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Orbitally tuned correlations of CM- and Mi-events in Miocene shallow marine carbonates in the Mediterranean region

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Shallow marine carbonate successions offer a great potential for the preservation of changes in paleoenvironmental conditions although their frequently low stratigraphic resolution limits their viability for such studies. However, many recent studies aim to significantly improve the stratigraphic resolution of such sections in the Mediterranean region. Particularly the Oligocene-Miocene Decontra section on the Maiella Platform (central Italy) with its long lasting and widely continuous record offers an ideal possibility for this type of study.

The present study aims to further improve the stratigraphic resolution of the section via orbital tuning. To achieve this, we investigated high-resolution gamma ray (GR) and magnetic susceptibility (MS) data for possible cyclic patterns and their correlation to known orbital parameters of the long and short eccentricity cycles as well as the obliquity cycle. The observed 405 kyr eccentricity cycles in the GR and MS record were used to orbitally tune the Decontra section. This approach allows, within a well-established bio-, sequence- and isotope stratigraphic framework, precise correlation of the Decontra section with deep-sea records of the Mediterranean region, as well as the global climate record. The results further indicate that the 405 kyr eccentricity cycle is particularly well preserved in the interval between ~17 and 13.5 Ma in the GR data. Since GR is a direct proxy for raised precipitation of authigenic Uranium caused by increased burial of organic carbon in isolated setting, it follows the same long-term orbital pacing as observed in deep-sea carbon and oxygen isotope records. The observed 405 kyr GR beat is thus assumed to correlate with the carbon isotope maxima observed during the "Monterey event". Furthermore, the tuning of the section allowed a precise correlation of long-term trends in the magnetic susceptibility data with the global sea level curve.