



## Seasonal variations of the surface circulation in the Gulf of Cadiz, SW Iberia

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The Gulf of Cadiz is the sub-basin of the North Atlantic nearest to the Strait of Gibraltar. Its surface circulation, less studied nowadays than the deeper, is integrated into the general circulation of the Northeast Atlantic: the Azores current, which transports some 15 Sv between latitudes 35°N-40°N to feed the Canary Current, frequently forms meanders that separate themselves from the main flow. The easternmost meander of the Azores current constitutes the surface circulation of the Gulf of Cadiz. Part of this meander enters the Mediterranean Sea through the Strait of Gibraltar to balance evaporation and buoyancy losses within this Sea. This anti-cyclonic circulation is subject, however, to seasonal variations. These variations have been studied by means of a 9-year time series of surface current velocity recorded by a Puertos del Estado RAP buoy in the northern Gulf of Cadiz.

During spring-summer, the upwelling season, high south-east velocities are observed, compatible with an anti-cyclonic circulation, in good agreement with the in situ measurements performed during GOLFO 2001 survey. During autumn and winter, velocities tend to decrease and, at the end of the year, a reversal to north-west direction is observed in most of the years under study. This change has been correlated with the atmospheric forcing, in particular with the seasonal wind regime. During most of the year, westerlies prevail at seasonal time scales. But, at the end of the year, coinciding with the flow reversal, easterlies are observed. This would be related to seasonal variations in the location of the Azores high, at lower latitudes in wintertime, along with the development of a continental high of thermal origin over the Iberian Peninsula. These

two concomitant factors favour easterlies to be dominant at seasonal time scales during these periods of flow reversal. Changes in the outer circulation are also followed by changes in the circulation over the continental shelf. Whereas in spring-summer, a cyclonic mesoscale cell is observed in the eastern shelf, it vanishes during autumn and winter and a south-east flow towards the Strait is detected.