{rokbox title=|Map of the Western Mediterranean and scheme of its circulation :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-time-series-water-mass-transports-balearic-channels-vargas-et-al-2025-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-time-series-water-mass-transports-balearic-channels-vargas-et-al-2025.jpg{/rokbox}

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A time series of water mass transports through the Balearic Channels using an ocean circulation inverse method: 1996–2022.
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Abstract: Time series of temperature and salinity from CTD (Conductivity Temperature Depth) sections in the Ibiza and Mallorca Channels from 1996 to 2022 are used to calculate a time series of transports of Atlantic Water (AW), Western Intermediate Water (WIW), Levantine Intermediate Water (LIW) and Western Mediterranean Deep Water (WMDW). The oceanographic stations were distributed on two triangular closed boxes for the application of inverse circulation modelling. A data set of 80 oceanographic campaigns was initially considered. After examination and interpolation of the data, only 23 campaigns contained the complete sections forming the two boxes and were suitable for the calculation of transports using the inverse method. Over the course of 42 oceanographic cruises, only the southern sections of the Ibiza and Mallorca Channels were completed. In these cases, transports were derived from geostrophic velocities, using the sea floor as a reference level of no motion, and without employing the inverse method. The results from both methodologies showed a prevailing southward annual transport of the upper layer (AW + WIW) ranging between −0.1 Sv and −0.21 Sv in the Ibiza Channel and a northward transport between 0.07 Sv and 0.09 Sv in the Mallorca Channel (depending on the methodology used). A subjective classification of the circulation patterns for each individual campaign revealed the existence of 5 circulation modes: Northern Current mode, inflow mode, two-way circulation, reversed two-way circulation, and eddy circulation mode. The two-way circulation mode, with a southward flow at the western side of both channels and a northward flow at the eastern sides, was the most frequently observed circulation pattern. However, the inter-annual variability seems to be larger than the seasonal signal and it was very difficult to establish a seasonality in the occurrence of these circulation

modes. LIW flows to the south in the Ibiza Channel and to the north in the Mallorca one, but the transports of this water mass were very low, suggesting that the main path of LIW follows the northern slope of the Islands, within the North Balearic Current. These results are used to speculate about the circulation and mass budget in the Northwestern Mediterranean.

Keywords: Ibiza channel, Mallorca channel, Balearic channels, Inverse modelling, North Balearic current, Western mediterranean