Automatic Extraction of tectonic lineaments from high and medium resolution remote sensing data in the Hindukush-Pamir.

Mehdi Rahnama and Richard Gloaguen

TU Bergakademie Freiberg, Geology, Remote Sensing Group, Germany (mehdirahnema@yahoo.com, +49-3731-393160)

We propose to investigate neotectonic activity and deformation in north-east of the Afghanistan and south-east Tajikistan using remote sensing. We analyse geomorphic features such as stream profiles and drainage patterns and combine it with lineament analysis from high and medium resolution satellite data. For this purpose, we developed a new toolbox for the Automatic Lineaments Feature Extraction . Considering both classical and recently-reported edge detection methods, we chose 4 filter types: Sobel, LoG, Canny and Prewitt and then used the Hough transform for the identification of linear features. We finally merge close line segments with similar directions using polynomial curve fitting. The modern deformation, the fault movements,, and the induced earthquakes in Afghanistan and Tajikistan are driven by the collision between the northward-moving Indian subcontinent and Eurasia. The general patterns and orientations of faults and the styles of deformation that we interpret from the imagery are consistent with the styles of faulting determined from focal mechanisms of historical earthquakes. With these techniques we are able to assess the activity of faults otherwise inaccessible. We show that the SW-Pamir is largely controlled by the Chaman-Herat fault system and, to a lesser extent by the Darvaz fault zone.