Examination of tectonic activity using RS/GIS approach: A case study of Chaman Fault

F. Rabab[1]; S. R. Ahmed[1]; H. Waheed[1]; S. Shahid[1] and S. A. Mehmood[2]
[1]*Institute of Geology, University of the Punjab, Lahore, Pakistan*
[2]*Department of Space Science, University of the Punjab, Lahore, Pakistan*
farwarabab@gmail.com

Abstract

This research paper the sensitivity of the hypsometric integral (HI) and its relationship to neotectonics. We used digital elevation models (DEM) 90 m spatial resolution from the Shuttle Radar Topographic Mission (SRTM) to calculate HI values in the Chaman Fault. The Chaman Fault is an active tectonic structure formed as a result of India-Eurasia collision. The goal of this research is to find the tectonics of chaman fault. We used an analysis grid of regular squares of different sizes to calculate maximum, minimum, and mean elevations. The spatial distributions of HI do not show clear spatial patterns and correlation with mean elevation or relief amplitude. We applied spatial pattern analysis using Local Indices of Spatial Autocorrelation (LISA) to measure the degree to which our HI distribution was clustered, dispersed, or randomized. LISA analysis shows that the data are auto correlated because of high positive *z*-scores. Hot spots (clusters with high HI values) are consistent with tectonic uplift and show a strong correlation with the different structural domains in the region. Cold spots represent recent sedimentation close to faults and coincide with shallow earthquake clusters in the region. The HI values do not show any correlation with relative topographic position or lithology. Analysis of HI distribution shows that they are robust and independent of digital elevation model (DEM) resolution but are strongly scale dependent. The LISA technique allows the extraction of clusters of the HI that reveal recent tectonic processes; otherwise it is difficult to interpret the high variability of HI values.