



## **The internal layering of snow along a section of the EGIG-line, western Greenland, derived from GPR and ASIRAS-measurements**

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During CryoVex 2004, one of ESA's CryoSat validation campaigns, high resolution ground-penetrating radar measurements were performed in the western part of the Greenland Ice Sheet.

Principal objective of all CryoSat land ice validation activities is to assess and quantify uncertainty in the CryoSat measurements and to investigate the interaction of the Ku-band radar altimeter within the upper meters of the snowpack. The presented GPR data set, consisting of lines of a detailed grid net (100 x 100m), was collected by using 500 and 800 MHz antennae. The grid is located at point T05 (70° N, 47° W) of the EGIG-line at an altitude of around 1940m NN, corresponding to the upper percolation zone. In this region surface melting occurs during the summer and melt water percolates into the snow pack to form ice lenses or continuous layers of high density. Reflections of the radar pulse are attributed to changes in the dielectric constant, which - in dry snow and firn - is controlled by the density contrast.

Based on the GPR-measurements several internal horizons down to a depth of about 10m, including the last summer surface, could be identified and tracked throughout the grid. Simultaneous GPS-measurements were used to map the horizons within an absolute reference frame. Additional information from snow-pit and firn-core analysis enable a conversion of two-way travel time to depth and an estimate of the accumulated mass for the periods and volumes enclosed by the horizons. Finally, results from the ground-based measurements are discussed in comparison with results from the airborne ASIRAS-system, in order to get a better understanding of how horizons visible in both records correlate with each-other.