

## **ESA DUE PERMAFROST: Circumpolar Remote Sensing Service for Permafrost – Evaluation and Application Case Studies**

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The task of the ESA Data User Element DUE Permafrost project is to build up a Remote Sensing service for permafrost applications with extensive involvement of the permafrost research community. The DUE Permafrost remote sensing products are land temperature, soil moisture, frozen/thawed surface status, terrain parameters, land cover and surface waters.

A major component is the evaluation of the DUE Permafrost products to test their scientific validity for high-latitude permafrost landscapes. The primary programme providing ground data is the Global Terrestrial Network for Permafrost (GTN-P) initiated by the International Permafrost Association (IPA). The involvement of scientific stakeholders and the IPA and the ongoing evaluation make the DUE Permafrost products usable and trustworthy. We show evaluation case studies in Alaska and Siberia and first applications by the permafrost research community.

The adaption of the remote sensing products for the permafrost and climate modeling is experimental and highly dependent on the users' involvement. For a few years already, the Geophysical Institute Permafrost Laboratory (GIPL), University of Alaska Fairbanks, US (<http://www.gi.alaska.edu/research/snowicepermafrost/Permafrost>) has successfully demonstrated the value of using LST derived from remote sensing data for driving its permafrost models. Further experimental testing of the DUE Permafrost products for use by the modeling community (permafrost and climate) will range from

- (i) the evaluation of external data of the models, with modifying or providing new external data (e.g. tundra land cover, surface water ratio, soil distribution),
- (ii) to new drivers for regional models derived from remote sensing (e.g., LST),
- (iii) to the evaluation of the output data from the models (e.g. spatial patterns of moisture, freeze/thaw and surface temperature).