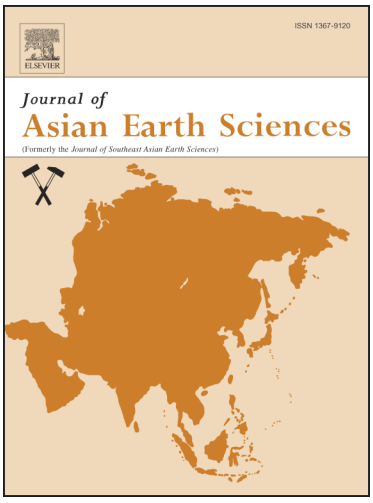

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Fine-grained quartz OSL dating chronology of loess sequence from southern Tajikistan: Implications for climate change in arid central Asia during MIS 2

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Abstract

The desert and semi-desert region of arid central Asia is one of the most important areas of middle-latitude dust emission and deposition in the Northern Hemisphere. Marine isotope stage 2 (MIS 2) was the latest and one of the most representative intervals of dust emission from the region, and it is especially important for research into processes of dust transportation and deposition. Here, we report the results of an optically stimulated luminescence study of the Hoalin section in southern Tajikistan, which was deposited during MIS 2. The fine-grained quartz single aliquot regeneration (SAR) approach was used and its reliability was verified by internal checks. In addition, grain-size analyses, calculated dust accumulation rates (DARs) and mass accumulation rates (MARs) were used to reconstruct the pattern of climate change during MIS 2. The mean DAR for southern Tajikistan during MIS 2 was 0.43 m/ka, and the corresponding average MAR was 673 g/cm^2/a for a non-river-terrace site, which is higher than the average MARs estimated for the central and southern Chinese Loess Plateau (CLP). In contrast to previous suggestions, the high dust DARs and MARs during the LGM indicate a 'cold-dry' climatic pattern, rather than a 'cold-humid' pattern. Our results also confirm that the patterns of high dust emission and deposition during the LGM in the mid-latitude arid zone of Asia were synchronous.