



## **Late Cenozoic eolian dust encroaching on fluvial systems on the NE Tibetan Plateau**

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Revealing the history of eolian dust impact on fluvial hydrological system is crucial for understanding of the modern weathering processes linked to carbon cycles in arid and semi-arid central Asia. Here we present bulk carbonate Ca-Mg-Sr concentrations and Sr isotopic compositions in a new fluvial sequence (12.8-4.8 Ma) in the Xining basin, and to compare these proxies with a previously reported fluvial section (12.2-5.1 Ma) in the Linxia basin, ~200 km southeast of the Xining basin. The Linxia basin bulk carbonate  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios show general lower values than those in the Xining basin between 12.2-~8 Ma, increase sharply at ~8 Ma, and can overlap those in the Xining basin since ~7 Ma. The post-7Ma bulk carbonate  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios of the two basins resemble carbonate  $^{87}\text{Sr}/^{86}\text{Sr}$  of the typical eolian Red Clays in the Chinese Loess Plateau, suggesting a dominating eolian dust impact on fluvial systems in the Linxia basin since ~8 Ma. By using the carbonate elements and  $^{87}\text{Sr}/^{86}\text{Sr}$  discriminations, we further confirm that the initiation of dust impact on fluvial systems in the Xining basin is earlier than 12.8 Ma. The much earlier eolian dust impact on fluvial systems in the Xining basin than that in the Linxia basin suggests a stepwise expansion of eolian dust delivery systems in Central Asia during Late Cenozoic.