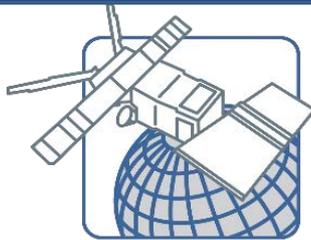


TIGER-NET
Satellite Observations
Supporting Integrated Water
Resources Management in Africa



Funded by the European Space Agency's (ESA) Strategic Initiative and run within the Data User Element programme

WOIS



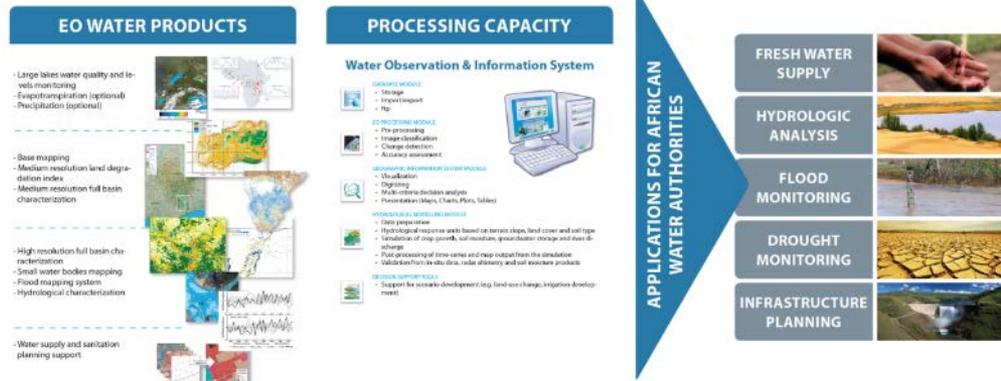
Water Observation Information System for Integrated Water Resource Management

Christian Schleicher, GeoVille Information Systems, Austria



TIGER-NET Objectives

Development of a Water Observation and Information System (WOIS) for monitoring, assessing and inventorying water resources in a cost-effective manner by satellite observation, with focus on operational Sentinel data.



Implementation, capacity building and training of African water authorities to fully exploit the observation capacity offered.



WOIS Host Institutions



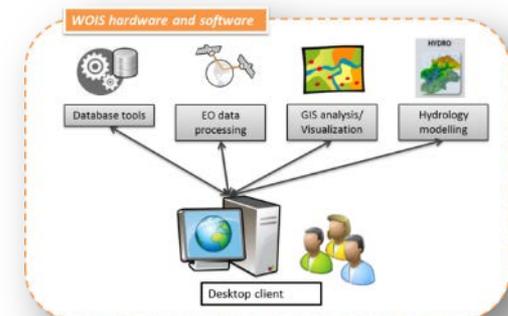
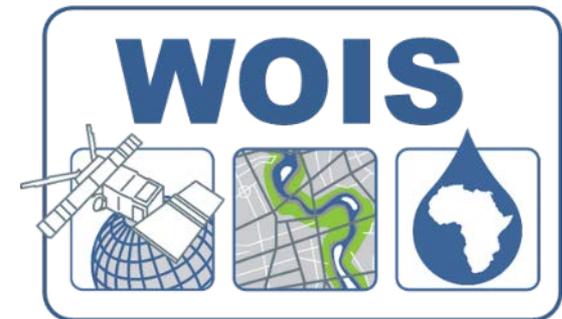
- 💧 Nile Basin Initiative
- 💧 Lake Chad Basin Commission
- 💧 Volta Basin Authority
- 💧 DWS, South Africa
- 💧 DWA, Namibia
- 💧 DWA, Zambia
- 💧 METTELSAT, DRC
- 💧 ZAMCOM, Zimbabwe
- 💧 IWMI, Ethiopia
- 💧 UN-WFP, Ethiopia
- 💧 INAM, Mozambique
- 💧 ACF, Senegal





