GROUP ON EARTH OBSERVATIONS

INSIGHT FOR A CHANGING WORLD

GEO WEEK 2017

23-27 OCTOBER 2017

GROUP ON EARTH OBSERVATIONS

Data Management & Sharing principles within the GEO-Wetlands Initiative

Jonas Eberle
(Friedrich Schiller University Jena, Germany)

FRIEDRICH-SCHILLER-UNIVERSITÄT JENA

GEO Wetlands Initiative

Introduction

- GEO Wetlands officially established as GEO Initiative in 2016
- Portal development (including data management & sharing) funded by the EU H2020 project SWOS (Satellite-based Wetland Observation Service)
- Participation in further GEO activities (e.g., GEOSS Evolve, GEO Community Portal Team)

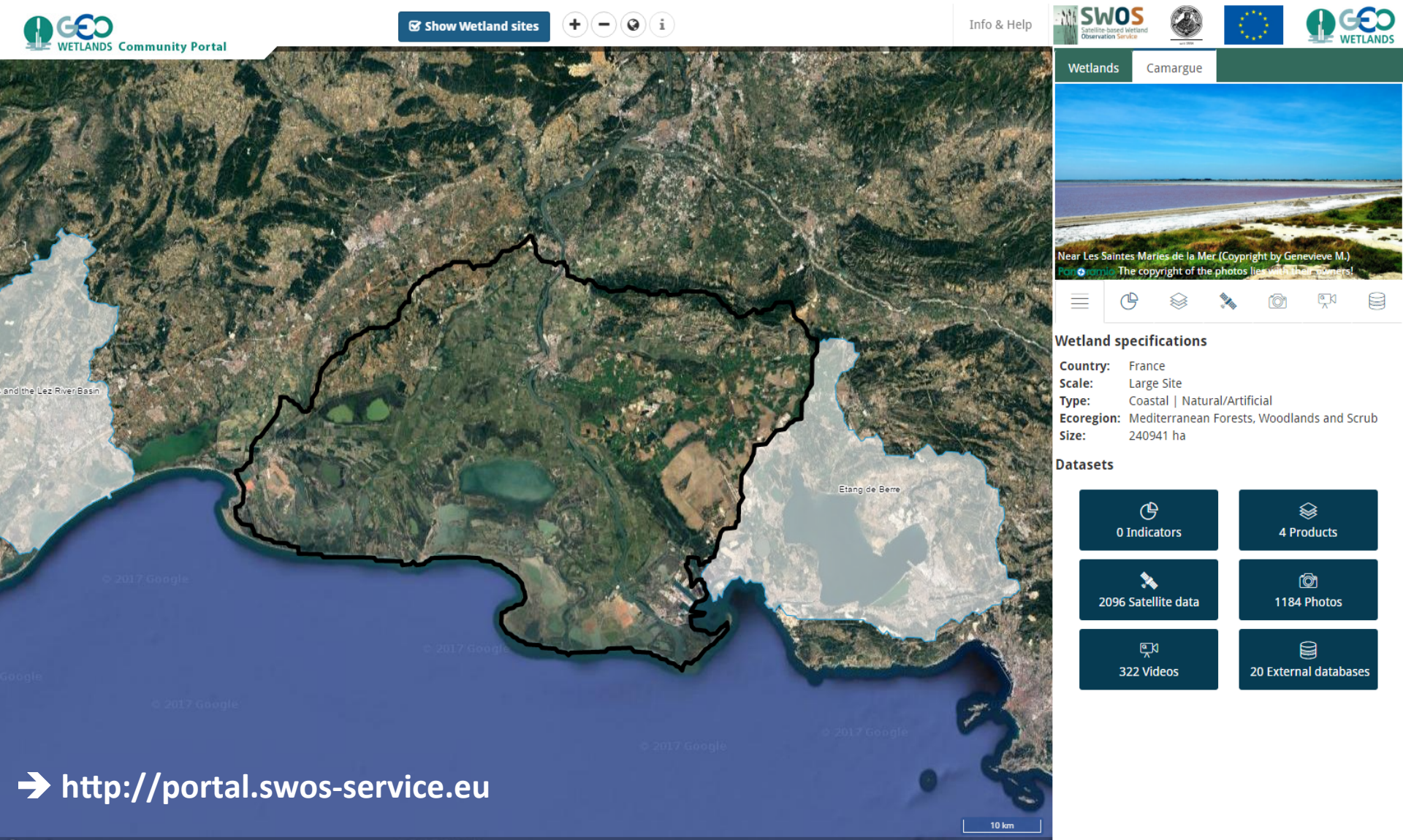
GEO Wetlands Community Portal

What we do

- Sharing wetland-related **maps** (e.g., Land Use Land Cover/Change, Surface Water Dynamics, Wetland Inventory, Land Surface Temperature, Water Quality) & indicators
- **Connecting** external databases through GEOSS / GCI
- Demonstrate **use cases** through storylines
- Provide an overview of and simple access to **free available satellite data**

