Neotectonic deformation in the Southwestern Tian Shan, Western China: evidence from paleomagnetic study of Quaternary sediments from the Mingyaole Anticline

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This paleomagnetic study is located at the north-west extremity of the Tarim Basin and has aimed to constrain the style of Neotectonic deformation where indentation of the Pamir Orogen into the southward-verging Tian Shan frontal zone has produced a complex zone of thrusting, folding and strike-slip. Sampling focused on two Pliocene to Pleistocene sedimentary formations folded across the Mingyaole Anticline, the major structural feature between the two frontal zones, has yielded well-grouped characteristic remanent magnetizations at 18 of 24 sites and a positive fold test. Together with fabric evidence, the results indicate a probable post-depositional detrital origin for the remanence. The results show that only small inter-locational vertical-axis rotations have occurred within the Kashi-Atushi fold and thrust system since the Miocene and imply that the Kashi depression has behaved as a quasi-rigid block. A common 15-30º counterclockwise (CCW) rotation relative to Eurasia since the Miocene of the Kashi Depression and the bordering Tian Shan range proves to be unrelated to the right lateral motion along the Talas-Ferghana intracontinental transform fault to the north west. This contrast is provisionally interpreted as taking place along a transfer fault between different segments of the thrust belt. Ongoing CCW rotation of the Tarim Basin is interpreted as a regional response to impingement by northward movement of the larger Tibetan Block to the south east.