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Envisat ASAR and meteorological measurments for determination of glacier snow melt on Jan Mayen

Cecilie Rolstad Denby (1), Eirik Malnes (2), Dirk van As (1,3)

(1) Norwegian University of Life Sciences, Mathematical Sciences and Technology, Ås, Norway (cecilie.rolstad@umb.no), (2) Northern Research Institute (Norut), Tromsø Research Park, P.O.Box. 6434, N-9294 Tromsø, Norway, (3) GEUS, Ø. Voldgade 10,1350 Copenhangen, Denmark

Synthetic Aperture Radar (SAR) data are sensitive to wet snow, as radar waves are absorbed effectively in the surface resulting in low radar backscattering. In contrast, dry snow or blue ice gives high backscattering. By using a change detection technique where we compare the radar backscatter in a wet snow image with a dry snow reference image, we can effectively map the wet snow areas. We apply this technique to a time series of Envisat ASAR wide swath data (75 m spatial resolution) over the volcanic island Jan Mayen (71ºN, 8º30'W) in the North-Atlantic sea. On the island twenty glacier flow down in all direction from the central Berenberg crater in the elevation range of 120-2200 m a.s.l. The SAR sensor provides frequent images (typically 2-5 times per week) and the analyzed data set covers the snow melting period April to November 2009. An automatic weather station was placed on a glacier at 330 m a.s.l. in this period. The result from the ASAR data set is a time series of wet snow cover maps over the respective glaciers of Jan Mayen. These maps are validated using the meteorological measurements. The energy balance is also calculated for the period. This work is an initial study of remote sensing of snow melt at Jan Mayen.