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Active tectonics of the Pamirs: Inferences from remote sensing analysis of stream profiles and geomorphology

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The Pamir mountain belt of Central Asia is an outstanding example of extreme crustal shortening during the collision of the northwestern corner of the Indian indenter with Asia. This region with large-scale active tectonic structures represents an ideal natural laboratory for the remote sensing study of collision-related deformation. Cenozoic deformation appears to have been dominated by north-south shortening along east-trending structures within the Pamir. Recent deformation is concentrated on the margins of the orogen and, in addition characterized by north-trending faults and folds within the high terrain. The aim of this study is to identify active structures within the Pamir on the basis of LANDSAT 7 and ASTER images, as well as SRTM and ASTER DEM's by analysing stream profiles (fractal and stream gradient analysis) and geomorphology, putting them into the framework of kinematics within the Indo-Asian collision. Preliminary results indicate E-W directed extension for the central Pamir, marked by seismicity with E-W orientated T axis and normal faulting in the Lake Karakul region. In the eastern Pamir widespread dextral strike-slip faults show prominent neotectonic features, such as right lateral offset drainages and terrace risers, apparently rooting in the Karakorum Fault. Combined dextral strike-slip and normal faulting occur in the northeastern Pamir. Here, mountains of up to 7500m above plains and valleys show a local relief of over 4 km. To the west and southwest, the mountains are bounded by moderate dipping active normal faults with prominent triangular facets, alluvial fans and fault scarps. Analysis of longitudinal riverprofiles reveal zones of anomalously steep channels when crossing these faults. However, channel gradients in the Karakul region show no significant change due to normal faulting. Another aspect of this work is the identification of paleoriver channels. Some major rivers of the Pamir display unusual drainage patterns for tectonic active regions, they are long and the river gradients are extremly gentle. Further ongoing analyses of stream pro-

files will allow us to understand the establishment of todays drainage network with respects to surface deformation.