

TECTONIC GEOMORPHOLOGY AND SEISMICITY ALONG DAUKI FAULT, NORTHEASTERN BANGLADESH AND EASTERN INDIA

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The Northeastern flank of peninsular India (part of northeastern Bangladesh and India) is one of the most tectonically active regions in the world where Late Cretaceous tertiary sediments together with underlying Jurassic rocks and Precambrian granites/gneiss are exposed along the southern fringe of Shillong Plateau. The huge pile of sediments of Sylhet Trough is dissected by E-W and NNE-SSW striking Dauki Fault system. Shillong Plateau is marked by spectacular gorges, incised river valleys, waterfalls and straight topographic high in its southern boundary where as the northern boundary shows a relatively smoother, staircase-type topography. The eastern part is dissected from Mikir Hills by Kopili River whereas the Plateau stopped its journey westwards by Brahmaputra River. The Dauki fault system is segmented at least 4 parts along its more than 300 km long length. One of its branch also passed through the Alluvium of Northern Sylhet Trough where subsurface slice of Palaeocene to recent rocks formed a monoclonal nature between the main fault system and the branch. The branch has been identified by seismic and field investigation. The kink bands like topography around the Dauki Fault are marked on DEM, which might be caused due to oblique slip movement along the Dauki fault. Geomorphic indices like mountain front sinuosity, valley floor width to height, stream length gradient index, drainage basin asymmetry and transverse topographic symmetry factor suggest the tectonic activity is much higher in the eastern part than the western part of the fault. The drainage basin in the east is tilted towards west. The lineament data (>92) collected from DEM and field investigation show that most of lineaments along the Dauki fault run though E-W (70°-100°) but some are also ENE-WSW directed. The lineament (154) in the main plateau area were also calculated, among which the western part shows the dominance of 20°-45° set, in the middle part 30°-40° set is dominated, and 50°-90° set is the main in the eastern part. In all these 3 part, some lineaments are also striking along 330°-340°. The 3D river network has been established using SRTM data after filling the voids through software RiverTools™ and gOcad™. The whole 3D river network of the plateau has been developed to understand the tectonic forcing on the longitudinal river profile especially on the southern flank of the plateau. The longitudinal profiles along some rivers in the vicinity of the Dauki Fault show the effect of active exhumation of the plateau. The available earthquake data from different network has been collected to find out the possible mechanism for the southern part of the plateau along with geological fieldwork. Though the earthquake epicentre concentration is greater in Assam valley but the quantity of earthquake epicentre along Dauki fault, southern part of the plateau and on Sylhet trough is not negligible. The result does not support the 'quiescence of tectonic activity' along the Dauki fault. The earthquakes in this area mainly follow three directions – along the Dauki fault, along the Sylhet lineament and along the old Brahmaputra lineament which actually framing the Sylhet Trough into an oval shape. The seismicity in both south part of Shillong Plateau and Sylhet Trough is related to the movements along Dauki fault and its associated faults.