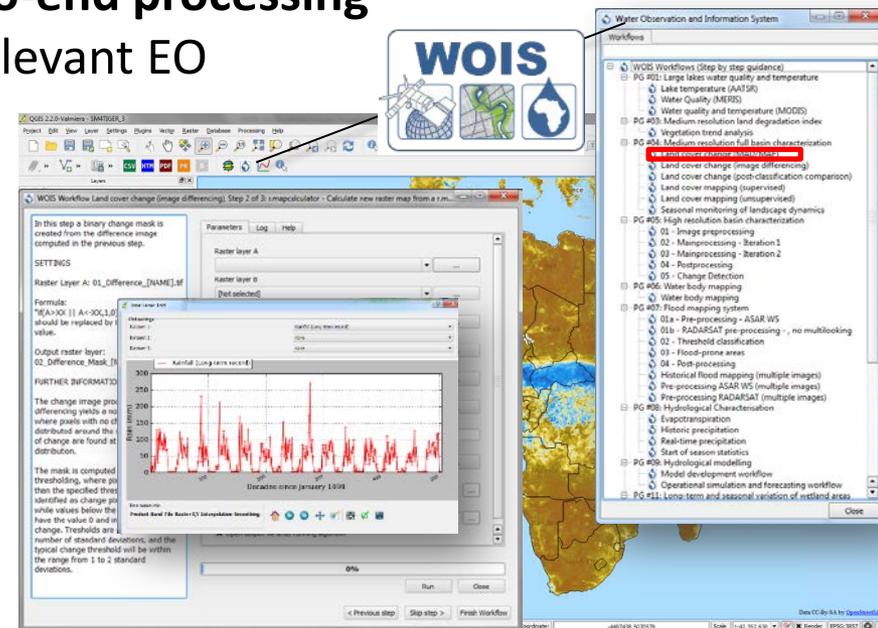
WOIS System Assets

- 💧 **Cost and license free – Open Source**
- 💧 **Easy transferable – Easy to operate**
- 💧 **Capable of**
 - 💧 retrieving, storing and processing EO data from Optical and Radar sensors, as well as integrate in-situ data from multiple sources
 - 💧 producing water related information products
 - 💧 large scale data processing capabilities
 - 💧 mapping and reporting functionality
 - 💧 integrating and linking to existing user systems
 - 💧 scalable for future applications and demands
 - 💧 supporting decisions based on full GIS framework

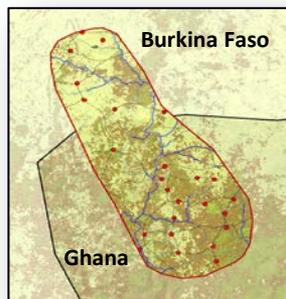
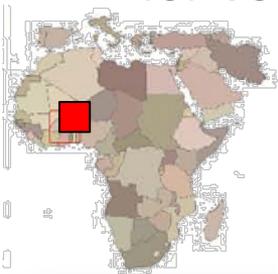


WOIS Development Status

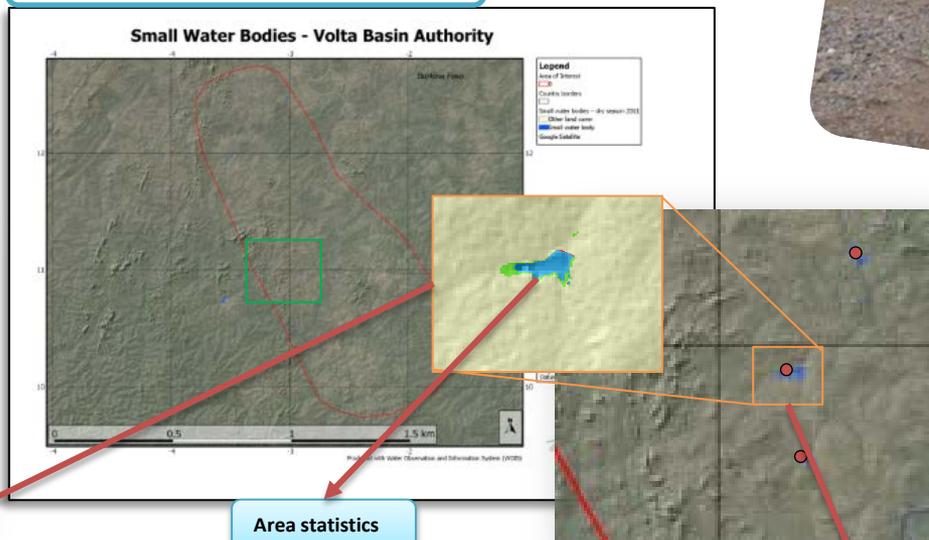
- 💧 Library of **48** customized workflows for importing, processing and analyzing optical and radar EO data in support of water management
- 💧 **Step-by-step guidance** for the end-to-end processing of the product portfolio and other relevant EO processing/GIS tasks
- 💧 **Automated retrieval and processing** of EO data needed for user requested information products
- 💧 **Each tested and validated** for a number of regions



Water body mapping for Volta Basin



Small Water Body (SWB) mapping



Seasonal change analysis

Class	Area [km ²]
Decrease of small water bodies	0.49
Constant small water bodies	4.16
Increase of small water bodies	2.93

