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Monitoring and resolving sub-seasonal to inter-annual variability through a choke point in the Western Mediterranean Sea circulation, using gliders and models

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Abstract (Oral Presentation)

The Ibiza Channel plays an important role in the circulation of the Western Mediterranean Sea, governing the north/south exchange of different water masses that are known to affect regional ecosystems. The circulation in the channels is influenced through the variability of different drivers that affect the sub-basins to the north (N) and south (S).

A now 7-year (2011 – 2018) timeseries from the quasi-continuous glider endurance line monitoring of the Ibiza Channel undertaken by SOCIB (Balearic Coastal Ocean observing and Forecasting System), show high frequency variability overlying key sub-seasonal to inter-annual patterns and shifts in water mass properties and transport volumes. In this study we use a multi-platform approach to resolve the key drivers of this variability and gain insight into the inter-connection between the N and S of the Western Mediterranean Sea, through this 'narrow' choke point.

The glider data indicate that the following are key components in the variability of the N/S flow through the channel; variability in regional winter mode water production (Winter Intermediate Water), intermediate water (Levantine Intermediate Water) properties, the northward flows of a fresher water mass and the strength of the basin-scale circulation. To the north atmospheric forcing in the Gulf of Lions is a dominant driver, while to the south, at the eastern edge of the Alboran Sea, the mesoscale circulation patterns of the Atlantic Jet and Alboran gyres dominate the variability but do not appear to influence the fresher inflows. The Mediterranean Sea is undergoing change, the effects of which are visible in the Ibiza Channel timeseries. The study highlights the importance of sub-seasonal variability and the scale of rapid change possible in the Mediterranean, as well as the benefits of leveraging high resolution glider datasets within a multi-platform study.