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Tropically-driven climate shifts in southwestern Europe during MIS 19, a low eccentricity interglacial

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The relative roles of high- versus low-latitude forcing of millennial-scale climate variability is not well known. Here we show that millennial variability during Marine Isotope Stage (MIS) 19, a period of reduced eccentricity centered at 785 ka and the best analogue to our present interglacial from an astronomical point of view, was related to a nonlinear response to Earth's precession cycle. We present terrestrial and marine climate profiles from the southwestern Iberian margin, a region particularly sensitive to precession. In contrast to our present interglacial, we show for the first time low latitude-driven 5000-year cycles of drying and cooling in the western Mediterranean region along with warmth in the subtropical gyre related to the fourth harmonic of precession. These cycles indicate repeated intensification of North Atlantic meridional moisture transport that along with decrease in boreal summer insolation triggered ice growth and may have contributed to the glacial inception, at ~774 ka. Superimposed on this cyclicity, freshwater fluxes into the North Atlantic during MIS 19ab amplified the cooling events leading to glaciation. The discrepancy between the dominant cyclicity observed during the Holocene, 2500-yr, and that of MIS 19, 5000-yr, challenges the similar duration of the two analogue interglacials under natural boundary conditions.