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Deglacial and Holocene changes in Mediterranean Thermohaline Circulation: A joint perspective from Eastern and Western basins

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The dominant arid climate conditions over the Mediterranean (Med) control water properties and the formation processes of intermediate and deep water masses. Deep convection cells occur in both the E- and W-Med basins and there are interconnected through the intermediate waters mostly formed in the easternmost area of the Med. Model projections anticipate that the current situation of climate change will led to an overall weakening of this circulation system during the current century. But the natural range of variability in the intensity of individual cells, the drivers and the inter-connection patterns between the cells is not well stablished. During the recent past (las deglaciation and current Holocene) both E- and W-Med had experienced periods of major disruptions in convection. The last organic layer (ORL1) formed in the W-Med during the deglacial period and later the last sapropel (S1) in the E-Med. Both enhanced productivity and weakening in convection are regarded as the causes in the two events but due to different drivers, the deglacial freshening in the case of the ORL1 and the African monsoon flooding for the S1. Here we present U/Mn ratios measured in the foraminifera diagenetic coatings from sediment cores from both E- and W-Med. The nature of this proxy, that provides information of the oxygen water content, allows its application in a wide range of oceanographical/oxygen conditions, a situation that limits other proxies whose carrier is very sensitive to oxygen content. This approach allows us, by the first time, to compare the oxygen evolution of individual basins and at different water depths by means of the same tool. The comparison with other available proxies let us to interpret the drivers of the changes and analyze the evolution of Med deep and intermediate convection along the ORL1 and S1. This new view advocates for a very close link between these two events but with very distinctive response of the individual cells to the dominant forcings.