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CryoSat/SIRAL Cal1 Calibration Orbits

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The main payload of CryoSat 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 SAR processing. This allows to reach an along track resolution that is significantly improved with respect to 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 corrections for transfer function, gain and instrument path delay have to be computed (as in previous altimeters), but also corrections for phase (SAR/SARIn) and phase difference between the two receiving chains (SARIN only).
Recalling that the CryoSat's orbit has a high inclination of 92° and it is non-sun-synchronous, the temperature of the SIRAL changes continuously along the orbit with a period of about 480 days and it is also function of the ascending/descending passes. By analysis of the CAL1 calibration corrections, it has been verified that the internal path delay and the instrument gain variation measured on the SIRAL are affected by the thermal status of the instrument and as a consequence they are expected to vary along the orbit.
In order to gain knowledge on the calibration corrections (i.e. the instrument behavior) as function of latitude and temperature, it has been planned to command a few number of orbits where only CAL1 calibration acquisitions are continuously performed. The analysis of the CAL1 calibration corrections produced along the Calibration orbits can be also useful to verify whether the current calibration plan is able to provide sufficiently accurate corrections for the instrument acquisitions at any latitude.
In 2016, the CryoSat/SIRAL Cal1 Calibration Orbits have been commanded two times, a first time the 20th of July 2016 and a second time the 24th of November 2016, and they required coordination among many operation teams (Mission Planning, FOS, PDS and Quality) aiming at defining a thorough strategy for the Calibration Orbits.
In this abstract, the Calibration Orbits will be presented together with the preliminary analysis of the calibration corrections generated during this activity.