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Syntectonic deposits of the Kuqa Depression and implications for the southward propagation of deformation in the late Miocene

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The fold-and-thrust belts in the southern forelands of Tian Shan were tectonically deformed as a result of intra-continetal deformation in response to the Indian-Eurasian collision; therefore, they are essential for understanding the tectonic evolution of the Tian Shan Range and the basinward propagation of deformation. Although the reactivation of Tian Shan has long been studied, when and how this deformation was initiated and propagated are still in controversial. In forelands, growth strata are closely linked to folding and faulting, and, thus, syntectonic deposits can provide essential information on tectonic deformation.

The Kuqa Depression, which is located on the southern flank of the Tian Shan range, is a typical rejuvenated foreland basin in response to the Cenozoic Indian-Eurasian collision. Several parallel lines of fold-and-thrust belts are the evidence of Cenozoic deformation and its southward propagation. Detailed magnetostratigraphic studies of syntectonic deposits on the Kelasu, Qiulitage and Kalayuergun structural belts suggested that the deformation of them initiated at the latest Miocene synchronously. Although most Apatite Fission-track results revealed an early onset of rejuvenation at $\sim$25 Ma, the deformation may has not migrated steadily into the forelands, but was focused on pre-existing basement structures. Combined with previous results around the long range, we suggest that the Tian Shan range experienced an intensive deformation as a whole in the late Miocene and the deformation began to propagate into forelands. The episode of accelerated deformation was related to the increase in northward motion of the Tarim Block in the late Miocene.