

New high-resolution record of middle to late Miocene climate evolution

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After the fairly warm Miocene climate optimum about 17-15 million years ago, Earth's climate began to cool. Holbourn et al. present a new high-resolution record of climate evolution over the middle to late Miocene from 12.9 to 8.4 million years ago based on stable isotopes in sedimentary benthic foraminifera in the western Pacific Ocean.

They also combine their data with previously published data going back to 16 million years ago from the same location to study the transition from a <u>warmer climate</u> to a cooler one. They focus on the relationship between climate and changes in the eccentricity and obliquity of Earth's orbit around the Sun.

They find that changes in carbon isotope ratios track long-period (400,000 year) variations in the eccentricity cycle, and changes in oxygen isotope ratios track shorter-term (100,000 year) variations in eccentricity and 41,000 year variations in obliquity.

From the oxygen isotope record, the authors observe that Earth's climate cooled in a series of incremental steps at about 14.6, 13.9, 13.1, 10.6, 9.9, and 9.0 million years ago.

In general, <u>climate variability</u> decreases after about 13 million years ago, except for a warming episode about 10.8–10.7 million years ago, which the authors associate with a maximum in the eccentricity of Earth's orbit.

More information: Middle to late Miocene stepwise climate cooling:



Evidence from a high-resolution deep-water isotope curve spanning 8 million years, *Paleoceanography*, <u>DOI: 10.1002/2013PA002538</u>, 2013 <u>onlinelibrary.wiley.com/doi/10 ... 013PA002538/abstract</u>

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