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Persistent arid Tarim Basin at least from the Early Oligocene onwards

Zihua Tang and Zhongli Ding

Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China (tangzihua@gmail.com)

The retreat of the Paratethys Sea from the Tarim Basin westward has been proposed to increase the aridity over central Asia during the Cenozoic Era by palaeoclimate modelers. Here we present high-resolution palynological and geochemical records from a fluvial Kezilenuer section from the Kuche Depression, northern Tarim Basin. The Kezilenuer section exposes a distinct outcrop of foreland sediments and spans $\sim$30.5 $-$ 5.8 Ma, an interval when the Paratethys shrank westward significantly. Our results demonstrate that xerophilous plants, such as Chenopodiaceae and Artemisia, dominated the palynological spectrum with slight fluctuations during the late Miocene. The geochemical data further suggests that the sediments just suffered plagioclase weathering and the weathering indices remained stable low values throughout the whole section. Both lines of evidence suggest a persistent arid condition prevailed in the Tarim Basin, likely independent of the coverage of the Paratethys. This scenario seems to challenge previous modeling outputs on the impacts of land-sea distribution on central Asian aridity.