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Correlation of very long-term variations in Cenozoic δ13C record and eccentricity modulation cycles

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Time-series analysis of the Cenozoic carbon isotope record (δ13C) shows evidence of prominent very long-term cyclicity of a periodicity close to 9 Myr. Amplitude modulation (AM) analysis of Earth's orbital eccentricity variations shows similar long-term cycles of 9 Myr modulating the well known $\sim$2.4 Myr cycles. Some lines of correlation between 9 Myr carbon-cycle and orbital eccentricity variations are also observed hinting at a possible link between the two. Additionally, the Paleocene-Eocene Thermal Maximum event (PETM, 55.9 Ma) is situated within a pronounced 9 Myr cycle in the δ13C. In particular, the PETM corresponds to an inflection point in the decreasing part of the 9 Myr cycle pointing to a possible link between accelerated rates in δ13C variations and the onset of the PETM.