Area statistics

SWB ID	AREA	PERIMETER
1	21171.4174	904.002332
2	183454.388	2946.96615
3	294551.767	3484.08552

Localization of SWBs

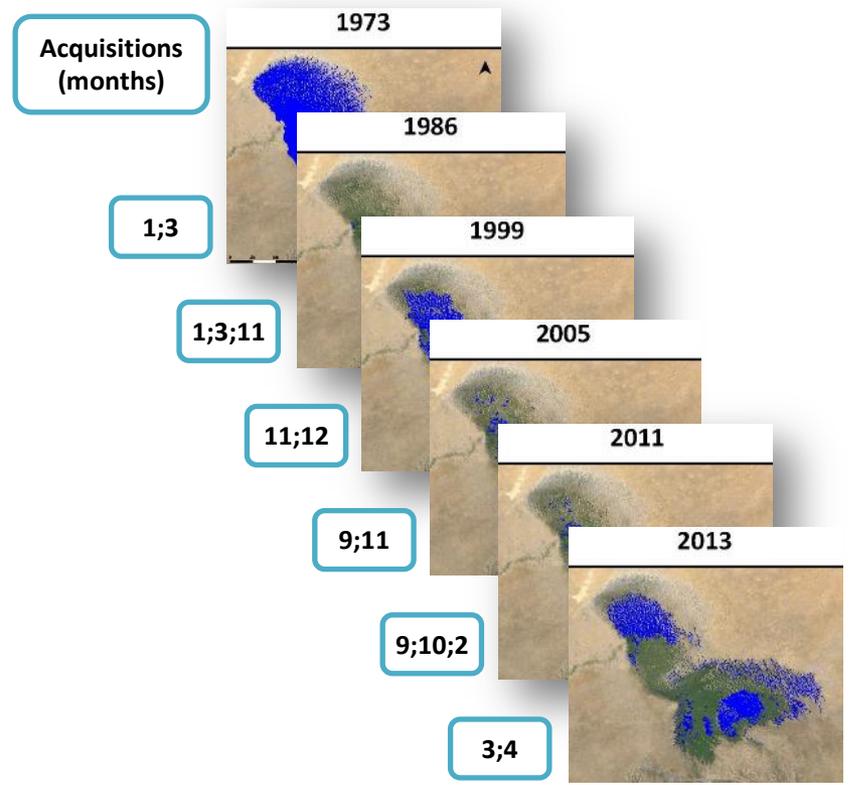
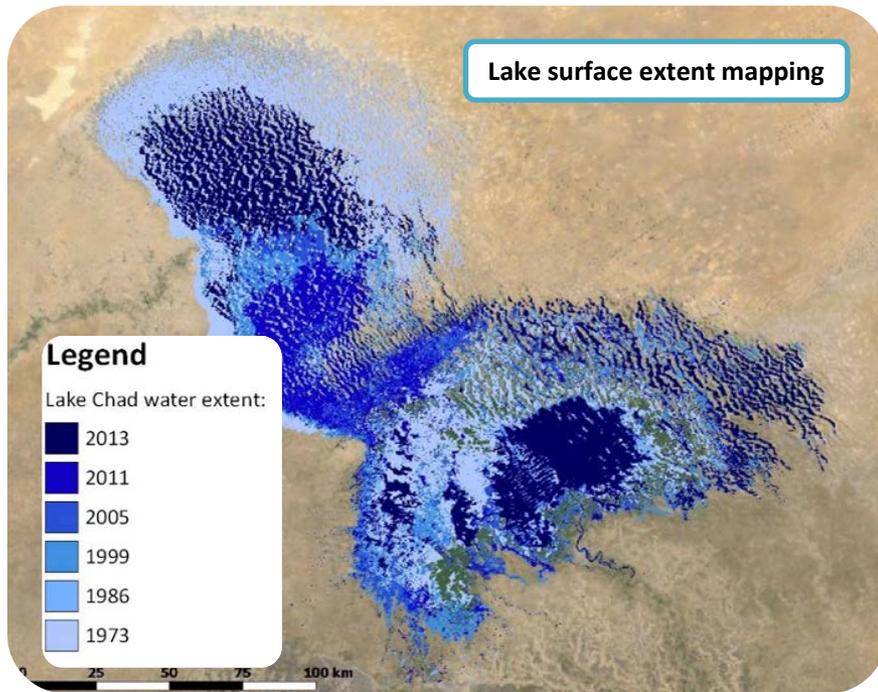
SWB ID	XCOORD	YCOORD
1	-3.369437	11.990526
2	-3.417772	11.98972
3	-3.416978	11.972579

