

A circumpolar dataset for utilization of Scatterometer derived soil moisture at locale scale



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This document is the product guide for the version 1 release of the circumpolar Scaling Layer. It has been compiled for the PAGE21 project (FP7 – ENV - 2011 GRANT AGREEMENT NO: 282700), a project coordinated by the Alfred –Wegener -Institute for Polar and Marine Research . It is based on the deliverable document D5.1 ‘Downscaling results and daily average surface temperatures for the whole continental arctic region, for the 2000-2010 snow-free periods’

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2 Dataset overview

This dataset provides scaling information applicable to satellite derived surface coarse resolution surface soil moisture datasets following the approach by Wagner et al. (2008). It is based on ENVISAT ASAR data and can be utilized to apply the Metop ASCAT dataset (25km) for local studies as well as to assess the representativeness of *in-situ* measurement sites and thus their potential for upscaling. The approach based on temporal stability (Wagner et al. 2008) consists of the assessment of the validity of the coarse resolution datasets at medium resolution (1km, product is the so called 'scaling layer').

High correlations (R^2) suggest that the coarse resolution measurements are applicable on local scale and good agreement with *in-situ* measurements can be expected. It has been derived for the entire Arctic within the framework of the PAGE21-project. Approximately 14,000 single GM datasets have been orthorectified, normalized and resampled to tiles which allow efficient spatial-temporal analyses of the backscatter values (Sabel et al. 2007, Pathe et al. 2009, Sabel et al. 2012a). Coarse resolution soil moisture applicability is however also impacted by landscape heterogeneity specifically with respect to abundance of small lakes (Högström et al. 2014). A masking scheme for areas where C-Band higher resolution SAR (ASAR WS ~120m) is available has been developed (Sabel et al. 2012b, Milestone report 34/35) and applied (see Figure 1).

3 Data specification

3.1 File naming

File name: OOO_SSSSS_PPP_VVV_YYYYMMDD_ROI.EEE

Where

OOO="organisation", e.g. TUW

SSSSS="sensor and mode" e.g. ENVISAT ASAR GM - ASARGM

PPP="product"

VVV="product version"

YYYYMMDD= "acquisition date and time" (or year range YYYY_YYYY)

ROI="region/site of interest"

EEE="file extension", e.g. tif

Product codes

SCA Scaling layer – no masking for water bodies applied

SCM Scaling layer – Masking for water bodies applied

Site code

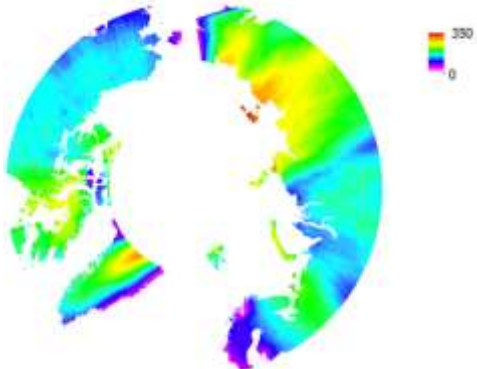
E30 Circumpolar subset 30 – 180 E

W30 Circumpolar subset 180 W – 30 E

REG data available for regions with water fraction estimate available from ESA DUE Permafrost and STSE ALANIS Methane

3.2 Data Description

Table 1: Description of the scaling layer applicable to the Metop ASCAT surface soil moisture dataset

| Subject | Specification |
|--------------------|---|
| Variable | Scaling layer |
| Units | R^2 [0-1] scaled to [0-100] |
| Coverage | circumpolar 60°- 76.7° latitude |
| Time period | Based on snow-free seasons 2005-2011 (irregular sampling intervals) |
| |  |
| Coordinate system | GCS_WGS_1984 |
| Spatial resolution | 15'' |
| Data format | GeoTIFF NetCDF |
| Data codes | 0 – 100, Integer |
| Other data codes | NaN for no data or masked |

3.3 Examples

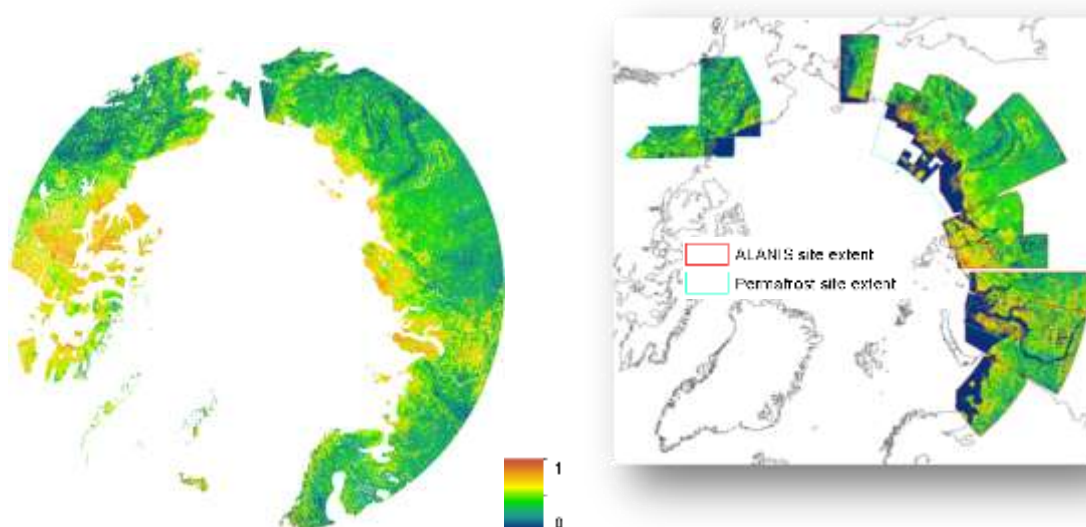


Figure 1: Scaling layer based on ENVISAT ASAR GM (R^2 of local and regional backscatter): left – without masking; right – masked based on open water sub-pixel contributions from ENVISAT ASAR WS products of the ESA DUE Permafrost project and STSE ALANIS Methane project (Sabel et al. 2012b).

4 Known issues

Over 8000 ENVISAT ASAR GM were used for creating the Scaling Layer. Gaps in the product may result due to data availability and geocoding constraints.

5 Data access and contact information

Data can be accessed via PANGAEA (<http://doi.pangaea.de/10.1594/PANGAEA.839818>) and should be cited as:
Widhalm, Barbara; Sabel, Daniel; Hasenauer, Stefan; Doubkova, Marcela; Bartsch, Annett (2014): Circumpolar Scaling Layer for downscaling of Scatterometer derived soil moisture with links to geotiff images and netCDF files (2005-01 to 2011-12). Department of Geodesy and Geoinformatics, TU Vienna, doi:10.1594/PANGAEA.839818

For questions about the dataset, contact Annett.Bartsch@tuwien.ac.at.

Additional information on the Project can be found at www.page21.eu

6 References

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