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ALOS Observation Results of the 2011 Magnitude-9.0 Earthquake off the Pacific coast of Tohoku-Kanto District, Japan

Yosuke Miyagi[1*], Masuo Takahashi[1], Masanobu Shimada[1]

[1]Japan Aerospace Exploration Agency

At 5:46 on March 11, 2011 (UTC), a magnitude 9.0 huge earthquake occurred off the Pacific coast of Tohoku-Kanto district of Japan (38.32N, 142.37E, 32 km in depth; hypocenter information from USGS Web site), accompanied by a massive tsunami. The earthquake and tsunami caused severe damage in many cities, and more than 20 thousand people were killed and lost their homes. After the main shock, many aftershocks or induced earthquakes have occurred in various places in Japan. The Japan Aerospace Exploration Agency (JAXA) has performed emergency observations since the occurrence of the earthquake, using three sensors (PALSAR, AVNIR-2, and PRISM) installed on the Advanced Land Observing Satellite (ALOS). Using optical images or PALSAR amplitude images acquired before and after the earthquake, we detected tsunami inundation areas, and monitored a transition of the area after the earthquake. Next, we detected extensive crustal deformation associated with the M9.0 earthquake, using the differential interferometric SAR (DInSAR) technique. In the resultant interferograms, there are so many obvious color fringes over almost whole area in the eastern and the northeastern Japan. The maximum displacement in the interferograms was estimated to be more than 4m at the tip of Ojika Peninsula relative to the tip of Tsugaru Peninsula, from an ascending orbit. Considering a mechanism of this earthquake, the color pattern which means deformation away from the satellite indicates a subsidence or eastward displacement in the coast area. Moreover, we can find several local fringes that are obviously different from the surrounding fringe pattern. These show the crustal deformation associated with shallow inland earthquakes (e.g. M6.1 earthquake in the northern Ibaraki Prefecture on March 19; M7.0 earthquake in Hamadori of Fukushima Prefecture on April 11). In this presentation, we introduce several ALOS observation results of the 2011 M9.0 earthquake and tsunami, and of several inland earthquakes. Other ALOS observation results are shown in EORC/ALOS web page of JAXA.
http://www.eorc.jaxa.jp/ALOS/en/index.htm

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