



Seasonal signal in the Mediterranean outflow through the Strait of Gibraltar observed in Espartel sill. A contribution from INGRES project

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The Espartel sill (ES), located off Cape Espartel, Morocco, at 5° 59'W longitude in the Strait of Gibraltar, is the second sill in importance after the main sill of Camarinal (CS), which is situated at 5° 46'W, some 20 km to the East. ES could be seen as the last gate of the Mediterranean outflow in its path to the open ocean. There, tidal currents are much weaker than in CS, a fact that facilitates the computation of flows from current observations. This was the reason to install a long-term monitoring station of the flows through the Strait in this site. The station has been deployed in September 2004 within the Spanish funded project REN03-01608/MAR (acronym INGRES) and, up to now, it has collected observations of velocity (ADCP) and near-bottom temperature/salinity during more than a year.

These data have revealed a seasonal signal in both the flows and the T-S properties of the Mediterranean outflow, with maximum outflow in late spring (April-May) and minimum in September-October and a secondary semiannual signal superposed to the annual cycle. The annual signal is very clear in the temperature of the outflowing water, warmer in winter (December-January), cooler in late spring (May-June). A concomitant though weaker signal is also found in the salinity time series, water being fresher in winter (January) and saltier in May-June. The temperature and salinity signals combine to give less dense outflowing water in winter than in summer. A first interpretation of these results tends to confirm the idea put forward by other authors that the seasonal signal in the outflow is tightly linked to the intermediate and deep water formation processes in the Mediterranean.