

Single and Multipolarimetric P-Band SAR Tomography of Subsurface Ice Structure - DTU Orbit (09/11/2017)

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In this paper, first results concerning the characterization of the subsurface of ice sheets and glaciers through single and multipolarization synthetic aperture radar (SAR) tomography (TomoSAR) are illustrated. To this aim, the processing of data acquired in the framework of the European Space Agency IceSAR 2012 campaign is discussed. IceSAR 2012 was conceived so as to support the secondary objectives of the future Earth Explorer mission BIOMASS, which will be a SAR instrument with media penetration capabilities due to the use of the P-band frequency. In this regard, a tomographic study of ice was motivated by the fact that cryospheric remote sensing is of fundamental importance in order to understand more in depth the morphology and the dynamic processes regulating ice sheets. The main objective of the tomographic experiment of the campaign herein discussed was indeed to assess the capability of P-band SAR to retrieve any information about ice subsurface structure. Imaging has been achieved through TomoSAR techniques, applied to airborne multibaseline data acquired in the southwest of Greenland. Different imaging approaches are compared, and the main results achieved are presented: It is found that scattering in the upper layers of glacial subsurface can be achieved up to an extent of about 20–60 m, conditional on the different types of glaciological zone observed. Moreover, clear morphological structures have been found beneath the ice surface at one of the investigated sites.

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Authors: Banda, F. (Ekstern), Dall, J. (Intern), Tebaldini, S. (Ekstern)

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