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Plio-Pleistocene high-low latitude climate interplay: a Mediterranean point of view

F. Colleoni (1), S. Masina (1,2), A. Negri (3), and A. Marzocchi (1)

(1) Center for Euro-Mediterranean Climate Changes, Bologna, Italy (flocolleoni@gmail.com), (2) Istituto Nazionale di Geofisica e di Vulcanologia, Bologna, Italy (simona.masina@bo.ingv.it), (3) Dpt. di Scienze della Vita e dell'Ambiente - Universita' Politecnica delle Marche, Ancona, Italy, (a.negri@univpm.it)

The high-low-latitude climate interplay during the Plio-Pleistocene global cooling is not yet well understood. Insight on the Mediterranean region can provide some clues about past significant climate changes since the basin reflects the climate dynamics of both high-latitude and low-latitude regions, being connected to the North Atlantic and subjected to monsoon influence. Here we shade light on this connection problem by performing a spectral analysis on an Eastern Mediterranean stack of planktonic records spanning the last 5 million years and by further comparing it to North Atlantic and Pacific deep- and surface-water records. Our main conclusion is that the Mediterranean detected the main global climate transitions over the last 5 Myrs although sapropel depositions indicate that it remained influence by the African summer monsoon during the whole interval. Our analysis reveals that until 2.2 Ma the Mediterranean planktonic record is driven by regional processes dominated by precession. The progressive emergence of the 41-kyr frequency in the Mediterranean records around 2.8 Ma suggests that, since this date, the Mediterranean was more and more affected by the high-latitude climate dynamics forcing than by the low-latitude one. Moreover, during the ongoing Plio-Pleistocene cooling, the 41-kyr frequency signal in the Mediterranean records anticipated high-latitude deep-water response to the intensification of the Northern Hemisphere Glaciations (NHG) and lagged the signal in tropical latitudes. Finally, toward 1.2 Ma the results suggest that the progressive shift from the 41-kyr to the 100-kyr frequency was led by the northern high latitudes. Overall, our results confirm that the Mediterranean is an ideal site to study the interplay between high and low-latitude climates.