

DEM modelling of the Tertiary Deformation of the Pamir and adjacent blocks

Paul Tapponnier, Jiao Liqing, Priyamvada Nanjundiah, and Sylvain Barbot

EOS/ASE, Nanyang Technological University, Singapore

The occurrence of two recent, shallow, strike-slip earthquakes in the Pamirs help elucidate the tectonic processes that control 3D crustal deformation around the Northwest corner of the India/Asia collision zone. InSAR data, and the focal mechanisms of these two events - 12/2015, Mw 7.2, South-Karakul, and 11/2016, Mw 6.6, West-Muji earthquakes – are consistent with respectively left- and right-lateral strike-slip motion on two conjugate, respectively NE- and EW-striking faults. On high-resolution optical images, the two corresponding active fault-systems can be mapped for several hundreds kilometres to connect with the Pandchir/Chaman and Karakorum fault systems, respectively. The former - hitherto undocumented - connection across high-mountain terrane and glacial topography, is marked by clear surface-breaks and alignments of large, river-damming landslides. The two fault systems accommodate part of India/Tibet's northwest prong's convergence, as it crashes on the strong, southern edge of Paleozoic Asia. They foster westward and eastward extrusion of Tajikistan and Tibet, respectively. Key elements of such complex, large-scale faulting and continental strain may be modelled using the Yade DEM deformation code.