Detection of crustal deformation signal and fault dislocation model associated with 2016 Kumamoto earthquake:Preliminary report by space geodesy laboratory in Hokkaido university

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Three M>6 earthquakes occurred on 14th April (12:26:41.1 GMT, Mw 6.2 [Mj 6.5] and 15:03:50.6 GMT, Mw 6.0 [Mj 6.4]) as foreshocks and 15th April (16:25:15.7 GMT) as main shock (Mw 7.0 [Mj 7.3]) in Kumamoto prefecture along Beppu-Shimabara rift system. These focal mechanisms have been reported right-lateral with NE-SW striking. Epicenters during this event concentrated along the Beppu-Shimabara rift system dividing Kyusyu region. The Beppu-shimabara rift system is located from Beppe bay in Oita prefecture to Shimabara peninsula in Nagasaki prefecture via Yatsushiro bay in Kumamoto prefecture, and western part of the rift system is linking to the Okinawa trough. The rift system is one of the active geothermal area including Kyujyu volcanic system, Mt. Aso, Mt. Unzen. Although the mechanism of constructing the rift system is uncertain, some mechanisms are assumed to be pull apart basin, which is constructing under N-S extension field with right-lateral, and continental pull apart, which is influenced by mantle flow.
GSI (Geospatial Information Authority of Japan) group have already reported on their website that signals of crustal deformation associated with the event using InSAR and MAI. These results have indicated deformation field caused by right-lateral slip and >30 cm subsidence at Mt. Aso. We have applied PALSAR-2 data spanning 2016 Kumamoto earthquake to InSAR and offset tracking in order to obtain robust crustal deformation signal. These data are sharing with PIXEL (PALSAR interferometry consortium on study our evolving and surface) group. Our results show near-fault 3D displacement field where is lack of data in GSI results, and also show significant shape offset at the Futagawa- and Hinagu-fault belt. We present preliminary fault dislocation model to reproduce our results.

Keywords: Kumamoto earthquake, Synthetic Aperture Radar, Crustal deformation, Rifting system

