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A central database for the Global Terrestrial Network for Permafrost (GTN-P)

Kirsten Elger (1), Jean-Pierre Lanckman (2), Hugues Lantuit (1), Ævar Karl Karlsson (2), and Halldór Johannsson (2)

(1) Alfred Wegener Institute for Polar and Marine Research, Potsdam, Germany (kirsten.elger@awi.de; hugues.lantuit@awi.de), (2) Arctic Portal, Akureyri, Iceland (jean@arcticportal.org; aevar@arcticportal.org; halldor@arcticportal.org)

The Global Terrestrial Network for Permafrost (GTN-P) is the primary international observing network for permafrost sponsored by the Global Climate Observing System (GCOS) and the Global Terrestrial Observing System (GTOS), and managed by the International Permafrost Association (IPA). It monitors the Essential Climate Variable (ECV) permafrost that consists of permafrost temperature and active-layer thickness, with the long-term goal of obtaining a comprehensive view of the spatial structure, trends, and variability of changes in the active layer and permafrost. The network's two international monitoring components are (1) CALM (Circumpolar Active Layer Monitoring) and the (2) Thermal State of Permafrost (TSP), which is made of an extensive borehole-network covering all permafrost regions. Both programs have been thoroughly overhauled during the International Polar Year 2007-2008 and extended their coverage to provide a true circumpolar network stretching over both Hemispheres.

GTN-P has gained considerable visibility in the science community in providing the baseline against which models are globally validated and incorporated in climate assessments. Yet it was until now operated on a voluntary basis, and is now being redesigned to meet the increasing expectations from the science community. To update the network's objectives and deliver the best possible products to the community, the IPA organized a workshop to define the user's needs and requirements for the production, archival, storage and dissemination of the permafrost data products it manages.

From the beginning on, GNT-P data was "outfitted" with an open data policy with free data access via the World Wide Web. The existing data, however, is far from being homogeneous: is not yet optimized for databases, there is no framework for data reporting or archival and data documentation is incomplete. As a result, and despite the utmost relevance of permafrost in the Earth's climate system, the data has not been used by as many researchers as intended by the initiators of these global programs. The European Union project PAGE21 created opportunities to develop this central database for GTN-P data during the duration of the project and beyond. The database aims to be the one location where the researcher can find data, metadata and information of all relevant parameters for a specific site. Each component of the Data Management System (DMS), including parameters, data levels and metadata formats were developed in cooperation with GTN-P and the IPA. The general framework of the GTN-P DMS is based on an object-oriented model (OOM) and implemented into a spatial database. To ensure interoperability and enable potential inter-database search, field names are following international metadata standards.

The outputs of the DMS will be tailored to the needs of the modeling community but also to the ones of other stakeholders. In particular, new products will be developed in partnership with the IPA and other relevant international organizations to raise awareness on permafrost in the policy-making arena. The DMS will be released to a broader public in May 2013 and we expect to have the first active data upload – via an online interface – after 2013's summer field season.