{rokbox title=|(a) Location of the study area (red square) (b) Three-dimensional perspective of the bathymetry in the study area :: Image: Authors| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-persistent-depth-intensified-mixing-during-western-mediterranean-transitions-initial-stages-pineiro-et-al-2021-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-persistent-depth-intensified-mixing-during-western-mediterranean-transitions-initial-stages-pineiro-et-al-2021.jpg{/rokbox}

S. Piñeiro, C. González-Pola, J. M. Fernández-Díaz, A. C. Naveira-Garabato, R. Sánchez-Leal, P. Puig, J. Salat, **R. Balbin**, 2021. **Persistent, Depth-Intensified Mixing During The Western Mediterranean Transition's Initial Stages.**
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Abstract: Major deep-convection activity in the northwestern Mediterranean during winter 2005 triggered the formation of a complex anomalous deep-water structure that substantially modified the properties of the Western Mediterranean deep layers. Since then, evolution of this thermohaline structure, the so-called Western Mediterranean Transition (WMT), has been traced through a regularly sampled hydrographic deep station located on the outer continental slope of Minorca Island. A rapid erosion of the WMT's near-bottom thermohaline signal was observed during 2005–2007. The plausible interpretation of this as local bottom-intensified mixing motivates this study. Here, the evolution of the WMT structure through 2005–2007 is reproduced by means of a one-dimensional diffusion model including double-diffusive mixing that allows vertical variation of the background mixing coefficient and includes a source term to represent the lateral advection of deep-water injections from the convection area. Using an optimization algorithm, a best guess for the depth-dependent background mixing coefficient is obtained for the study period. WMT evolution during its initial stages is satisfactorily reproduced using this simple conceptual model, indicating that strong depth-intensified mixing (K ∞ (z) □ 22 $\times 10^{-4}$ m2 s^{-1}; z □ 1,400 dbar) is a valid explanation for the observations. Extensive hydrographic and current observations gathered over the continental slope of Minorca during winter 2018, the first deep-convective winter intensively sampled in the region, provide evidence of topographically localized enhanced mixing concurrent with newly formed dense waters flowing along-slope toward the Algerian sub-basin. This transport-related boundary mixing mechanism is suggested to be a plausible source of the water-mass transformations observed during the initial stages of the WMT off Minorca.

Keywords: deep waters, temperature, salinity, Western Mediterranean, anomaly, numerical

model