

The lower limit of Quaternary inferred from a viewpoint of isotope

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On June 30 in 2009, the International Union of Geological Sciences (IUGS) recognized the Quaternary Period as a formal chronostratigraphic unit and it spans the last 2.6 million years (Ma) of Earth history, instead of hitherto used 181 Ma. In the present talk, I consider what sort of the new beginning age of the Quaternary from a viewpoint of isotope. It is well known that the best proxy for the past climatic change is an oxygen isotope (^{18}O) curve of benthic foraminiferal tests in marine sediment cores. Lisiecki and Raymo (2005) reported a ^{18}O curve since the beginning of Pliocene (5.3 Ma) by stacking all ^{18}O curves of 57 sediment cores recovered from a worldwide ocean floor. According to this curve, the climate during the Pliocene (5.3~2.6 Ma) was warm and had small amplitudes between the glacial and interglacial periods. On the other hand, the climate of the Quaternary started from a conspicuous cooling during the glacial periods at the beginning, although there was no notable cooling during the interglacial periods. Furthermore, the amplitudes of the ^{18}O curve are getting wider between the glacial and interglacial periods. Judging from the amplitudes of the ^{18}O curve in the early Quaternary, the size of continental ice sheets during the glacial periods must be similar to that of the last deglacial period when the sea level was 50+/- 20 m lower than today, if we assume 120 m sea level drop at the last glacial maximum.

Reference.

Lisiecki, L.E. and Raymo, M.E. (2005) A Plio-Pleistocene stack of 57 globally distributed benthic ^{18}O records. *Paleoceanography*, 20, PA1003, doi:10.1029/2004PA001071.

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