AN INTEGRATED DESIGN FOR EARTHQUAKE ENERGY RELEASE AND FORECAST MODEL DEVELOPMENT

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The sizes of earthquakes are measured using well-defined, measurable quantities such as seismic moment and released or transformed elastic energy. No simple calculative measures exist for analysis of the nature of nucleation and strain energy released in earthquakes and eruptions some promising avenues of research such as “remote triggering” of earthquakes and the newly discovered Episodic Tremor and Slip (ETS) that may lead to success in the future indicates robust areas of elevated strain rates where data coverage is strong. The proposed study is a novel method for the observation of seismicity rate changes magnitudes events that would be expected to occur depending on the recurrence time of the recent events based on the size analyzed by the seismic moment and the effect of the dynamic strains as the region shows increase in moment rate and seismic strain energy release rate as a nucleation locking has taken place and earthquake is likely to occur in the vicinity. The seismic moment and the elastic energy transformed during an earthquake are directly related to measureable parameters. For example, the seismic moment is related to the area of the fault rupture, the average displacement or slip during the rupture, and an elastic constant that provides quantitative measure for integrated earthquake warning methodology in the forecast model design. For earthquakes and eruptions, elastic energy derives from two sources: (1) the strain energy stored in the volcano/fault zone before rupture, and (2) the external applied load (force, pressure, stress, displacement) on the volcano/fault zone.

In the present study it is observed that in the past two years from 2012-2014, shallow intra-plate earthquake events had been recorded beneath Shillong and its adjoining areas of North-East India as well as beneath Myanmar, the Kangra Valley in the Himachal Pradesh, Gujarat in Western India and in Kerala, South India. The occurrence rate of intra-plate earthquake ($Mw \geq 4.2$) with a shallow depth between (5 km - 48 km) depth causing a wide-spread ground shaking, which has increased in recent time, 150 such occurrences has been noticed between 2012 and 2014 with the latest incident of M5.0 last recorded on 16th August, 2014 at the Manipur-Myanmar border at a depth of 96.5 kilometres. The flow diagram through an integrated earthquake model has been designed and has been shown in Figure 1.

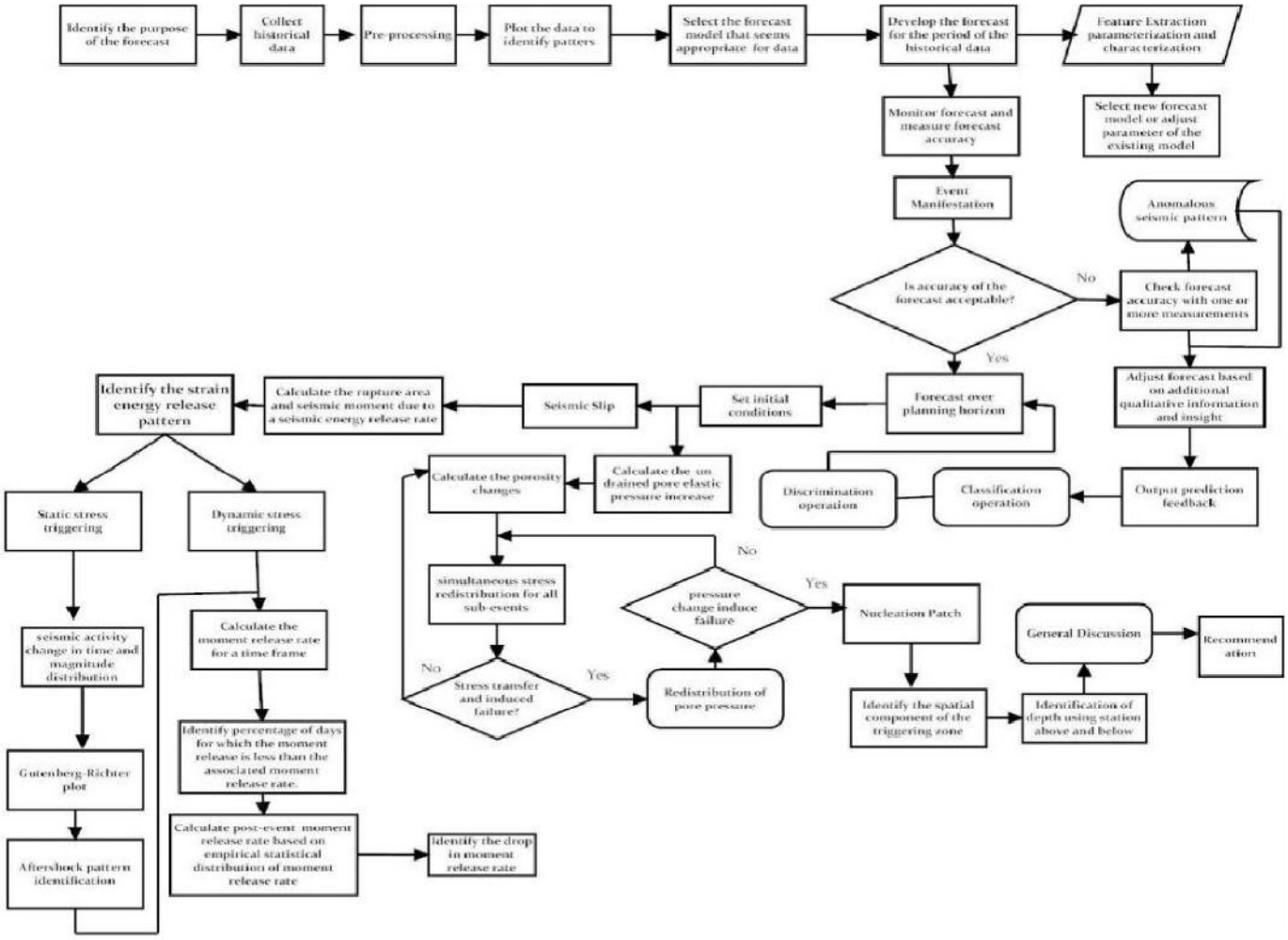

Figure 1: An Integrated model for earthquake genesis pattern analysis