



## **ESA GlobPermafrost – mapping the extent and thermal state of permafrost with satellite data**

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The ESA GlobPermafrost initiative (2016-2019) aims at developing, validating and implementing information products based on remote sensing data to support permafrost research. Mapping of permafrost extent and ground temperatures is conducted at 1 km scale using remotely sensed land surface temperatures (MODIS), snow water equivalent (ESA GlobSnow) and land cover (ESA CCI landcover) in conjunction with a simple ground thermal model (CryoGrid 1). The spatial variability of the ground thermal regime at scales smaller than the model resolution is explicitly taken into account by considering an ensemble of realizations with different model properties.

The approach has been tested for the unglacierized land areas in the North Atlantic region, an area of more than 5 million km<sup>2</sup>. The results have been compared to in-situ temperature measurements in more than 100 boreholes, indicating an accuracy of approximately 2.5°C.

Within GlobPermafrost, the scheme will be extended to cover the entire the circum-polar permafrost area. Here, we provide an evaluation of the first prototype covering “lowland” permafrost areas north of 40° latitude (available on [www.globpermafrost.info](http://www.globpermafrost.info) in early 2017). We give a feasibility assessment for extending the scheme to global scale, including both mountain and Antarctic permafrost. Finally, we discuss the potential and limitations for estimating changes of permafrost extent on decadal timescales.