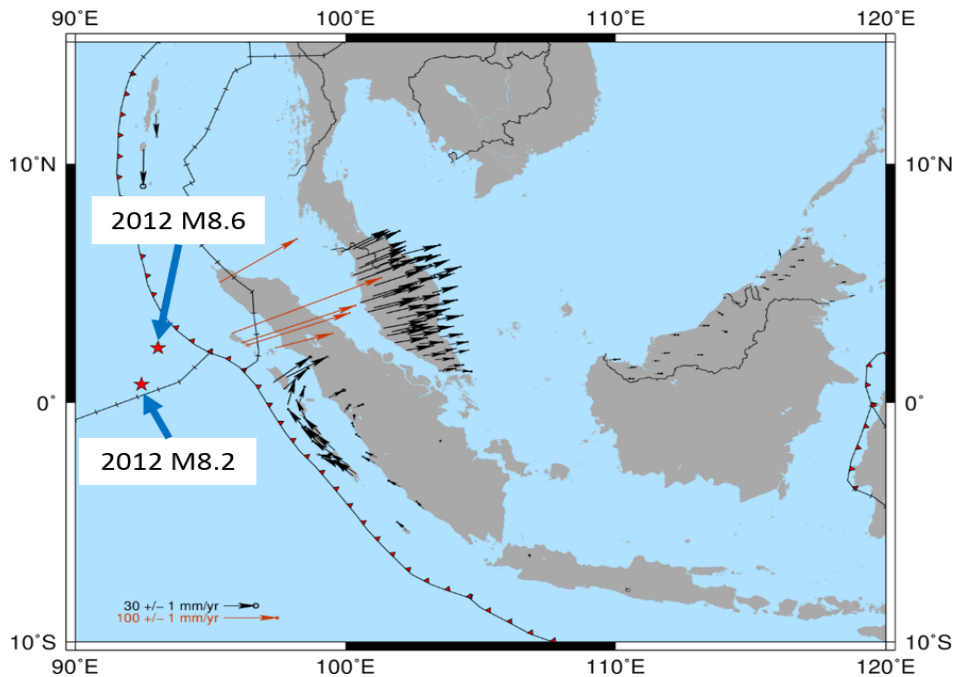


The Sunda megathrust deformation process: 15 years of recent great earthquakes

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Abstract: We present a comprehensive analysis of the Sunda megathrust deformation using continuous GPS from 1999 - 2014. The complex deformation pattern has been caused by a number of major earthquakes, including the 2004 Aceh, 2005 Nias, 2007 Bengkulu, 2012 northern Sumatra, and also several significant earthquakes events during 2008 and 2010, are discussed. This study includes a number of permanent GPS sites, starting with 16 sites in 1999 and increasing to 150 sites in 2014. These sites are located in Indonesia, Malaysia and the Philippines. The spatiotemporal distribution of decay vectors recorded by GPS sites indicated a local anomaly motion within the Sundaland plate caused by the past great earthquakes. The decay amplitudes from previous great earthquakes suggest that the central - southern Peninsular Malaysia and central Sumatra are a single region. This region is likely experiencing a poroelastic deformation where a distinctive decay amplitude vector was identified when compared to the northern Peninsular Malaysia, and northern and southern Sumatra. Numerous great ruptures of the Sunda megathrust have caused significant co-seismic offsets, as well as viscoelastic relaxation for multiple events that overlap in time on the western Sundaland plate. Earlier studies of the Sunda megathrust did not depict an overall post-seismic deformation in spatial terms, in fact, this study shows that the extent of the deformation zone was underestimated. The regional variation of post-seismic deformation in Peninsular Malaysia and Sumatra suggests that the region is subjected to intraplate and internal deformation, however this result needs further investigation and verification.

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**L1 Lecture Theatre
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