

## Flow velocity measurements of an ice stream using SAR interferometry and GPS

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Synthetic Aperture Radar (SAR) interferometry (InSAR) is an effective tool to measure flow rate of ice stream on Antarctic continent. We applied the InSAR technique to X band SAR data acquired by German X band SAR satellite TerraSAR-X, and tried to measure flow rate of an ice stream Flattunga, which flows out to Prince Olav coast, East Antarctica. The used two scenes are in the StripMAP mode, and observed at March 21 and April 1, 2011 in the descending orbit 166. The perpendicular baseline length between the two observations was -96.9 m. In order to make differential InSAR (DInSAR) image, we also used ASTER GDEM.

Starting point of an inner Antarctic continent route of Japanese Antarctic Research Expedition (JARE) is located in the upper stream region of Flattunga. We implemented GPS measurements from the end of April to the beginning of May, 2012 in the wintering period of JARE53 at S19 (69°00'28.6"S, 40°08'22.6"E, ellipsoidal height: 615.0m) in the route. From a preliminary analysis of the data, we obtained a flow rate of 15 cm/day and a flow direction of N44 W at the site.

Obtained displacement by DInSAR from TerraSAR-X data was approximately 40 cm for 11 days at around S19 site. The displacement is smaller than the above value from GPS measurement. We will compare the displacement by DInSAR with that by GPS by projecting the direction to ice flow direction of Flattunga.

In the presentation, we also intend to show a result obtained by a differential InSAR analysis of ALOS/PALSAR data.

**Keywords:** Differential SAR interferometry, GPS, ice stream, Antarctica