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Late Miocene deformation and surface uplift of the North Pamir

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The Pamir Plateau, as the west extension of the Tibetan Plateau, forms a prominent salient into central Asia. Previous studies have suggested that the Pamir indented northward, causing retreat of the proto-Paratethys Sea and aridification of Central Asia. However, its indentation and surface uplift history are poorly constrained, with existing studies focusing mainly on the eastern side of the Pamir salient. This study presents new multi-proxy data from the southeast Tajik Basin, located on the western side of the salient, to explore the tectonic evolution of the Pamir Plateau. In the southeast Tajik Basin, our magnetostratigraphic study indicates that the fluvial and alluvial strata were deposited between ~20-8 Ma, with thick conglomerates starting at ~15 Ma. Provenance data from sandstone detrital zircon U-Pb ages and mudstone ϵ_{Nd} values indicate a pronounced shift in sediment source from the Central Pamir to the North Pamir around 12 Ma. This provenance change is corroborated by carbonate stable oxygen isotopes showing a gradual decreasing trend between 12-8 Ma, which most likely reflects surface uplift of the North Pamir. Collectively, our results indicate that the North Pamir was originally part of the broad Tarim-Tajik Basin, and has been gradually uplifted since ~12 Ma.