GEO Wetlands Community Portal

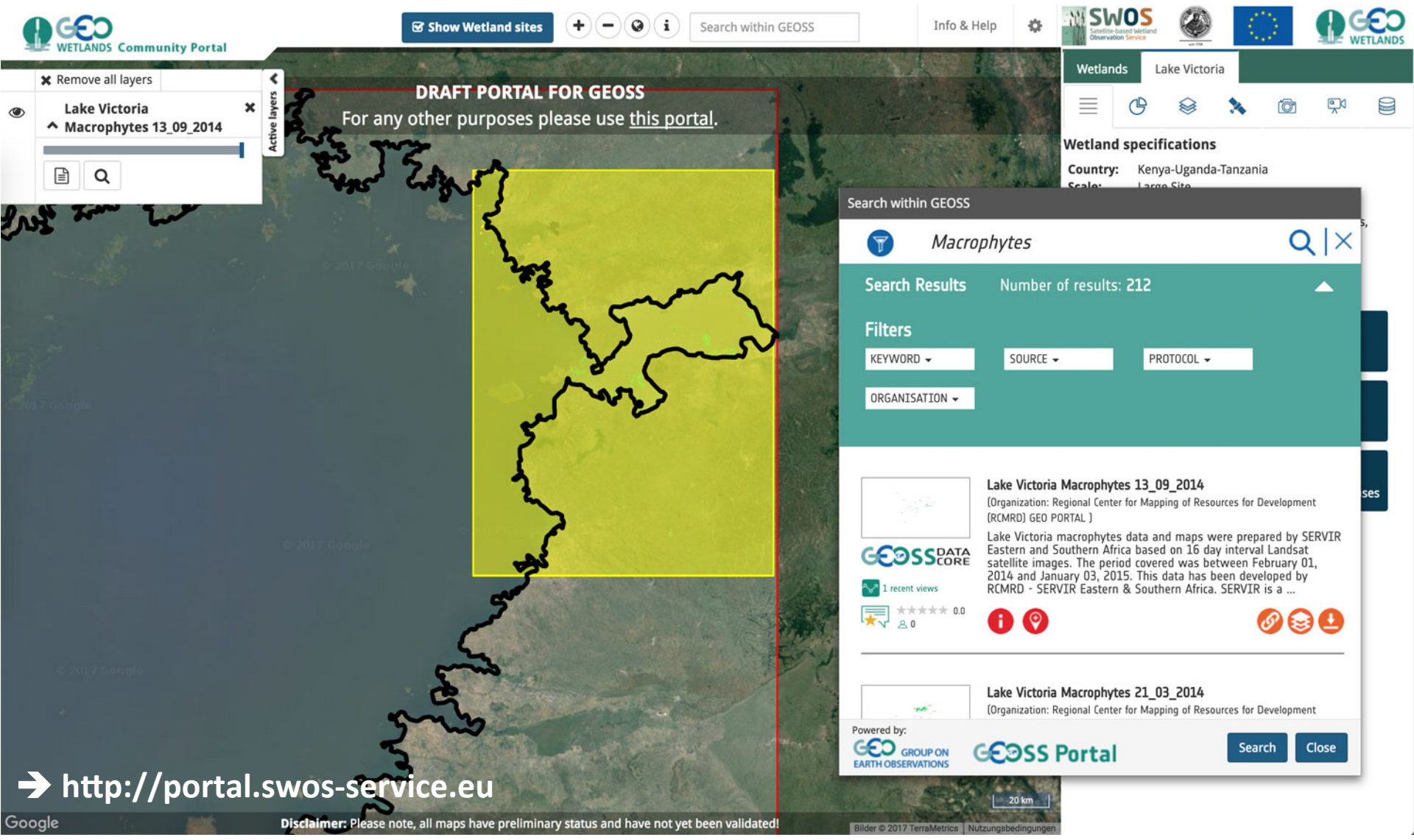
What we have



➔ http://portal.swos-service.eu

Reusable GEOSS Widgets

What we have



➔ http://portal.swos-service.eu

Data management & sharing

What we have

- SWOS Data Management Plan following GEO principles
- Standard-compliant OGC web services
  - OGC Catalogue Service for Web (CSW)
  - OGC Web Map Tile Service (WMTS)
  - (OGC Web Feature Service & OGC Web Coverage Service)*
- Software toolbox
  - Generating map products from satellite data in common data format
  - Providing simples tools for metadata and map publishing*
- Automated map publishing workflow based on
  - INSPIRE-compliant metadata
  - Geospatial standards for map products

