

Global Determination of Snow Cover using Remote Sensing and a Near Real Time Processing Chain

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ABSTRACT

Remote sensing offers the best prerequisites for obtaining comprehensive information on global snow cover. Although microwave remote sensing can provide limited information about the thickness of the snowpack and the water stored (i.e. snow water equivalent), its geometric resolution is not sufficient for an accurate spatial analysis. Optical remote sensing provides the required spatial resolution, but it is often compromised by clouds or at high geographical latitudes by the polar night. In order to obtain cloud-free information on daily snow cover from optical data, the German Aerospace Center developed the already established product Global SnowPack (GSP). It is based on the daily MODIS snow products originating from Terra and Aqua platforms and provided by NSIDC. With the help of sequential algorithms and additional data (digital elevation model, land cover classifications), pixels with clouds or polar night are continuously eliminated. While the Global SnowPack has so far only been calculated retrospectively for the entire hydrological year, there will now also be a near real time product (NRT-GSP). The latest MODIS data (these are available after approx. 2 days) are interpolated on a daily basis using the previous days. The product will be available in the future on the GeoService of the Earth Observation Center. We see an application of this product, for example, in the prediction of extreme hydrological events. In a recently published study, the development of the snow cover of various catchment areas of nival rivers derived from Global SnowPack was incorporated into a snowmelt runoff model. It was found that extreme high and low water events during the annual spring flood were reflected early in the development of the snow cover extent. With the help of the NRT-GSP product, such a development would be recognizable at an early stage and preparations could be made.

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