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European Space Agency campaign activities in support of Earth Observation Projects: Examples for Snow and Ice

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In the framework of its Earth Observation Programmes the European Space Agency (ESA) carries out ground-based and airborne campaigns to support geophysical algorithm development, calibration/validation, simulation of future spaceborne earth observation missions, and applications development related to land, oceans and atmosphere. Campaigns in support of future mission development have technological, geophysical and simulation objectives while exploitation projects need validation for the assessment of the quality of the earth observation products and of the service provision

ESA has been conducting airborne and ground measurements campaigns since 1981 by deploying a broad range of active and passive instrumentation in both the optical and microwave regions of the electromagnetic spectrum such as lidars, limb/nadir sounding interferometers/spectrometers, high-resolution spectral imagers, advanced synthetic aperture radars, altimeters and radiometers.

These campaigns take place inside and outside Europe in collaboration with national research organisations in the ESA member states as well as with international organisations harmonising European campaign activities.

For the different activities a rich variety of datasets has been recorded, are archived and users can access campaign data through the EOPI web portal [http://eopi.esa.int].

At present, recently deployed and ongoing scientific campaigns produce high value datasets and analyses to support for the Living Planet Programme (Earth Explorers Core and Opportunity missions), the GMES and Earth Watch missions as well as other ESA Earth Observation projects in the fields of Atmosphere, Ocean and Ice, Land Surface Processes and Solid Earth.

This paper focuses on describing the general setup for campaign execution and gives examples for ongoing activities dedicated to snow and ice.

During NosREx in winter 2009/2010 and NosREx_II in 2010/2011 ground based scatterometer data at X- and Ku-bands together with in-situ measurements co-incident in time have been analysed. Experimental data on backscattering signatures of snow are needed for testing theoretical backscatter models and for validating and advancing retrieval algorithms.

The Canadian snow and ice experiment (CASIX 2010) was set up to gain further knowledge about the di-electric status of the underlying soil layer at the time of snow onset and the sensitivity of radar backscatter to varying forest fractions. In addition it also deals with the sensitivity of the Ku and X-band radar responses to snow on sea ice.