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Present and past variability of the Mediterranean Outflow Water using Nd isotopes

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The Mediterranean Outflow Water (MOW) is a source of heat and salt into the Atlantic Ocean, and it has been proposed that it preconditions the water masses that participate in the production of deep water into the north Atlantic, or the Atlantic Meridional Overturning Circulation (AMOC). Although some modelling and proxy studies have suggested that past changes in properties of the MOW could have consequences to the AMOC, this impact is still being debated. Seawater Nd isotopic composition (ε_{Nd}) has been used as a conservative water mass tracer in the modern ocean, but also as a paleo-circulation proxy measured in the Fe-Mn coatings of foraminifera. One of the advantages of using Nd isotopes is that this tracer can be used to calculate the mixing and export rates of water masses nowadays, but also in the sedimentary record, which could help estimate the mixing and exportation rates of the MOW into the North Atlantic in the present and in the past. But recently, some studies have shown processes that can modify the signal of ε_{Nd} in seawater and consequently, in the sedimentary archive (for example pore water reactions). In order to test the reliability of ε_{Nd} as a tracer for the MOW, we analyze ε_{Nd} from seawater samples, foraminifera Fe-Mn coatings and sediments from transects located in the Iberian Margin. Seawater results show that ε_{Nd} can be used to identify the different water masses located in the Iberian Margin. Considering that the ε_{Nd} values of the MOW differ from the values of the surrounding Atlantic waters, Nd isotopes seem to be a good tool to trace the MOW through the Iberian Margin. The comparison of these results with the ε_{Nd} values of core-top foraminifera and sediment samples provides us with enough information to infer how the geochemical signal of seawater Nd isotopes is transferred to the Fe-Mn coatings of foraminifera, and how to interpret these results on a palaeoceanographic context. This study aims to establish the basses to interpret ε_{Nd} reconstructions of MOW changes since the last glacial period in relation with AMOC changes.