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Tidal stress triggering earthquakes: case study eastern part of the Indian Ocean

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Seismological studies indicate that almost all earthquakes occurrence are attributed with tectonic stresses. On the other hand, Earth tides represent the largest periodic stresses variations within the Earth crust and deep layers. Although, the amplitude of the tidal stress is small compared to the tectonic stresses, but tidal stresses rate is comparable or even higher than the tectonic stresses rate (Dieter Emter, 1997). This high rate tidal stress may superimposed slow tectonic stress and act as triggered to the seismological activities. Many authors investigated tidal stresses as earthquake triggering agent. However, the obtained results are contradicting from region to another.

\quad In ocean regions large earthquakes are usually occurred along the high accumulated stresses tectonic plates. Large magnitude earthquakes along these regions may accompanied with tsunamis. Tidal stresses through ocean is added by tidal loading due to variable movement of the water mass.

\quad The tectonic active region located between the collision of Indian and Burmese plates has been selected as a case for the current study. This region is characterized by high seismic activity, with numerous large events, resulted from this collision. In addition, The choice of our case study is due to the importance of Indian Ocean littoral regions where it should generate and pay attention to earthquake and Tsunami warnings especially after occurring the 26th December 2004 Sumatra Tsunami.

\quad Tidal deformation has been computed for the selected region using modern body tide model and Satellite derived global ocean tide model. Different statistical methods were applied to determine the degree of correlation between tidal deformation as triggered to the seismic activities. Magnitude and focal depths of the test events are considered on the correlation process. The study shows a higher degree of correlation of the tidal stresses to large deep events rather that moderate shallow events.