

Full reference:

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Abstract:

Much of our understanding of Cenozoic climate is based on the record of $\delta^{18}\text{O}$ measured in benthic foraminifera. However, this measurement reflects a combined signal of global temperature and sea level, thus preventing a clear understanding of the interactions and feedbacks of the climate system in causing global temperature change. Our new reconstruction of temperature change over the past 4.5 million years includes two phases of long-term cooling, with the second phase of accelerated cooling during the Middle Pleistocene Transition (1.5 to 0.9 million years ago) being accompanied by a transition from dominant 41,000-year low-amplitude periodicity to dominant 100,000-year high-amplitude periodicity. Changes in the rates of long-term cooling and variability are consistent with changes in the carbon cycle driven initially by geologic processes, followed by additional changes in the Southern Ocean carbon cycle.

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