Derived parameters:

- Area
- Location
- Surface and changes
- ... Maps
- ... Statistics



Water Surface Extent for Lake Chad Basin



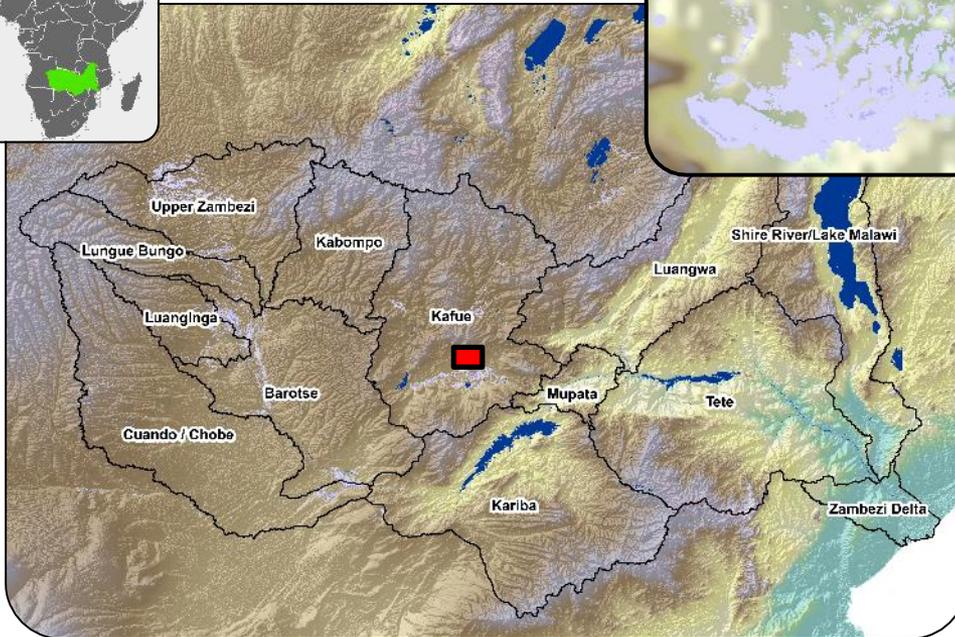
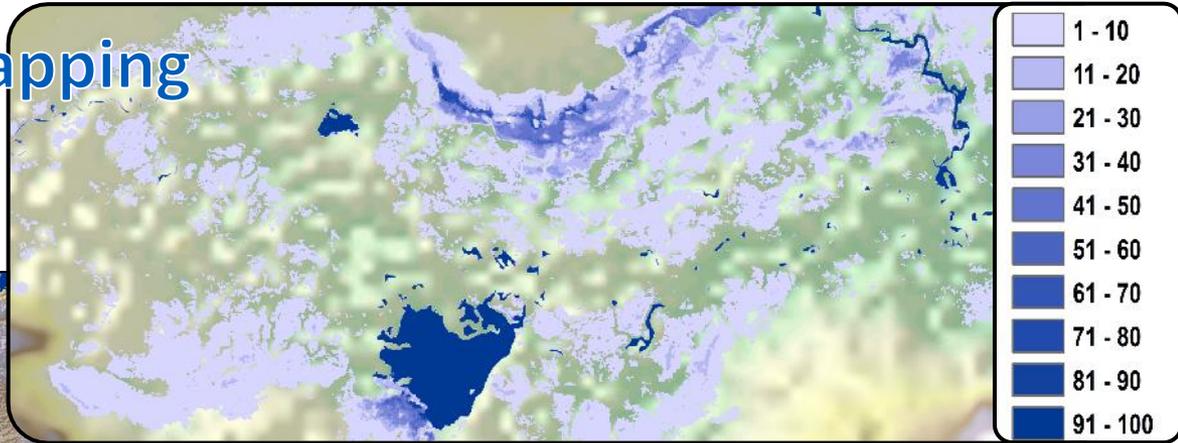
“The WOIS is essentially helping water managers in Africa to integrate and transition their existing in-situ monitoring systems to a more cost-effective satellite based monitoring system”



