

Marine Isotope Stage 8 millennial-scale variability as observed in the Asian monsoon

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Previous work from several stalagmites collected from Dongge Cave, and Hulu Cave, China has shown significant shifts in oxygen isotope values, which have been interpreted in terms of changes in Asian monsoon strength. During the last two glacial periods (MIS 2/3/4 and MIS 6), variability up to half the amplitude of a glacial/interglacial transition has been observed [1,2]. Strong monsoon events have been correlated to the Dansgaard/Oeschger (D/O) warm events in Greenland and weak monsoon events have been correlated to ice-rafted debris (IRD) events in the North Atlantic.

Here, we present a complete record of the Asian monsoon from 240 to 300 ka using two stalagmites from Dongge Cave, D10 and D8. Significant oxygen isotope shifts of up to 2 per mil occur throughout this period with a millennial-scale pacing of roughly 1 event every 2.5ka. Both the amplitude and relative pacing of the events is similar to those events observed in the previous two glacial periods indicating that the nature of glacial period climate variability has not changed dramatically over the last three glacial cycles. At lower frequencies, the monsoon correlates with insolation. In addition, the monsoon is unusually strong during the time of MIS 8.5 with values corresponding to peak interglacial time.

MIS 8 contains three weak monsoon periods at 280ka, 255ka, and 245ka, the last of which immediately precedes the shift into MIS 7. It is likely that these three intervals correspond to three significant periods of IRD deposition in the North Atlantic [3]. This observation suggests that the connection between the northern high latitudes and the tropical western Pacific Ocean (where the Asian monsoon originates) that was observed in the two most recent glacial periods can be extended to include MIS 8.

References

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