

Static fault models for the 2004 Southeast Off Kii Peninsula Earthquake -Consistency between seismological and geodeitic data-

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The Southeast Off Kii Peninsula earthquake occurred on September 5, 2004 around the Nankai Trough axis. This earthquake was an intraplate earthquake of the Philippine Sea plate. This was a doublet event consisting of M7.1 at 19:07 and M7.4 at 23:57. Slip distribution models were proposed based on seismological data. But these models are not consistent with crustal displacement data obtained by the continuous GPS network. Therefore we examine the consistency between seismological and geodetic data by estimating static fault models based on GPS data by referring seismological fault models. One problem in geodetic analysis is that the daily routine solution by the Geographical Survey Institute include information about crustal deformation of 2 earthquakes with a combined manner. We analyzed the GPS phase data acquired between the two events and estimated station coordinates after the 19:07 earthquake. We estimated a static fault model for the 19:07 event, and another fault model representing the sum of two events. In both cases, we estimated a single rectangular fault with uniform slip. Optimum fault parameters are estimated by a grid search technique. The estimated fault model for the 19:07 event is consistent with those based on seismological data in its location, shape, and size. Moment magnitude of the 19:07 event was estimated as Mw7.2, slightly larger than the magnitude by the Japan Meteorological Agency. On the other hand, the model for the sum of two events is consistent with aftershock distribution in its location, and its shape is similar to that of CMT solution by the National Research Institute for Earth Science and Disaster Prevention. But the fault shape is different from those of Yamanaka (2004) or Yagi (2004). The seismic moment of the estimated model is nearly equal to the sum of seismological estimates of seismic moments. These results imply a complicated nature of the 23:57 rupture, but the overall effect due to this event can be well represented by the CMT solution or ours. The consistency in seismic moment between seismological and geodetic estimates preclude a possibility of a slow or aseismic rupture process.