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Geometry Analysis of Drainage Basins by Means of Tectonic Geomorphology Indicators (Case Study: Sadkharv, Kalateh-Sadat, Farub-Ruman and Gelian Catchments)

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Abstract

Drainage systems as parts of geomorphological landforms are sensitive to tectonic activities. The purpose of this research is to study the anomaly of drainage system and its relevance to neotectonic in Sadkharv, Kalateh-Sadat (in southern slopes of Joghatai mountains), Farub-Ruman (in southern slope of Binaloud mountains) and Gelian (in northern slopes of Aladagh mountains) catchments. The hierarchical anomaly index (Δa), density of hierarchical anomaly (ga), bifurcation index (R), percent of basin asymmetry (PAF), basin shape (Bs) and the mean length of first order streams (LN1) parameters were calculated. Then linear relations and correlation coefficient (R) between parameters were obtained. Data show that there is positive relation with

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strong correlation coefficient (r= 0.963) between Δa and ga parameters. There are also positive relations between Δa and PAF, Δa and BS, Δa and LN1, ga and PAF, ga and BS, ga and LN1 parameters. Correlation coefficients for Δa-PAF, Δa-Bs and Δa –LN1 pairs are respectively 0.796, 0.737 and 0.892 and between ga-PAF, ga-Bs and ga-LN1 pairs are respectively 0.920, 0.875 and 0.896. There is no meaningful correlation between R and other parameters. Evaluation of correlation between parameters reveals that Δa and ga indexes have more efficiency in identification of active tectonic of catchments than other parameters. Although all studied basins are tectonically active based on above-mentioned indexes, the highest rate of tectonic activity is associated with Farub-Ruman, Sadkharv and Gelian catchments and the lowest rate is related to Kalateh-Sadat catchment.

Keywords: Geometry, Tectonic, Hierarchical Anomaly of Drainage Basin, Bifurcation Index, Kalateh-Sadat.

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