

climate change initiative

→ PERMAFROST

DUE Permafrost & DUE GlobPermafrost heritage

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permafrost
cci

ESA UNCLASSIFIED - For Official Use





DUE Permafrost and GlobPermafrost



❖ DUE – Data User Element : specific ESA program

❖ Several user work shops in the past

❖ EGU side event, Vienna – May 2010



❖ UAF, Fairbanks – March 2011



❖ AWI, Potsdam – February 2012



❖ AGU side event, San Francisco – December 2016



❖ EGU side event, Vienna – May 2017



❖ ACOP side event, Sapporo – July 2017



❖ AWI, Potsdam – November 2017



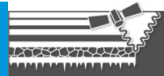

❖ AGU side event, San Francisco – December 2018





Evolution



DUE Permafrost (2009-2012, Arctic) 	GlobPermafrost (2016-2019) 	Permafrost_cci Phase I so far (2018-2021)	Options (-2023)
Harmonized MODIS LST data as auxiliary information for GTN-P	Permafrost equilibrium modelling using MODIS (gap filling approach developed)	➔ Usage of MODIS adjustment scheme – input for transient modelling	
Lake detection and intra-annual variability via ENVISAT –ASAR WS	Landsat trends (1999-2014), specifically lakes	➔ Comparison to Permafrost_cci time series	
Combination of existing global landcover maps for the Arctic	Prototypes of landcover based on Sentinel-1/2		➔ Circumpolar implementation
Landsurface status (freeze/thaw) and soil moisture as auxiliary information for GTN-P (2007-2011) ➔	Conversion to ground temperature tests	➔ Extension (2007-2018), Comparison freeze/thaw ground temperature and Permafrost_cci time series	➔ Revision for multi-purpose freeze/thaw product
First demonstration of rockglacier (RG) mapping with DinSAR ➔	➔ Extension to a larger number of regions and to Sentinel-1	➔ Homogeneous inventories	➔ updates
First demonstration ground subsidence with DInSAR ➔	➔ Extension ground subsidence (more regions and to Sentinel-1	➔ Extension to seasonal and long-term signals	
Dissemination via PANGAEA, GTN-P portal, WebGIS with data download (registration required)	Dissemination via PANGAEA, AWI APGC catalogue (PERSYS) and AWI WebGIS (open)	➔ Dissemination via CEDA and AWI WebGIS	

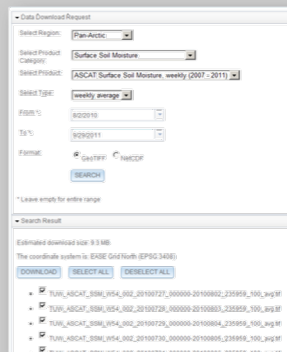
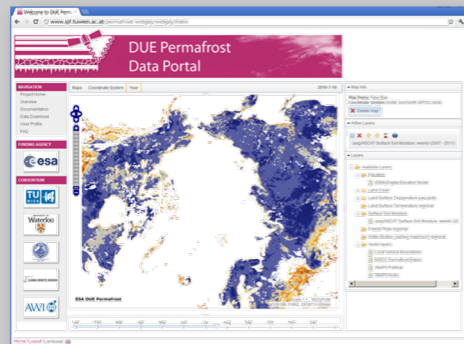




DUE Permafrost data portal

Visualization of time series ,
overlays with other data possible

data by time period
including documentation



Arctic Portal

Time series for selected GTN-P
monitoring sites - LST, Soil
moisture and surface status

PANGAEA

Full data set including
documentation and updates



Incl. download functionality



DUE Permafrost data in GTN-P database

Home > Boreholes > Bolvansky 59 > Datasets

Search:

Data	Variable	Frequency	Data Type	Method	Resolution	Start	End	Policy
Dataset	Air Temperature	Daily	Constant Over Interval	Thermistor Automated	Irrelevant	14. Aug 2006	13. Aug 2015	Open
Dataset	Ground Temperature	Daily	Constant Over Interval	Thermistor Automated	Irrelevant	14. Aug 2006	13. Aug 2015	Open
Dataset	Surface Temperature	Daily	Constant Over Interval	Thermistor Automated	Irrelevant	14. Aug 2006	13. Aug 2015	Open
Dataset	Surface Temperature (satellite)	Monthly	Average	AATSR (satellite)	1x1 km	01. Feb 2005	01. Dec 2009	Open
Dataset	Surface Temperature (satellite)	Monthly	Average	MODIS (satellite)	25x25 km	01. Mar 2000	01. Dec 2013	Open
Dataset	Surface Temperature (satellite)	Weekly	Average	MODIS (satellite)	1x1 km	01. Jan 2013	30. Dec 2013	Open
Dataset	Surface Temperature (satellite)	Weekly	Average	MODIS (satellite)	25x25 km	01. Oct 2007	30. Dec 2013	Open

