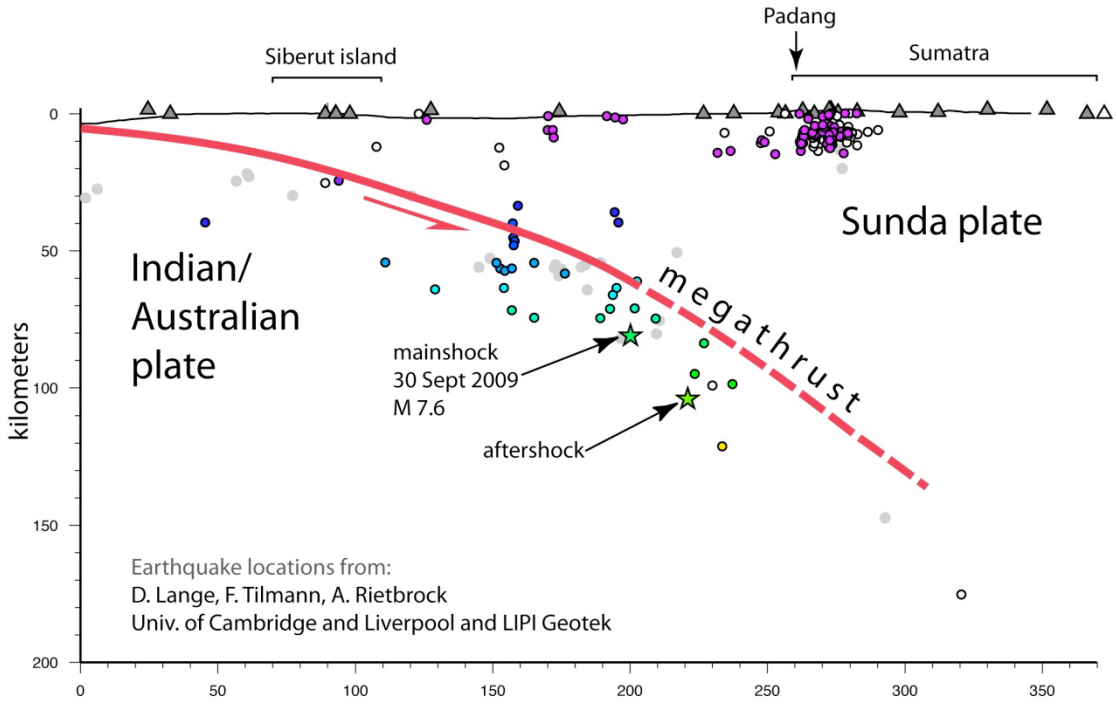

Origin of Sumatran earthquake and aftershocks of Sept. 30 2009

This cross-section image shows the origin of the Sept. 30 earthquake (upper green star) and an aftershock. The dots (colored according to depth) represent previous small earthquakes in West Sumatra from April 2008 to February 2009, as located by Dr. Frederik Tilmann and others using portable land-based and ocean-bottom seismometers (triangles). The diffuse band of earthquakes angling down beneath Siberut island and Sumatra reflect deformation within the descending Indian/Australian plate and illuminate its location. The top of this diffuse band of earthquakes helps define the Sunda megathrust, which is the boundary between the two plates. The part of the megathrust shown with a solid red line is the part that is locked and is therefore likely to produce a great earthquake within the next few decades. The part that is shown with a dashed red line appears from GPS measurements to be unlocked and slipping more or less freely; it is unlikely to slip abruptly and cause great earthquakes. The magnitude 7.6 earthquake of 30 September 2009 appears to have been produced by the rupture of a fault within the descending plate, well below the megathrust. The large aftershock (lower green star) also appears to be within the descending plate. The two locations are from the U.S. Geological Survey.