Geophysical Research Abstracts
Vol. 19, EGU2017-11723, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

Morphotectonic studies in earthquake swarm activity prone SW Saurashtra, Western India

Naimisha Vanik, Deepak M Maurya, Mohamedharoon Shaikh, and Laxman Singh Chamyal
Department of Geology, The M. S. University of Baroda, Vadodara-390002, India

The Saurashtra peninsula is a distinct tectono-geomorphic entity located at the western continental margin of India. It is bounded by the North Kathiawar Fault (NKF), West Cambay Basin Margin Fault (WCBMF) and the Narmada-Son Fault (NSF) in the north, west and south respectively. In general, the Saurashtra comprises dominantly of trappean lava flows with associated structurally controlled dykes belonging to the Deccan Trap Formation of late Cretaceous to Paleocene age and Mesozoic sedimentary rocks with thin Tertiary and Quaternary in the fringes. Geomorphologically, it is a large table land with highest elevations in the centre and radial drainage pattern. The SW Saurashtra region is experiencing periodic earthquake swarm activity witnessed in 2001, 2004 and from 2007 onwards with some 200 shocks and 2011 with some 400 shocks of magnitude 5.0 and less. We carried out geomorphic studies in the area with a view to map various faults influencing landscape configuration and provide a geological perspective of the swarm activity. The area is drained by southward and SW flowing incising rivers viz. the Hiran, Saraswati, Singwada, Sangawadi, Rupen, Machundri, Rawal, Malan, Raidi and Dhantarvadi river. The rivers flow through Deccan Trap formation followed successively by Tertiary sediments of Gaj formation, Quaternary miliolite sediments and recent coastal deposits. The major faults demarcated during the study are developed in the Deccan Trap Formation and trend in NNE-SSW and ENE-WSW directions. All faults show prominent scarps with striations along fault planes, tilting and shearing of lava flows. The neotectonically active nature of the faults is evidenced by the youthful fault controlled topography, bedrock incision, knickpoints and waterfalls formed over Quaternary miliolites, variable coastal geomorphic set up (mudflat to beach-dune complex dominated), two levels of raised notches along the coastline and the development of highly asymmetric drainage basins. Our morphotectonic data suggests that the compressive stresses generated by the northward movement of the Indian plates is distributed in a complex manner along various faults which is responsible for the earthquake swarm activity in SW Saurashtra.