S. Monserrat, J.L. López-Jurado and M. Marcos, (2007). A mesoscale index to describe the regional circulation around the Balearic Islands
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Abstract: Historical oceanographic surveys carried out around the Balearic Islands (western Mediterranean) suggest two different scenarios for the regional ocean circulation. In one scenario, occurring during cold winters, cool water is formed at intermediate layers (100–300 m) in the Gulf of Lions. This Western Mediterranean Intermediate Water (WIW) usually moves southward reaching the Balearic Channels, deflecting the warmer Levantine Intermediate Water (LIW) coming from the Eastern Mediterranean, and even blocking the Ibiza Channel. On the other hand, during mild winters, less WIW is formed and then LIW flows through the channels, appearing at their characteristic depths. The oceanographic surveys around the Balearic Islands (1985–2004) have provided a qualitative index, indicating the presence or not of WIW in the Ibiza Channel, based on the analyses of θS diagrams. A quantitative index based on mean water temperature between 100 and 300 m depth in the channels may also be defined. Both indexes, the qualitative and the quantitative, give consistent information on WIW presence for the period 1985–2004, however, both are short in time and have gaps in the series. In order to obtain a longer and continuous index for WIW presence and then for regional circulation, air–sea heat fluxes at the Gulf of Lions during winter months were obtained from the meteorological NCEP/NCAR reanalysis dataset and compared with other meteorological data such as surface air temperature. The standardized air temperature anomalies at 1000 hPa in the Gulf of Lions during winter (December–March) has been shown to be the simplest and best indicator of absence/presence of WIW in the Balearic Islands channels in late spring. Values above 1.0 of the standardized temperature anomaly would indicate absence of WIW in the Ibiza Channel. The high correlation obtained with available in-situ oceanographic data allows the use of this index as an indicator of presence of WIW and then of different regional circulation scenarios backwards in time and in those years for which the oceanographic data are missing or scarce.