Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03972, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03972
EGU General Assembly 2008

Comparing Models for Snow Accumulation retrieved from Microwave Remote Sensing

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As a consequence of global warming, the surface mass balance of the ice sheets changes. As this impacts the global sea level, knowing the processes in the ice sheets is of great importance. Polar regions are difficult to access, and existing field data are mostly restricted to small areas. Because of the high spatial variability of ice sheet properties, this leads to large uncertainties in the quantification of parameters needed to estimate the surface mass balance.
Microwave remote sensing has been widely used to gather information on the ice sheets, providing a high spatial and temporal resolution and being independent of daylight and cloud cover. One major issue in the determination of ice sheet surface mass balance is the quantification of snow accumulation. There have been many different approaches to infer accumulation data from microwave remote sensing data, all of which have to deal with large uncertainties and technical limitations.
This study documents and compares three different methods of snow accumulation retrieval focusing mainly on the Greenland ice sheet. All of the methods reviewed include models of the interaction of microwaves with snow layers having different properties depending on their age. Simulated microwave backscatter σ^0 and temperature brightness T_B are compared to satellite data, and different inversion techniques are used to retrieve snow accumulation. Results from the inversion are then validated against data measured during past and recent field campaigns.
The future aim of this study is to improve and combine these models in order to increase the accuracy of snow accumulation data obtained by microwave remote sens-

ing.