous results on the basin circulation for better understanding the nutrient dynamics within the basin where the inputs from the different sources (atmosphere, runoff and open ocean) have similar order of magnitude. This, to the aim of building scenarios on the impact of climate driven changes in elemental fluxes to the basin on the internal nutrient dynamics.