

Ground deformation associated with the earthquake occurred in Solomon Islands on April 1, 2007 detected by ALOS/PALSAR

Yousuke Miyagi⁽¹⁾, Taku Ozawa⁽²⁾, and Masanobu Shimada⁽¹⁾

⁽¹⁾Japan Aerospace Exploration Agency / Earth Observation Research Center, Tsukuba Space Center, 2-1-1 Sengen, Tsukuba, Ibaraki 305-8505, Japan, E-mail: miyagi.yousuke@jaxa.jp, shimada.masanobu@jaxa.jp

⁽²⁾National Research Institute for Earth Science and Disaster Prevention, 3-1 Tennodai, Tsukuba, Ibaraki 305-0006, Japan, E-mail: taku@bosai.go.jp

On April 1, 2007 (UTC), a large M8.1 earthquake occurred in Solomon Islands and was accompanied by a large tsunami. The Japan Aerospace Exploration Agency (JAXA) performed emergency observation using ALOS/PALSAR, and we noted this earthquake as an example of disaster monitoring and observation in remote locations. Comparing PALSAR amplitude images observed before and after the earthquake, we could find some changes (increase or decrease of land area) associated with the earthquake. We went to the Solomon Islands in the end of July 2007 and investigated the damaged area. In the field investigation, we could see several evidences of major uplift or land slides corresponding to some signals in PALSAR images, and investigated damaged area by tsunami. A difference of tsunami damage in neighboring islands suggests that there may be a boundary of uplift and subsidence between them. Ground deformations were detected over a wide area using a DInSAR technique. We presume that such deformations represent co-seismic deformations caused by a reverse dip-slip faulting in the supposed seismic fault. From the geodetic data detected by DInSAR processing, we inferred a fault model and slip distribution for the earthquake. Although it is a preliminary result, the model well explains the observed deformation, and exhibits good agreement with that inferred from the teleseismic data [Yamanaka, 2007], which indicated a two-eyed large slip area.

In the field investigation in late July, we acquired testimonies from inhabitants that some uplift occurs near the Ghizo Island after the earthquake. In another field investigation in right after the earthquake, testimonies that mean not uplift but rather subsidence in almost same area were acquired [Nishimura et al., 2007]. Therefore we checked PALSAR images observed after the earthquake and explore a possibility of after slip.