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1 Updated Earthquake Hazard in Sumatra

John McCloskey, Suleyman Nalbant, Sandy Steacy and Andrea Antoniolli
Geophysics Research Group, Environmental Sciences Research Institute, University of Ulster, Coleraine, N. Ireland, BT52 1SA (j.mccloskey@ulster.ac.uk)

On March 28 2005 the Sunda megathrust ruptured again, producing a second great (M8.7) earthquake. The rupture was contiguous with that of the December 2004 Sumatra-Andaman earthquake, and it has been shown that its occurrence is entirely consistent with stress triggering. Triggering stresses at the hypocentre of the second earthquake were, however, very small, on the order of just 0.1 bar. Calculations show that stresses imposed by the second rupture have brought the megathrust immediately to the south, under the Batu and Mentawai islands, closer to failure and have expanded the area of increased stresses on the Sumatran fault. Paleoseismologic studies show that the Mentawai segment of the Sunda megathrust is well advanced in its seismic cycle and is therefore a good candidate for triggered failure. The area under Siberut Island has not failed since 1797 though has produced several intermediate size (M6-7) earthquakes in the past year and probably poses the greatest present threat. The northern section of the Sumatran fault has also experienced a large increase in stress as the result of the 2004 and 2005 great earthquakes and has the potential to produce a large event.. Here we update the stress calculations for these two faults to include: the most recent inversions of the 28/3/05 event, aseismic slip which is has been shown to be occurring under the Batu Islands, visco-elastic relaxation and the effects of the intermediate seismicity.