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ICE SHEETS SNOW SURFACE HEIGHT EVOLUTION FOLLOWED BY SATELLITE RADAR ALTIMETRY.

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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. 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 short observation period, and by the snow dynamics (accumulation, compaction,...). The accuracy is limited depending on factors proper to ice sheets like topographic induced errors, radar penetration effects, ascending/descending differences, short term fluctuations of radar echoing, and by the number of data available. Here we present results obtained using the repeat altimetry technique over the ERS2 lifetime, from 1995 to 2003. This technique allows taking into account 100 more data than classical cross over analysis, which gives us a resolution of 0.5deg in longitude and 0.1 in latitude. We built maps of the temporal snow surface elevation trend, of the seasonal cycle. We compared to the potential dynamics effects using the balance flux as a proxy and to atmospheric effects using accumulation rates as a proxy. The discussion emphasize the use of this method for other interpretations in term of radar signal, of the observability of phenomena and the impact of having a long term continuity with ERS, ENVISAT, and future satellites to fit in the their track.