

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

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ACC028-06

Room:102

Time:May 24 09:45-10:00

Temporal elevation changes in glaciers revealed by multi-temporal DEM calibrated with GPS survey in the Langtang, Nepal

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Existence of a debris mantle makes it difficult to detect temporal changes in glacier area, it is useful to calculate changes in elevation when studying fluctuations in debris-covered glaciers. Therefore, an approach using remotely sensed (RS) digital elevation models (DEMs) is feasible solutions to evaluate how fast Himalayan glaciers are changing. In generally, RS-DEMs include variable kind of errors. Hence, validation and calibration using field measurements data are necessary for accurate estimation of changes in elevation. However, few ground-based observational studies are available, because of remoteness and high altitude.

We compute annual elevation change of glacier surface using multi-temporal RS-DEMs calibrated with differential GPS data which we performed in the Langtang region, Nepal Himalaya. Annual elevation change of glacier surface by generating a weighted least square linear regression model.

Field campaigns are performed with differential GPS (DGPS) in 2008 and 2009. And the DGPS data are converted DEM, and used for calibration and validation of RS-DEMs. RS-DEMs used in this study are topographical map derived DEM in 1992, SRTM DEM in 2000, and ASTER DEMs between 2001 and 2004. We will show the result in presentation.

Keywords: glacier, Himalaya, GPS, remote sensing, DEM, Langtang