

Coseismic deformation of the West Off Fukuoka Prefecture Earthquake detected by ENVISAT/InSAR

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At 10:53 on 20 Mar. 2005, the earthquake with the magnitude of 7.0 shocked in and around Fukuoka City, and extensive damage occurred. Crustal deformation associated with the earthquake was detected by Japanese nationwide GPS network (GEONET) which had been constructed by GSI, and it showed that the northeast of the area where aftershocks were occurring moved to the west and that the south area moved to the south. According to GSI, this deformation field can be explained by that induced by a left-lateral strike slip on the fault directed to northwest - southeast. To investigate more detailed crustal deformation, we are analyzing a spaceborne SAR interferometry. In this poster, we will present its result.

In this analysis, SAR data which were acquired on 23 Feb. 2005 and 30 Mar. 2005 by ENVISAT satellite of ESA were used. Observation mode was IS2 of VV polarization; the incidence angle was 23° , the swath width was about 100 km, and the spatial resolutions were 4 and 8 m in the azimuth and range directions, respectively. The line-of-sight (LOS) direction was $(-0.377, 0.090, -0.922)$ in the coordinate set (east, north, up). Crustal deformation which can be obtained by SAR interferometry is a component projecting a three-dimensional vector onto LOS direction. In this interferogram, a phase difference of 2π radian corresponds to displacement of 2.8 cm in LOS component.

The perpendicular component of the orbit difference (B_{perp}) was 370 m, and the recurrence period was 35 days. By such relatively good condition for an application to SAR interferometry, coherence could be obtained not only in a populated area but also in a mountain area. The obtained interferogram showed that the northeast of the area where aftershocks were occurring had moved away from the satellite, and the displacement of 3 cm in LOS direction was detected in the Singu Town. On the other hand, it showed that the south of the area where aftershocks were occurring had moved to the satellite, and the displacement of -6 cm was detected in the Itoshima Peninsula. Considering a left-lateral strike slip on the fault directed northwest - southeast, it is expected that the northeast of the area where aftershocks were occurring moves to the west and the subsiding direction, corresponding to the direction moving away from the satellite and that the south area moves to the east or south and the uplifting direction, corresponding to the direction moving to the satellite. Thus crustal deformation that the interferogram shows is corresponding to that caused by this earthquake. It is expected that such deformation becomes useful data on the analysis more detailed fault mechanism.