Geophysical Research Abstracts, Vol. 9, 08187, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08187

Detection of Climate Transitions in Asia Derived from Speleothems

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Speleothems offer archives of climatic variability in the past. We analyse isotope records of stalagmites from three caves at different locations in Asia: Oman, Northern India and China. These records are proxies for the rainfall variability at these locations and cover a time range between about 3 and 4 kyr. At these locations, the influences of the summer and winter monsoon are rather different.

Recurrence is a fundamental property of dynamical systems. A statistical analysis of recurrence plots can uncover hidden transitions in data series, which are not obvious using linear statistical methods.

The analyses of the recurrence structure of the isotope records of the stalagmites reveals transitions at the same times, although the data series itself do not correlate. This result suggests that at these times the entire monsoon system underwent changes which are visible in the isotope records despite the different reaction of the local rainfall on the summer and winter monsoon.