

## Detection of irregular change of ice sheet in north-western Greenland using ALOS/PALSAR data

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Under the situation of ongoing rapid ice sheet melting in Greenland, it is likely that the ice sheet flow velocity is changing there. We applied differential interferometric synthetic aperture radar (DInSAR) to several SAR scenes of north-western Greenland observed by ALOS/PALSAR and the obtained displacement maps had been shown in JpGU2014 as well as maps of the displacement difference obtained by double DInSAR (DDInSAR) technique which means taking the difference between two DInSAR images.

Stable ice flow is a dominant component of surface displacements over ice sheet. Since phase change in a differential SAR interferogram induced by steady surface displacement is canceled out by taking the difference, we can detect irregular surface displacement such as ice sheet flow rate change by DDInSAR.

In order to detect irregular displacement, the DDInSAR technique was applied to an ALOS/PALSAR scene (path-frame: 76-1590) which was observed at three times in series at August 30, October 15, and November 30 in 2007. Two maps of displacement along radar illumination direction have been obtained from the two DInSAR images and a map of displacement difference has been obtained from the DDInSAR image. In the displacement difference map, we found several spots of circular or elliptical shape where displacement differences of 10 to 15 cm were observed. Because the positions of the spots are almost coincident with locations of ponds on the ice sheet near coastal region, these differences seem to be induced by surface displacement of the ponds.

We are going to apply offset tracking technique to the same SAR data to estimate surface flow of the ice sheet and to do further investigation about the displacement differences by combining the surface flow estimated by the technique.

Keywords: Differential Interferometric SAR, ice sheet flow, offset tracking, Greenland