>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

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Abstract

Seasonal snow is an important component of the global climate system. It is highly variable in space and time, being sensitive to synoptic scale processes and long-term climate-induced changes related to temperature and precipitation. Current snow products derived from various satellite sensors by means of different retrieval algorithms show substantial differences in area extent and snow mass, a source of uncertainty for cryosphere monitoring and climate model validation. The ESA Climate Change Initiative (CCI+) Programme addresses seasonal snow as one of nine Essential Climate Variables derived from satellite data. Here we report on CCI activities concerned with the snow cover extent at regional to global scale.

In the first phase of the Snow-CCI project (2018 - 2021), reliable and fully validated processing lines for the generation of snow climate data records were developed and implemented. Homogeneous multi-sensor time series of daily snow extent were generated. Using GCOS guidelines, the product requirements for these parameters were assessed and consolidated in the frame of workshops and by direct interaction with users who are concerned with different climate applications. Consistent daily products on fractional snow extent at global coverage are provided for snow viewable from space (viewable snow) and for snow on the surface corrected for forest masking (snow on ground). Input data are medium resolution optical satellite images from the MODIS and Sentinel-3 SLSTR sensors, extending from 2000 to present. For the Snow-CCI Climate Research Data Package version 2 an iterative development cycle was implemented in order to improve and homogenise the snow extent products from different sensors. Independent validation of the snow extent products is performed using high resolution snow maps from Landsat and Sentinel-2 data acquired across different seasons and climate zones around the globe from 2000 onwards, as well as using in-situ snow data, following protocols developed by the snow community.

We will present an overview of the algorithms and systems for generation of snow products that are available at the ESA Open data portal. The 20 years timeseries from MODIS (starting in 2000, 1 km pixel spacing) and from Sentinel-3 SLSTR (from 2020 onwards) will be presented along with the results of the multi-sensor consistency and validation activities and of inter-comparisons with snow products from other sources, focussing on different mountain regions of the Earth.

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