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Strong North Atlantic Subtropical Gyre circulation fueling moisture advection into the Mediterranean realm during the Mid-Pleistocene Transition

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The wind-driven North Atlantic Subtropical Gyre is an important mediator of heat and moisture advection into central and southern Europe. Here we study the dynamics of the Subtropical Gyre during the mid-Pleistocene (approx. 1400 – 500 ka; MIS 44 – 14). This time interval is characterized by a profound increase in continental ice shield size and the switch from a 41 kyr to a ~100 kyr glacial/interglacial cyclicity ("Mid-Pleistocene Transition", MPT). Primary goal was to investigate the response of the Subtropical Gyre to changes in the boundary conditions (e.g. ice volume) over the course of the MPT. Our interpretation is based on paired δ^{18}O and Mg/Ca analyses on the thermocline-dwelling planktonic foraminifera *Globorotalia inflata* from Iberian Margin Site U1385 reflecting subsurface temperature and salinity variability at the eastern branch of the Subtropical Gyre. The results show generally cold/fresh glacials and warm/saline interglacials on thermocline level. Hence, advection of warm/saline subtropical waters is generally stronger during interglacials than during glacials. However, glacials MIS 20 and 18 stand out as they are characterized by anomalously warm and saline subsurface waters off Iberia. We infer that enhanced ice shield growth during the MPT led to a southward shift of the source region of the thermocline waters at the Iberian Margin. Combined with increased Ekman downwelling (causing a deepened thermocline) this effectively counteracted glacial subsurface cooling at Site U1385. The eccentricity minimum during MIS 20–18 further suppressed the development of strong trade winds and, hence, the advection of cold northern-sourced water masses. Relatively humid conditions in the eastern Mediterranean during MIS 20 and 18 indicate that atmospheric moisture derived from the warm water accumulated off Iberia might have been advected deep into continental Europe. It might be perceived that this moisture further fueled European glacier growth during the MPT.