ES3/P13/ID88 - SURFICIAL CRACKS OBSERVED AFTER THE PARIAMAN (PADANG) AND KERINCI 2009 EARTHQUAKES, INDONESIA: RELATIONSHIP WITH THE NATURE OF SEISMIC WAVES

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On 30 September 2009 a 7.5 Mw devastating earthquake occurred as a result of obliquethrust faulting near the subduction interplate boundary between the Australian and Sunda plates. Its epicentre located ~25 km WSW offshore Pariaman, West Sumatra. The published moment tensor solution suggests that a medium depth thrust fault striking NE-SW was the responsible trigger for the event, apparently perpendicular to the NWSE striking subduction zone. This earthquake caused 1,117 fatalities and 3,942 collapsed constructions, including houses, medical facilities, government offices and bridges.

A day after the Pariaman earthquake, 1 October 2009, the Kerinci 6.6 Mw earthquake occurred as a result of shallow strike-slip in the Sumatra Fault Zone and damaged buildings and caused three fatalities. The epicentre was located near Lempur Hilir, about 40 km south of Kerinci Lake. The published moment tensor solution suggests that a shallow depth fault striking NW-SE was the responsible trigger for the event, which has good agreement with the Sumatra Fault Zone striking NW-SE. Although the Kerinci earthquake was shallow and strong, surprisingly it did not produce extensive damage. Sungai Penuh has a population of 95,000, is capital of Kerinci Regency, and is the nearest town to the epicentre, yet it did not experience any damage and people in the town hardly felt any strong ground motion.

One method to study the nature of earthquake is through examining surface cracks. Examining systematic cracks at the soil surface, asphalt roads and bridges will inform how the seismic waves propagate to deliver damaging forces. Observations (Pariaman earthquake) made on a basketball field and adjacent Junior High School of Enam Lingkung District, Padang Pariaman Regency, which is built on thick Quaternary volcanic deposits, revealed that the ground floor had a crack system aligned NNW-SSE across the floor. Closer observation revealed many features associated with strike-slip movement on a crack, with a distinctive NW-SE compression direction. Observations (Kerinci earthquake) at the severely damaged Lempur Hilir Mosque that is built on thin Quaternary

lacustrine alluvium revealed that the ground floor had a particular crack aligned N-S across the floor. Closer observation revealed many features associated with strikeslip movement on a crack, with a distinctive NW-SE compression direction. Both observational results suggest that the floors of the basketball field and the mosque were cracked due to body primary waves released by these earthquakes, and they are consistent with moment tensor solutions derived from instruments.