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Expression, frequencies and dynamics of sub-orbital scale variability during Marine Isotope Stages 19: insights from the Sulmona Basin (central Italy)

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The study of abrupt climatic events within interglacial periods has assumed increasingly significance, especially in the context of current and future Global Change (Tzedakis et al., 2009). The Marine Isotope Stage (MIS19), spanning the ca. 790-760 ka period is considered the best orbital analogue of the present interglacial over the last 1 Ma. Exploring patterns, causes and expression of its variability is important for framing Holocene climate into a historical-natural context and for projecting its future in the light of both anthropogenic and natural forcing.
Here we present an high resolution, multiproxy biogeochemical record (δ18O, elemental and mineralogical composition, biogenic silica) from carbonatic endogenic lacustrine sediments hosted in the Sulmona Basin (central Italy) and covering the interglacial portion of MIS19, roughly corresponding to the MIS19c. The record shows significant variability at the centennial to millennial time scale. Sediments from the Sulmona Basin faithfully record regional hydrological and environmental conditions, which can be linked to Mediterranean and North Atlantic conditions thanks to well-known climate teleconnections (e.g. Giaccio et al., 2015, Regattieri et al., 2016). The robust 40Ar/39Ar chronology developed on volcanic ash layers (tephra) interbedded in the sediment allows to firmly place this variability onto an independent time scale. We investigate expression, pacing and periodicities of the short-term climate change and then compare it to the climatic framework apparent from several North Atlantic marine record, to unravel potential forcing and mechanisms for intra-interglacial climate variability.
Tzedakis, P. C., Raynaud, D., McManus, J. F., Berger, A., Brovkin, V., & Kiefer, T. (2009). Interglacial diversity. Nature Geoscience, 2(11), 751-755.
Giaccio, B., Regattieri, E., Zanchetta, G., Nomade, S., Renne, P. R., Sprain, C. J., ... & Sposato, A. (2015). Duration and dynamics of the best orbital analogue to the present interglacial. Geology, 43(7), 603-606.