

Crustal deformation by the West Off Satsuma Peninsula earthquake occurred on November 14, 2015

*Shigeru Nakao¹, Hiroshi Yakiwara², Shuichiro Hirano², Kazuhiko Goto², Kazunari Uchida³, Hiroshi Shimizu³

1.Department of Earth and Environmental Sciences, Graduate School of Science and Engineering, Kagoshima University, 2.Nansei-Toko Observatory for Earthquakes and Volcanoes, Graduate School of Science and Engineering, Kagoshima University, 3.Institute of Seismology and Volcanology, Kyushu University

The earthquake (JMA Magnitude 7.1) occurred on November 14, 2015 in the area of west off Satsuma peninsula. The epicenter is located in Okinawa Trough where is in about 160 km west from Makurazaki City in Kagoshima Prefecture. This earthquake is one of the largest earthquakes in this area. Seismicity in this area is low in last twenty years. Two continuous GNSS sites are operated by Kagoshima University, one is UJIS site in Uji island which is 84 km to east from the epicenter and the other is MESM site in Meshima island which is 121 km north from the epicenter. At UJIS seismic observation is also operated by Kagoshima University and it is operated by Kyushu University at MESM. We went to those sites in order to get GNSS and seismic data because GNSS and seismic data are not telemetered at those sites. In this research, co-seismic crustal deformation and activity of aftershocks are reported. We relocated the main shock and aftershock until 10:00 on November 16. Length of aftershock area is about 60 km. Its Strike is the same of Okinawa Trough. The epicenter of the main shock is located at the south-west end of the aftershock area and maximum aftershock, which is occurred on November 15, is at north-east end. Activity of aftershock in northern part of aftershock area is high. However, in southern part it is low except aftermath of occurrence of the main shock. GNSS data analysis is by Bernese GNSS software Ver. 5.2 with CODE precise ephemeris. Daily site coordinates of UJIS and MESM are calculated with GEONET sites. Coseismic deformation is estimated by the difference between two days averages before and after the main shock. Displacement at UJIS and MESM is 0.82 cm and 0.65 cm, respectively. The theoretical coseismic deformation is estimated by a strike slip fault model (Okada, 1992). Fault length, strike, dip angle and fault position are estimated by the length of aftershock area. Fault width is assumed a half of the fault length. Amount of fault slip is estimated by the relationship between earthquake magnitude and moment (Sato, 1979). JMA moment magnitude 6.7 is used (JMA, 2015). Theoretical displacement at UJIS and MESM is 1.3 cm and 1.1 cm. Direction of observed displacement is coincident with that of theoretical displacement. However, amount of observed displacement is smaller than theoretical one.