

Analysis of the 2009 Papua Indonesia Earthquakes (Mw 7.6 and 7.3)

Kimie Norimatsu[1]; James Mori[1]

[1] EQH, DPRI, Kyoto Univ.

The Mw 7.6 earthquake of 3 January 2009 occurred at 19:43 (UTC) as thrust faulting on a plate boundary along the northwest coast of the New Guinea Island. and the Mw 7.3 earthquake occurred at 22:33 (UTC) slightly to the east with almost same mechanisms. This is a region of complex tectonics where with convergence between the Pacific and Australian plates. The Pacific plate is likely being subducted southward underneath New Guinea on the Australian plate. Assuming southwestward dipping fault planes, these two events are consistent with this subduction process. The 2009 Papua earthquakes represent a doublet sequence. Doublet earthquakes are characterised by pairs of events within a short amount of time occurring on nearby portions of the same fault or no separate faults. It is important to understand the relationship between the earthquakes by estimating the slip distributions, distributions of the aftershocks and induced stress around the hypocenter area of mainshocks.

We calculated the slip distributions for the Mw 7.6 and Mw 7.3 earthquakes using the teleseismic waveform modeling. From our results, the depth of Mw 7.6 earthquake is approximately 15 km shallower than the reported depth from USGS (30 km), and the slip area is about 135 km along strike and 60 km along dip. The maximum slip is located west of the epicenter near the location of the largest aftershock, before the occurrence of the Mw 7.3 earthquake. The Mw 7.3 earthquake was apparently triggered by the Mw 7.6 earthquake. We study the details of the source process using seismic and geodetic data to estimate the relation between Mw 7.6 and Mw 7.3 earthquake.