*not yet available

Automated map publishing

Geospatial standards

Geospatial Standards

Surface Water Dynamics - SWD	
Data set reference and name	Identifier: *SWOS_SWD_SM (Surface Water Dynamics Standard Mask)* *SWOS_SWD_TF (Surface Water Dynamics Temporal Frequency)* *SWOS_SWD_TD (Surface Water Dynamics Temporal Dynamics)* Filename: *ID_{SENSOR}_{country}_{site-name}_DATEFROM_DATEEND* Where: *ID = Identifier* *{SENSOR}= "SAR" for SAR approach, "OP" for optical approach* *{country} = ISO Country code* *{site-name} = Name of the Wetland site* *DATEFROM and DATEEND contain one of the following* *YYYY = imagery acquisition from year YYYY* *YYYYMM = imagery acquisition from month MM in year YYYY* *YYYYMMDD = imagery acquisition from day, month, year* *If DATEFROM and DATEEND is the same, remove DATEEND (e.g., spe month)* Example: *SWOS_SWD_SM_SAR_EG_Burullus_201607_201608.tif* *with data from July and August 2016 based on SAR Data*
Data set definition	The Surface Water Dynamics SWD product represents a measure for the extent of water bodies. It is generated from Synthetic Aperture Radar (SA optical data. The two Sentinel-1 satellites are the main data sources for th Application to older C-Band SAR sensors (ERS-1/2, Envisat ASAR) is p principle but quality is going to be lower due to lower image quality. For product Landsat and Sentinel-2 is used. Three different product types are distinguished: 1. The SWD_SM dataset is a mask that discriminates between wat = 1) and dry land (mask = 2) for individual image acquisitions. 2. The SWD_TF product is derived from the SWD_SM product an number of flood occurrences relative to the number of valid ima percent. 3. The SWD_TD product is a generalization of flooding regimes o multi-annual basis. Currently two different methods are used. It in a supervised classification approach, with the multi-temporal and maximum pixel values as data source, or aggregated from th product if available. The former method classifies each pixel int

	open water, (2) temporarily open water or (3) never water. The latter method re-classifies open water occurrence frequency in percent of time into water regime classes, which are further described in chapter 3.2.2. Here, the class temporarily open water is separated into (2.1) regularly/seasonally and (2.2) intermittently open water. While the TF aggregation is done for both optical and radar data, the classification from multi-temporal statistics is only applied to optical data. The data source used for the respective product can be identified by a further suffix OP for the optical product and SAR for radar products. E.g. SWD_TD_OP, SWD_TF_SAR.
Temporal resolution	SWD_SM: For each satellite image acquisition and thus depending on the acquisition scheme of the sensor used. In the case of Sentinel-1a/b between 2 and 5 days. SWD_TD, SWD_TF: Every 12 months or multi-annual integrating the data acquired in the respective time range
Spatial coverage	Follows the approach described for the LULC dataset. In addition administrative boundaries of a territory are considered.
Origin	The surface water dynamics product will be derived from Sentinel-1 C-band SAR time-series data, as well as optical data from Landsat-8 and Sentinel-2.
Coordinate Reference System	European datasets: European ETRS89 LAEA projection. Non-European datasets: WGS 84.
Geometric accuracy	According to ortho-rectified satellite image base.
Thematic accuracy	>80%
Minimum mapping unit (MMU)	20 m
Data type	Raster data
Attributes	open water of single dates, frequency of open water occurence,temporal dynamics of water surfaces
Coding (Thematic pixel values)	For single water_surface maps (SWOS_SWD_SM): - 1: covered by water - 2: not covered by water For open water occurrence frequency (SWOS_SWD_TF): - Percentage scaled from 0 to 100 For TD water regime classes (SWOS_SWD_TD) - 1: Permanent open water (TF>85%) - 2: seasonally open water (50%<TF<85%) - 3: Intermittently open water (25%<TF<50%) 4: Never or occasionally open water (TF<25%)
Metadata	XML metadata files are to be produced according to the INSPIRE metadata profile.
Delivery format	Raster format (GeoTIFF). Opendoc shall be used for the documentation and XML for the metadata.

Automated map publishing

Metadata

ISO 19115 XML metadata file

Upload XML and geospatial data to SWOS file server

Publish geospatial datasets using OGC services

OGC W*S

Extract all input from ISO 19115 XML metadata file

Import OGC services and metadata into GEO-Wetlands Portal Backend

OGC CSW

Elasticsearch

Lessons learned

From Metadata to OGC web services

- When metadata from external software is linked within ArcGIS → additional ESRI-XML-Elements are added
- OGC Web Coverage Service for raster data access/download is complex as different versions come with different access requests
- OGC Web Map Tile Service (WMTS) not understood by all clients, but is better for performance issues (in our case)

GROUP ON EARTH OBSERVATIONS

Thank You!

Contact information:

Jonas Eberle
Friedrich-Schiller-University
Institute for Geography
Department Earth Observation
Loebdergraben 32
07743 Jena, Germany

phone: +49 3641 94 88 89
email: jonas.eberle@uni-jena.de

SWOS Satellite-based Wetland Observation Service

FRIEDRICH-SCHILLER-UNIVERSITÄT JENA

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642088.

www.earthobservations.org
www.geoportal.org