

## **Analysis of the influence of tectonics on the evolution valley network based on the SRTM DEM and the relationship of automatically extracted lineaments and the tectonic faults, Jemma River basin, Ethiopia**

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The Ethiopian Highland is good example of high plateau landscape formed by combination of tectonic uplift and episodic volcanism (Kazmin, 1975; Pik et al., 2003; Gani et al., 2009). Deeply incised gorges indicate active fluvial erosion which leads to instabilities of over-steepened slopes. In this study we focus on Jemma River basin which is a left tributary of Abay - Blue Nile to assess the influence of neotectonics on the evolution of its river and valley network. Tectonic lineaments, shape of valley networks, direction of river courses and intensity of fluvial erosion were compared in six *subregions* which were delineate beforehand by means of morphometric analysis. The influence of tectonics on the valley network is low in the older deep and wide canyons and in the and on the high plateau covered with Tertiary lava flows while younger upper part of the canyons it is high. Furthermore, the coincidence of the valley network with the tectonic lineaments differs in the *subregions*. The fluvial erosion along the main tectonic zones (NE-SW) direction made the way for backward erosion possible to reach far distant areas in E for the fluvial erosion. This tectonic zone also separates older areas in the W from the youngest landscape evolution *subregions* in the E, next to the Rift Valley. We studied the functions that can automatically extract lineaments in programs ArcGIS 10.1 and PCI Geomatica. The values of input parameters and their influence of the final shape and number of lineaments. A map of automated extracted lineaments was created and compared with 1) the tectonic faults by Geology Survey of Ethiopia (1996); and 2) the lineaments based on visual interpretation of by the author. The comparison of lineaments by automated visualization in GIS and visual interpretation of lineaments by the author proves that both sets of lineaments are in the same azimuth (NE-SW) - the same direction as the orientation of the rift. But it the mapping of lineaments by automated visualization in GIS identifies a larger number of shorter lineaments than lineaments by visual interpretation.

**Key words:** valley network, lineaments, faults, azimuth, Jemma River basin, Ethiopian Highlands

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