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Mediterranean thermohaline circulation variability from the last deglaciation associated with changes in the eastern Mediterranean water outflow

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The Eastern Mediterranean Sourced Water (EMSW) outflow through the Strait of Sicily and together with the Western Mediterranean Deep Water (WMDW) contribute with different proportion to the Mediterranean outflow waters (MOWs) that exit into the Atlantic Ocean through the Strait of Sicily. In this work, we investigate changes in the EMSW outflow from the last deglaciation, with special focus in two periods characterized by important hydrographic changes, 1) The Younger Dryas (YD) and 2) the Last sapropel (S1). For that, we analyze Neodymium isotopes in planktic foraminifera coatings, stable oxygen isotopes and Mg/Ca ratios from both benthic and planktic foraminifera as well as grain-size from a sediment core recovered at the western flank of Sicily channel at 1066 m depth (W-Sicily; NDT-6-2016). At present, this site is located below the hydrographic boundary layer between the eastern and western sourced water-masses and then, it is suitable to evaluate changes in the EMSW outflow. Our data suggests that enhanced and high-salinity flow of eastern Mediterranean sourced waters (EMSWs) during the YD resulted on an intensification of Mediterranean outflowing waters (MOWs) currents. We proposed that this enhanced MOW could have favored the reactivation of the Atlantic meridional overturning circulation (AMOC), which was operating in a weak mode. An important reduction of the EMSW flow during the S1 resulted in a reduced surface Atlantic water eastward flow, reducing its influence at W-Sicily. During the last part of the S1 (S1b) very distinctive hydrographic conditions developed both at surface, with strong mixing, and at depth with the appearance of a high salinity water mass. We propose that regional climate conditions led to an increase of the evaporation/precipitation, which would have favored deep water convection processes, promoting the formation of a high-salinity intermediate-water mass over the Tyrrhenian Sea area during this S1b period.