



Seismotectonics and the current state of stress in Chedrang valley and its vicinity - the rupture area of great Assam earthquake of June 12, 1897 (M=8.7) from waveform and stress tensor inversion

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The seismotectonics and the current state of stress for Chedrang valley and its vicinity, Shillong plateau, the rupture area of Great Assam earthquake of 1897 in northeastern region are observed with the help of high precision seismicity data during the period 1982-2004. Since the detailed picture of seismicity of chedrang fault and its vicinity is not known, an effort is made to investigate its seismotectonics for deciphering the seismicity, seismogenic zone and the prevailing stress pattern in the region. The seismicity pattern indicates that epicenters align along with Dudhnoi, Chedrang and Samin faults for the earth tremors of magnitude 1.0-4.0, 2.1-5.0 and 2.1-4.0 respectively and the micro tremor activity is relatively more intense towards the east of Chedrang fault than its western part. Absence of seismic activity is observed in association with Dapsi reverse and dauki faults. Since the maximum number of shocks within the depth interval 0 -30km is more than the number of shocks in the depth interval 30 - 50km, the bottom of seismogenic zone is inferred to be at 30km. Simultaneously, rupture process of associated faults are observed by determining the 9 focal mechanism solutions through waveform inversion incorporating the empirical Green's function besides 5 solutions by using P-wave first motions. The solutions are mostly thrust and strike slip type mechanism with an exception of an event as oblique mechanism. One of these mechanisms suggests thrust faulting with a significant portion of strike-slip motion and the

associated fault ie. Chedrang fault dips towards north of northeast. The stress tensor inversion from 14 mechanisms suggests that the region is characterized by NNW-SSE compression in Chedrang valley and its vicinity with predominant thrust faulting. Sudden change of stress regime from prevailing NNE to NNW is indication of probable occurrence of a large earthquake.