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# A simulation of the precession-minimum and present-day Mediterranean thermohaline circulation.

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Sapropels -organic matter rich layers- are common in Neogene sediments of the Mediterranean Sea. The formation of these layers is known to occur at precession minima and has been attributed to (1) increased production of organic-matter and (2) increased preservation due to a decrease in the thermohaline circulation (THC) and hence oxygenation of the deep waters. In order to assess the response of the Mediterranean THC to the climate system changes (Precipitation, Evaporation and Runoff) we used ocean general circulation models (MOMA and MED16) to simulate the Mediterranean THC for the present day and a precession minimum situation. MOMA has a horizontal grid mesh of 1/4 x 1/4 degrees and 19 levels in the vertical and MED16 has 1/16 x 1/16 degrees and 43 levels respectively. To our knowledge it is the first time that this issue is addressed with such numerical model resolution.

Both models show that sea surface salinity and Nile discharge play an important role in winter convection and water mass formation. Indeed, we find that MOMA is less sensitive to the climate system changes than MED16. Regarding the present-day THC the models provide reasonable agreement with the literature. Our results show that the precession-minimum conditions induce a fresher surface layer in the vicinity of the Rhodes Gyre thus preventing the preconditioning for the formation of the Levantine Intermediate water (LIW). Hence a shallow winter mixed layer and reduced ventilation around the basin during the precession-minimum period are observed which appears consistent with the "sapropel mode" of circulation.

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