

Geophysical Research Abstracts
Vol. 20, EGU2018-11925-2, 2018
EGU General Assembly 2018
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PerSys – WebGIS-based permafrost data visualisation system for ESA GlobPermafrost

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ESA DUE GlobPermafrost (www.globpermafrost.info) provides a remote sensing data service for permafrost research and applications. This service comprises of the generation of remote sensing products for various regions and spatial scales, and specific infrastructures for visualisation, dissemination and access to datasets. PerSys is the ESA GlobPermafrost geospatial information service for publishing and visualisation of information and data products to the public. Data products are described and searchable in the PerSys Data Catalogue, a core component of the Arctic Permafrost Geospatial Centre (APGC), established within the framework of ERC PETA-CARB at AWI. The data visualisation employs the AWI WebGIS-infrastructure maps@awi (<http://maps.awi.de>), a highly scalable data visualisation unit within the AWI data-workflow framework O₂A, from Observation to Archive.

WebGIS technology in maps@awi supports the project-specific visualisation of raster and vector data products of diverse spatial resolutions and remote sensing sources. This is a prerequisite for the visualisation of the wide range of GlobPermafrost remote sensing products like: Landsat multispectral index trends (Tasseled Cap Brightness, Greenness, Wetness; Normalized Vegetation Index NDVI), Arctic land cover (e.g., shrub height, vegetation composition), lake ice grounding, InSAR-based land surface deformation, rock glacier velocities and a spatially distributed permafrost model output with permafrost probability and ground temperature per pixel. All WebGIS projects are adapted to the products specific spatial scale. For example, the WebGIS 'Arctic' visualises the Circum-Arctic products. Higher spatial resolution products for rock glacier movements are visualised on regional scales in the WebGIS projects 'Alps', 'Andes' and 'Central Asia'.

GIS services were created and designed using ArcGIS for Desktop (10.4) and finally published as a Web Map Service (WMS), an internationally standardized format (Open Geospatial Consortium (OGC)), using ArcGIS for Server (10.4). The project-specific data WMS as well as a resolution-specific background map WMS are embedded into a GIS viewer application based on Leaflet, an open-source JavaScript library. The GIS viewer application was adapted to interlink all WebGIS projects, and especially to enable their direct accessibility via the GlobPermafrost Overview WebGIS project. The PerSys WebGIS is accessible via the GlobPermafrost project webpage and linked to the respective product groups as well as on maps@awi (maps.awi.de). All GlobPermafrost data products will be DOI-registered and archived in PANGAEA. In future, PerSys intends to encourage permafrost researchers other than GlobPermafrost to integrate and visualise their data.