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Circumarctic wetland dataset based on ENVISAT ASAR Global Monitoring Mode

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This document is the product guide for the version 1 release of the circumpolar wetness level map. 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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1 Contents

2 Dataset overview

Flux studies in arctic environments distinguish between the classes dry, medium (mixed/moist) and wet (e.g. Parmentier et al. 2011). Radar backscatter is dependent on sensor parameters such as incidence angle, polarisation and wavelength as well as target properties, e.g. surface roughness and vegetation structure as well as dielectric constant. Depicting material characteristics, the dielectric constant highly depends on soil moisture content, leading to higher backscatter values under wet soil conditions and low values under dry or frozen conditions. Active microwave measurements are therefore suitable to map wetlands, especially in boreal and tundra regions. It has been shown that C-Band can be used to identify peatlands over large regions (Bartsch et al. 2009, Reschke et al. 2012). Bartsch et al. (2011) demonstrate specific backscatter patterns for arctic wetland types based on a comparison of the Circum Arctic Vegetation Map (CAVM, Walker et al. 2002). These classes have been separated into dry, medium and wet in order to develop a scheme for identification with SAR data. The proposed method by Widhalm & Bartsch (in prep.) is applicable in arctic and subarctic environments. An additional class represents sandy soils (with segdes) or bare ground. This class can be found specifically in coastal regions (e.g. Lena Delta second terrace) and in case of drained lake basins (e.g. around Kytalyk).

3 Data specification

3.1 File naming

File name: OOO_SSSSS_PPP_VVV_YYYYMMDD_ROI.EEE

Where OOO="organisation", e.g. TUW
SSSSSS="sensor and mode"
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

Sensor/source code

ENVISAT ASAR GM - ASAGM

Product codes

WWN Wetness levels based on Widhalm & Bartsch (in prep) – limited masking for water bodies (no high spatial resolution mask for water bodies applied)

Site code

CIR Circumpolar

3.2 Data Description

Table 1: Description of the wetness levels product

Subject	Specification
Variable	Wetness levels
Units	Classes
Coverage	circumpolar 60° - 76.7°N (+Svalbard)
Time period	Static, based on data from 2005-2011, irregular sampling: 
Coordinate system	GCS_WGS_1984
Spatial resolution	Gridded to 15'' (original resolution 1km)
Data format	GeoTIFF , NetCDF
Data codes	1 – wet, 2 – medium, 3 – dry, 4 – sandy soil or bare
Other data codes	NaN for no data or masked

Table 2: CAVM classes (Walker et al. 2002) and the three moisture level categories. An additional a fourth class which represents sandy soil with sedges as well as barren ground has been introduced.

Moisture level	CAVM class
wet	12: Sedge/grass, moss wetland
	13: Sedge, moss, dwarf-shrub wetland
	14: Sedge, moss, low-shrub wetland
medium	2: Rush/grass, forb, cryptogam tundra
	5: Graminoid, prostrate dwarf-shrub, forb tundra
	7: Nontussock sedge, dwarf-shrub, moss tundra
	8: Tussock-sedge, dwarf-shrub, moss tundra
	9: Erect dwarf-shrub tundra
	10: Low-shrub tundra
dry	1: Cryptogam, herb barren
	4: Prostrate dwarf-shrub, herb tundra
	6: Prostrate/Hemiprostrate dwarf-shrub tundra

4 Known issues

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

A global land area and lakes mask has been applied. This results in some cases in gaps or inclusion of sea or lakes (misclassified as dry) into the map.

5 Data access and contact information

Data can be accessed via PANGAEA (www.pangaea.de) and should be cited as:
Widhalm, B., Bartsch, A., Sabel, D., Heim, B. (2014): Circumarctic wetland dataset based on ENVISAT ASAR Global Monitoring Mode. Department of Geodesy and Geoinformatics, TU Vienna, DOI: 10.1594/PANGAEA.840548

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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