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# Aeolian dust mixing patterns inferred from the grain-size distribution of Late Neogene sedimentary sequences from China

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The formation, transport and deposition of aeolian dust are intimately coupled to and indicative of changes in (palaeo-) climate. Several physico-chemical properties of dust can be used to trace the source area and to characterise the mode of transport. Many geological investigations in the loess covered region of central China have used grain-size measurements as a basis for differentiating widespread loess and paleosol units, correlating them regionally, and relating them to the deep-sea and ice-core isotope stratigraphy. Various grain-size parameters have been applied as indicators of past changes in atmospheric circulation (wind strength, aridity). However, many approaches to palaeoclimate reconstruction from fine-grained aeolian sediments ignore the common fact that sediments are mixtures of sediment populations derived from different sources and transported by different mechanisms. Many studies potentially fail therefore to recognise the true significance of variations in grain-size properties.

The present contribution provides a synthesis of the grain-size results obtained for a series of Late Tertiary Red Clay records and more typical Quaternary loess-paleosol successions distributed across the Chinese Loess Plateau. The aim is to decompose the grain-size distributions into a set of sedimentary components ('end members') with the end-member modelling algorithm EMMA, and to relate the spatio-temporal changes in their proportional contributions to sediment transport processes and to climate changes. The modelling results clearly suggest that the studied sediments are

adequately described as mixtures of a series of dust components. The distinction between components related to selective dispersal of dust from a single source, and components related to mixing of dust from different sources turns out to be a fundamental requirement for successful palaeoclimate interpretation.