

Remote Sensing of the Cryosphere – an overview

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Climatic change alters our environment globally but is likely to be more pronounced at northern latitudes. Variations in the earth's temperature have strong impacts on the components of the cryosphere: e.g. sea ice reduction, permafrost melting, earlier disappearance of seasonal snow cover and changes in atmospheric circulation patterns and the earth's albedo. Even though the overall sign is clear, some regions show a heterogeneous behavior depending on their latitude and altitude. Hence, it is of crucial importance to assess and quantify the effects of climatic variability and change on the cryosphere and its overall stability, and, in turn, the consequences of such changes for future impacts on the climate system.

Beside ground measurements satellite remote sensing represent a complementary source of information to retrieve comprehensive measurements of cryospheric parameters with favorable spatial and temporal resolution, even in remote areas. In addition to current measurements, long term data sets from optical/thermal sensors as well as passive and active microwave sensors are a valuable tool for climate research.

We will provide an overview on those satellite sensors that offer long time series and fulfill the requirements of WMO for a climate period (≥ 30 years). A first part will focus on pre-processing steps required to achieve the geometric and radiometric accuracy defined by GCOS. The second part is dedicated to some

regional examples taking into account different sensors and spectral ranges. Finally, a comparison between ground-based measurements and satellite retrieved products will demonstrate the usability of different satellite-derived essential climate variables. An outlook on future satellite missions aiming at the continuation of the long time series will conclude the talk.