

Detection of the 2015 Gorkha earthquake-induced landslide surface deformation in Sunkoshi River watershed, Nepal using InSAR images

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On August 2, 2014, Sunkoshi river was blocked by the large landslide near Jure village. At 2km downstream Jure, slight displacement on the slope was interpreted by InSAR (Synthetic Aperture Radar interferometry) image. According to field survey the displacement was surely identified and it was triggered by the 2015 Gorkha earthquake, according to local residents. InSAR image was produced from ALOS-2/PALSAR-2 (Phased Array type L-band SAR) data, which were observed on Feb 21, 2015 (before the earthquake) and on May 2, 2015 (after the earthquake). In producing InSAR image, RINC 0.47 software (Ozawa 2014) was used. Path and frame of the PALSAR-2 data is 156 and 550, respectively, and observation mode is Stripmap Fine [10m] mode. To remove the effect of topography from InSAR data, I used SRTM DEM (Digital Elevation Model) in 90 m resolution, but in processing InSAR image, DEM spacing were resampled finer in 45-m resolution. According to the field survey debris were push out from the slope (Photo 1a), and some cracks were identified near the top of the displaced slope, as shown in Photo 1b. The amount of the deformation was measured at ca.10cm, in the site (Photo 1b), and according to interpretation of InSAR image, deformation amount along satellite line of sight was estimated as less than 12cm toward southwest. Therefore, it is thought that both amounts were harmonized; further effort of noise reduction, e.g., finer resolution of DEM will be used. PALSAR-2 data used in this study were provided by JAXA in the framework of special collaborative research (B) "Surface deformation study using a new generation SAR" by Earthquake Research Institute, the University of Tokyo. This study was also supported by "the Nepal Earthquake and Hazard Mapping of Future Landslides for Making the Plan of Better Reconstruction" (Principal investigator, Prof. Chigira) related to the April 2015 Nepal earthquake in the J-RAPID Program by Japan Science and Technology Agency (JST).

* Reference Ozawa T (2014) Development of InSAR processing tools in NIED -Part 3-. Proceedings of Japan Geoscience Union Meeting 2014 STT59-P12.

<http://www2.jpgu.org/meeting/2014/session/S-TT59.html>

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