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Local Seismicity of the West Sumatran Subduction Zone

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The Sumatran margin played host to three great earthquakes in the preceding four years (Aceh-Andaman 26 December 2004 Mw = 9.2, Nias 28 March 2005 Mw = 8.7, Bengkulu 12 September 2007 Mw = 8.5). Yet, a part of the margin near the northern Mentawai islands remains unbroken, and the historical record suggests that only half of the accumulated tectonic strain might have been released by the Bengkulu earthquake in 2007. Earthquakes along the strike-slip Sumatra fault, though much smaller in magnitude, still present a significant seismic hazard, due to its proximity to dense populations and shallow depth. We present first data from two local seismic networks, which were installed in November 2007 and April 2008 along the active western Sumatran margin. The networks consist of 80 continuously recording three component short-period and broadband stations, covering 750 km of the active margin between 3 deg. S and 1.5 deg. N (provinces West Sumatra, Bengkulu and North Sumatra). The stations were installed on the islands Nias, Batu and the Mentawai Islands and the adjacent mainland. The rare occurrence of forearc islands along the Sumatran margin allows the deployment of seismic landstations above the shallow part of the thrust fault, thus providing high hypocenter location quality for the updip end of the seismogenic zone in an area where geodetic data are also available. The northern network recorded a 6.0 Mw earthquake on the Sumatra Fault and its aftershocks. In the southern part the stations captured the pronounced postseismic activity of the Mw 8.5 Bengkulu earthquake from 12 September 2007 including the Mw 7.0 event on 25 February 2008. First seismicity distributions suggest that aftershock activity is particular intense between the Mentawai Islands Sipora and North Pagai; in this area the coseismic slip distribution of the Bengkulu earthquake had a minimum. We present first results of this ongoing research project including the seismicity distribution and relate them to the background seismicity.