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Damaged area detection caused by 2015 Nepal earthquake with coherence difference obtained by PALSAR-2 three observatio

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2015 Nepal earthquake damaged buildings and roads in urban areas and induced many landslides in mountain areas. Satellite data enables us to search wide area and collect information about severe damaged area rapidly. Many earth observing satellites with high resolution optical and SAR sensors have carried out emergency observation after the disaster. In this study, coherence difference obtained by PALSAR-2 was used to detect the damaged area. Two coherence maps were produced from three observations. One coherence map was produced from the two data observed before the disaster (Oct. 4, 2014 and Feb. 21, 2015). The other coherence map was produced from the two data observed between the disaster (Feb. 21, 2015 and May 2, 2015). Since few seasonal/temporal coherence change is expected for urban area in a half year, decrease of the coherence between the two coherence maps implies the damage of building and roads.

The decrease of coherence in HH polarization obtained from the two coherence map was compared with the damaged area map, obtained from photos taken after the disaster. The coherence decrease map detects several severe damaged areas, such as collapse of Dharahara tower, collapse/damage of several temples in Durbar square in Katmandu city, severe building damage in Bhaktapur city, and Sankhu area. In addition to this, landslide area in Langtang region is also detected by the decrease of coherence. The difference of coherence map was also produced from HV polarization. But the visibility of damaged area is better in the coherence difference map produced from HH polarization.

Keywords: L-band SAR, Disaster, landslide