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CryoSat-2 SIRAL Calibration: Strategy, Application and Results

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The main payload of CryoSat-2 is a Ku band pulsewidth limited radar altimeter, called SIRAL (Synthetic interferometric radar altimeter), that transmits pulses at a high pulse repetition frequency thus making the received echoes phase coherent and suitable for azimuth processing.
This allows to reach an along track resolution of about 250 meters which is an important improvement over traditional pulse-width limited altimeters.

Due to the fact that SIRAL is a phase coherent pulse-width limited radar altimeter, a proper calibration approach has been developed. In fact, not only the corrections for transfer function amplitude with respect to frequency, gain and instrument path delay have to be computed but it is also needed to provide corrections for transfer function phase with respect to frequency and AGC setting as well as the phase variation across bursts of pulses.
As a consequence, SIRAL performs regularly four types of calibrations: (1) CAL1 in order to calibrate the internal path delay and peak power variation, (2) CAL2 in order to compensate the instrument transfer function, (3) CAL4 to calibrate the interferometer and (4) AutoCal, a specific sequence in order to calibrate the gain and phase difference for each AGC setting.
Commissioning phase results (April-December 2010) revealed high stability of the instrument, which made possible to reduce the calibration frequency during Operations.

Internal calibration data are processed on ground by the CryoSat-2 Instrument Processing Facility (IPF1) and then applied to the science data. In this poster we will describe as first the calibration strategy and then how the four different types of calibration are applied to science data. Moreover the calibration results over almost 2 years of mission will be presented, analyzing their temporal evolution in order to highlight the stability of the instrument over its life.