



The Mediterranean Sea overturning circulation

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The Mediterranean Sea conveyor belt system is composed of both zonal and meridional cells, interacting among themselves and creating an active vertical circulation. A 27 years eddy resolving reanalysis is used to diagnose for the first time the eulerian and residual vertical circulations of the global Mediterranean Sea. The basin-wide meridional overturning is structured around several anticyclonic and cyclonic cells. The anticyclonic cells in the separate Eastern and Western basins connect the deep ocean formation areas in the north to the central and southern regions. In the Eastern Mediterranean there are several anticyclonic cells: a weaker overturning cell starting from the Adriatic, a stronger one starting from the Aegean Sea and the Rhodes Gyre. The zonal overturning cell of the Mediterranean Sea is affected by the meridional vertical cell of the Aegean Sea, after the recent Eastern Mediterranean Transient. The dynamical nature of the meridional cells is different between the Western and Eastern Mediterranean basins with important contributions from the eddy transport components of the residual circulation. The zonal overturning maxima are about 1.4 Sv while the maximum values of the meridional overturnings are about 1 Sv. The connection of the zonal cell and the meridional overturning is visualized by computing the divergent and rotational components of the velocity field, aggregated in a two-layer flow forced by Gibraltar.