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Ku/Ka band observations over polar ice sheets

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For the first time, comparisons between Ku and Ka altimeter measurements are possible thanks to the new AltiKa instrument embarked onboard the Saral mission launched on February 25, 2013. This comparison is of particular interest when dealing with ice sheet observations because both frequencies have different penetration characteristics. We propose in this paper to revisit the estimation of the ice sheet topography (and other related parameters) with altimeter systems and to present illustrations of the differences observed in Ku and Ka bands using AltiKa, Envisat/RA-2 but also Cryosat-2 measurements.
Working on AltiKa waveforms in the frame of the PEACHI project has allowed us to better understand the impact of the penetration depth on the echo shape, to improve the estimation algorithm and to compare its output with historical results obtained on Envisat and ERS missions. In particular, analyses at cross-overs of the Cryosat-2 and Saral data will be presented.

Sentinel-3 mission should be launch during 2015. Operating in Ku band and in delay/doppler mode, it will be crucial to account for penetration effects in order to accurately derive the ice sheet heights and trends. The results of the work presented here, will benefit to the Sentinel-3 mission.