



Satellite radar altimetry survey of Ice Sheets surface height.

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The mass balance of the large polar ice sheets is of interest. It has been assessed using satellite radar altimetry which is the only available technique to survey the global ice caps volume over more than 10 years. However the previous studies at global scale were limited in time and in accuracy. The interpretation is limited by the knowledge on ice dynamics, by the small observation period, and the snow dynamics (accumulation, compaction,...). The accuracy is limited depending on factors proper to ice sheet like small scale topographic induced errors, radar penetration effects, short term fluctuations of radar echoing, and by the number of data available. Here we present results obtained using the repeat altimetry technique applied to ERS and ENVISAT and to Antarctica and Greenland. We take into account 100 times more data than classical cross over analysis, which gives us a higher resolution and extends the domain observed to areas where poor coverage of either ascending or descending tracks exist. We build maps of the temporal snow surface elevation evolution. In parallel we show the evolution of the radar measurement. This way we can estimate reliably the accuracy of the measured trends. We use the dual frequency radar measurements of ENVISAT to improve this description. The discussion emphasizes the observability of phenomena and the impact of having long term continuity with ERS, ENVISAT, and future satellites to fit in their track. We interpret the estimated trends in terms of ice and atmosphere dynamics. We conclude on the contribution of radar altimetry to the ice sheets mass balance determination.