



Arctic experiments to support CryoSat-2 validation

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Validating the elevation retrievals from a phase coherent pulse-width limited polar observing radar altimeter such as the Synthetic/interferometric radar altimeter (SIRAL), the primary payload of CryoSat, is not a simple one. In order to fully understand all the respective error co-variances it is necessary to acquire and correlate many different types of in-situ measurements (GPR, neutron probe density profiles, drilled and electromagnetic derived sea-ice thicknesses, for example) in highly inhospitable regions of the cryosphere at key times of the year. In order to correlate retrievals from CryoSat with other airborne and in-situ data it was decided early in the CryoSat development that an aircraft borne radar altimeter with similar functionality to SIRAL would provide the necessary link, albeit on the smaller scale, and provide pre-launch insight into expected performances and logistical difficulties.

In 2001 ESA commenced the development of its own prototype radar altimeter that mimics the functionality of SIRAL. Similar to SIRAL, but with subtle functional differences, the airborne SAR/Interferometric Radar Altimeter System (ASIRAS), has now been the centre piece instrument for a number of large scale land and sea ice field campaigns in the Arctic during spring and autumn 2004, 2006 and 2008 known as CryoVEx (CryoSat validation experiment). Additional smaller science/test campaigns have taken place in March 2003 (Svalbard), March 2005 (Bay of Bothnia), March 2006 (Western Greenland), April 2007 (CryoVEx 2007 in Svalbard).

It is a credit to all international parties in the CryoSat Validation and Retrieval Team (CVRT) for the coordination, planning, acquisition of in-situ and airborne measurements and the subsequent processing and distributing of its data for analysis. The CVRT has an infrastructure ready for validating CryoSat-2.

This paper describes the different measurements acquired, the key science results and stresses the importance of the campaigns to date (despite the loss of CryoSat-1 in Oct 2005 due to launcher failure) and those planned following CryoSat-2 launch in 2009.