Showing 1 to 7 of 7 entries

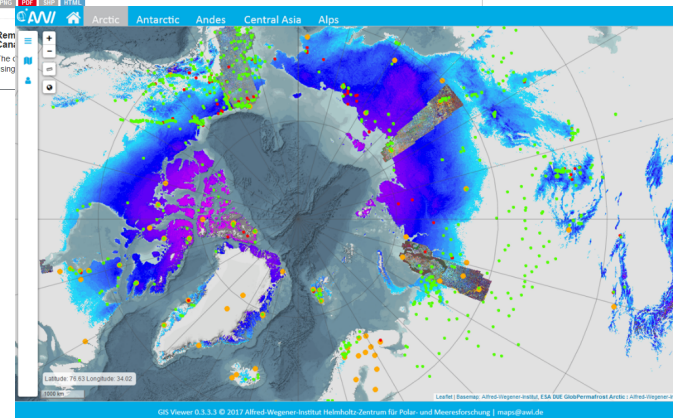
Designed & hosted by Arctic Portal



GlobPermafrost information system



- Hosted by AWI
- Open Access Data Catalogue
 - searching for project-specific geospatial data by e.g. tags, keywords, geographic location.
 - It provides a preview figure, localizes the dataset on a basemap with zoom/pan, displays a variety of metadata, and
 - links to a permanent DOI-based archival link at the PANGAEA data repository
- Open Access WebGIS Application
 - OGC-standardized Web Mapping Services (WMS) and Web Feature Service (WFS) technologies
- Catalogue and WebGIS also include selected DUE Permafrost and Permafrost_cci products

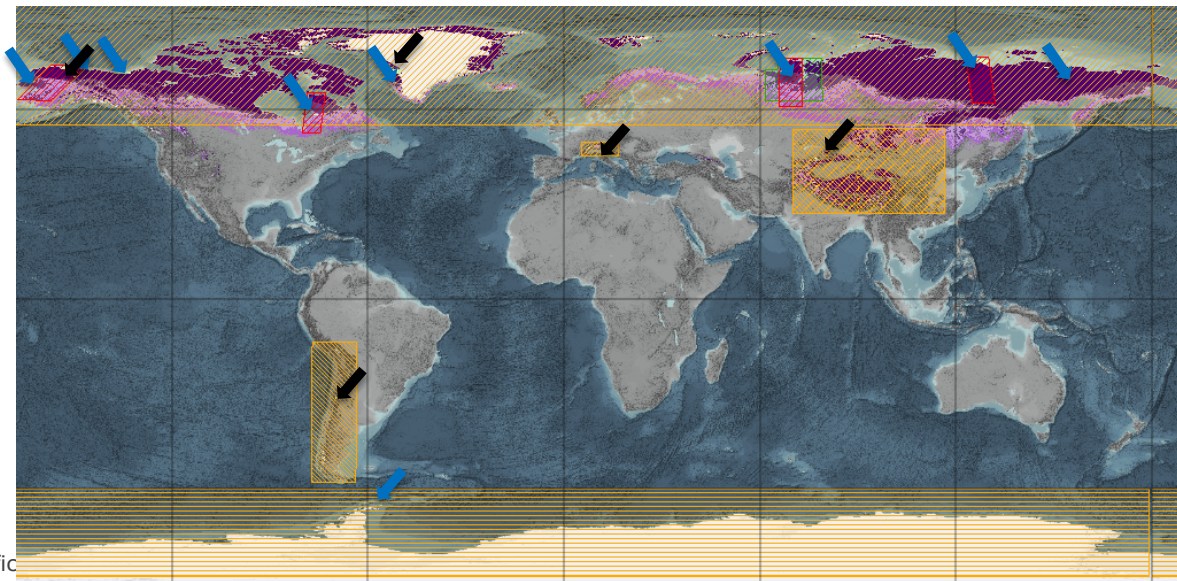




GlobPermafrost thematic products



- Permafrost extent
- Land cover prototype
- Regional scale trend analyses
- Local scale lowland permafrost (subsidence, ground-fast ice, mass movements)
- Mountain Permafrost (rock glaciers)





globpermafrost.info

GlobPermafrost Archive

GlobPermafrost Ground Temperature Source: University Oslo

The project

The European Space Agency launched the GlobPermafrost initiative (2016-2019) to develop, validate and implement information products to support the research



- Ramage, J., Jungsberg, L., Wang, S., Westermann, S., Lantuit, H. & Heleniak, T. (2021), '**Population** living on permafrost in the Arctic', Population and Environment. URL: <https://doi.org/10.1007/s11111-020-00370-6>
- Florence Lapierre Poulin, Daniel Fortier, and Dominique Berteaux. Low vulnerability of **Arctic fox** dens to climate change-related geohazards on Bylot Island, Nunavut, Canada. Arctic Science. e-First <https://doi.org/10.1139/as-2019-0007>
- Kåresdotter, E., Destouni, G., Ghajarnia, N., Hugelius, G., & Kalantari, Z. (2021). Mapping the vulnerability of **Arctic wetlands** to global warming. Earth's Future, 9, e2020EF001858. <https://doi.org/10.1029/2020EF001858>
- E E Webb, M. Loranty, J. Lichstein (2021): Surface water, vegetation, and fire as drivers of the terrestrial **Arctic-boreal albedo feedback**. Environ. Res. Lett. 16 084046
- Climate modelling: Burke, E.J., Zhang, Y., Krinner, G. (2020): Evaluating permafrost physics in the Coupled Model Intercomparison Project 6 (**CMIP6**) models and their sensitivity to climate change, The Cryosphere, 14, 3155–3174, 2020, <https://doi.org/10.5194/tc-14-3155-2020>.
- As map, e.g.
 - Julian Murton, Periglacial Processes and Deposits, Editor(s): David Alderton, Scott A. Elias, Encyclopedia of Geology (Second Edition), Academic Press, 2021, Pages 857-875, ISBN 9780081029091, <https://doi.org/10.1016/B978-0-12-409548-9.11925-6>.
 - Horizon2020 project Nunataryuk (GRID Arendal): Foldable map of permafrost around the world <https://www.grida.no/news/13>

