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Water export changes through the Strait of Sicily during the last deglacial period

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The Mediterranean Sea is constituted by two sub-basins connected through the Sicily channel. In the western basin deep water is formed at Gulf of Lions and in the eastern basin deep water convection occurs in both the Adriatic and Aegean Sea, while intermediate water is formed in the Levantine Sea area. The intermediate and deep water convection of the Eastern Mediterranean has been proved to be highly sensitive to varying fresh water fluxes, associated with increased rainfall during the African Humid period (15-6 kyr BP). Here we investigate for the first time, changes in the export rates of eastern Mediterranean sourced water masses (EMSW) into the western basin for the last ~15 kyr BP. For this purpose, we analyze $^{143}Nd/^{144}Nd$ isotope ratios (e_{Nd}) in planktic foraminifera coatings, a quantitative tracer of water mass provenance, from a sediment core recovered at the western flank of the Sicily channel (NDT-6-2016, 1066 m depth). At present, this site is located below the hydrographic boundary layer between the eastern and western sourced water-masses. The measured e_{Nd} values were then used to elucidate changes in EMSW export rates through late deglacial and Holocene periods applying an endmember mixing model. Our results indicate that EMSW export rates were maximum during the Younger Dryas (YD) period, about three times higher than during the S1, supporting the limited formation of both intermediate and deep water masses in the eastern basin during the S1 as suggested by previous studies. We propose that the enhanced EMSW outflow into the western Mediterranean over the YD was the result of the combined effect of 1) enhanced climate-driven convection in the Aegean Sea and 2) the reduced convection of western deep water during this period, when the last Organic Rich Layer deposited in the deepest areas of the western basin.