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Study of sea ice regions using AltiKa measurements

Jean-Christophe Poisson (1), Pierre Thibaut (1), Duc Hoang (1), François Boy (2), Amandine Guillot (2), and Nicolas Picot (2)

(1) CLS, Toulouse, France (jpoisson@cls.fr), (2) CNES; Toulouse, France

Since the launch of the SARAL/AltiKa mission on February 25th, 2013, altimeter measurements of excellent quality are acquired all over the globe for the first time in Ka-band. One of the main benefits of the Ka-band is to have a very low penetration length in the ice (unlike the Ku-band historically used by previous altimetry missions), which allows to significantly reduce measurements uncertainties of the sea ice topography. Flying on the Envisat orbit and providing measurements at 40 Hz, the exploitation of AltiKa waveforms on sea ice is of great interest.

Sea ice covered regions are characterized by a large number of different surfaces with a multitude of backscattering properties rapidly evolving with time. Thanks to the high resolution and precision of the AltiKa measurements, backscattering properties from each of these surfaces (first year ice, multiyear ice, fast ice, leads, polynyas, etc. ...) can be observed through rapid changes of the returned echo shape. In the framework of the PEACHI project (Prototype for Expertise on AltiKa, for Coastal, Hydrology and Ice funded by CNES) which aims at analyzing and improving AltiKa measurements, a waveform processing based on an altimeter echo classification is developed and performed on all available AltiKa data in the Arctic ocean. Through this processing a study is conducted on the the evolution of the sea ice cover observed in Ka-band.