Geophysical Research Abstracts
Vol. 16, EGU2014-6482-1, 2014
EGU General Assembly 2014


# Polyphase neotectonic movements in the Gavilgarh Fault Zone, central Indian craton: evidences from geomorpho-tectonic analysis

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The central part of Indian craton is believed to be a stable continental region with low strain build-up and long earthquake recurrence periods. It comprises two major Archean cratonic fragments (i.e. the Bundelkhand and the Bastar Cratons) and a Proterozoic mobile belt called Central Indian Tectonic Zone (CITZ), along which the cratonic fragments were amalgamated in the Proterozoic. Gavilgarh Fault Zone (GFZ) is an important component of CITZ and is represented by a >250 km long, ENE-WSW trending fault line which demarcates the southern boundary of the Satpura mountains. Although the eastern part of the lineament shows evidences of polyphase tectonic movements in the Meso-Neoproterozic (Chattopadhyay and Khasdeo, 2011), there is no focussed analysis of neotectonic activity in this fault zone although a number of earthquakes have been recorded within the CITZ in last 100 years or so. The present study comprises structural mapping and geomorphological analysis of a 200 km long stretch of the GFZ lineament. GFZ shows evidences of reverse fault-slip movements that possibly resulted in an uplift of the northern side, as deeper level rocks (e.g. Paleozoic Gondwana sandstones) are juxtaposed against the overlying Deccan Trap basalts of Mesozoic age along the fault line. Crushing of basalts along the lineament, asymmetric folds within Gondwana sandstone, inclination of Anisotropic Magnetic Susceptibility (AMS) axes etc. provide evidences for fault-drag folding related to the post-Deccan reverse faulting. Drainages crosscutting the lineament adjusted with the tectonic uplift either by incising their own sediments and bed rock or by increasing their sinuosity, only in the northern side, as seen in the satellite images. Hypsometric Integral values suggest that the immature/in-equilibrated drainage basins were restricted in the north while mature/equilibrated basins developed in the south of the lineament. Longitudinal profiles and S-L Index of the river profiles, prepared from DEM, clearly mark the knick ponits related to the faulting. Ages of terrace sediment samples obtained by luminescence dating method (OSL/IRSL) and ages calculated from knick point migration rate (following Loget and Van den Driessche, 2009) suggest that reverse slip movement along GFZ started possibly at c. 93ka and the fault reactivated again at c. 41 ka and further after c. 12 ka. This neotectonic movement may be a result of the reported regional shortening of $2\pm1$ mm/yr across the CITZ obtained from geodetic GPS measurement (Banerjee et al., 2008).

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