Flood Frequency

Historical flood mapping

For Zambezi Basin

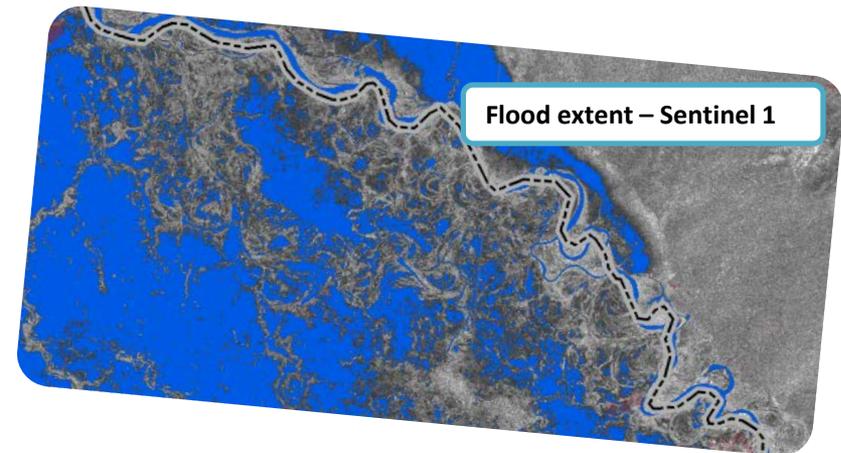
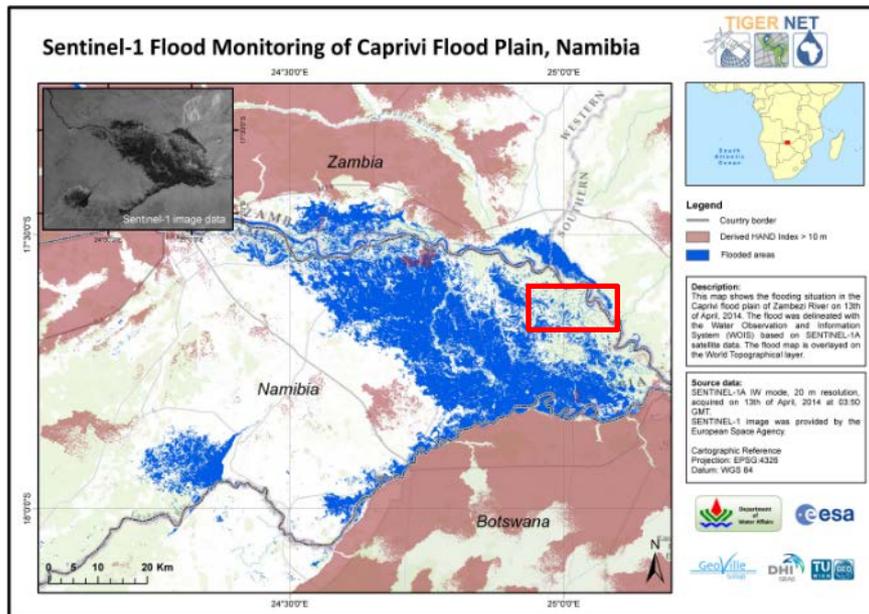


- 💧 Individual historic flood mapping
- 💧 Flood Frequency
- 💧 Based on ENVISAT ASAR WS
- 💧 Uses entire archive from 2005 to 12
- 💧 Change detection method by TUV
- 💧 Identification of permanent water (100% frequency)



WOIS Dynamic Flood Mapping In Zambezi Basin

- 💧 Based on Radar...
- 💧 ...C-Band of **Sentinel 1**, Radarsat
- 💧 Weather independent
- 💧 High temporal resolution



*“The recently launched **Sentinel-1 A** satellite by ESA demonstrated that it has capabilities to acquire necessary remote sensing data in rainy and cloudy weather conditions and **enable us to depict the flooding extent** in the eastern floodplains of the Zambezi.*

Paulina F. Mufeti, Ministry of Agriculture Water and Forestry Namibia



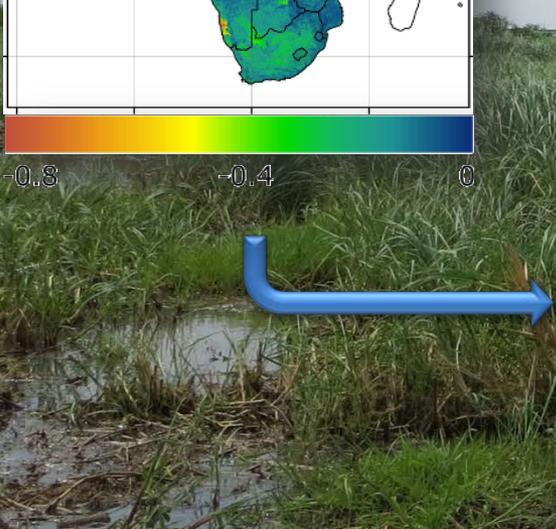
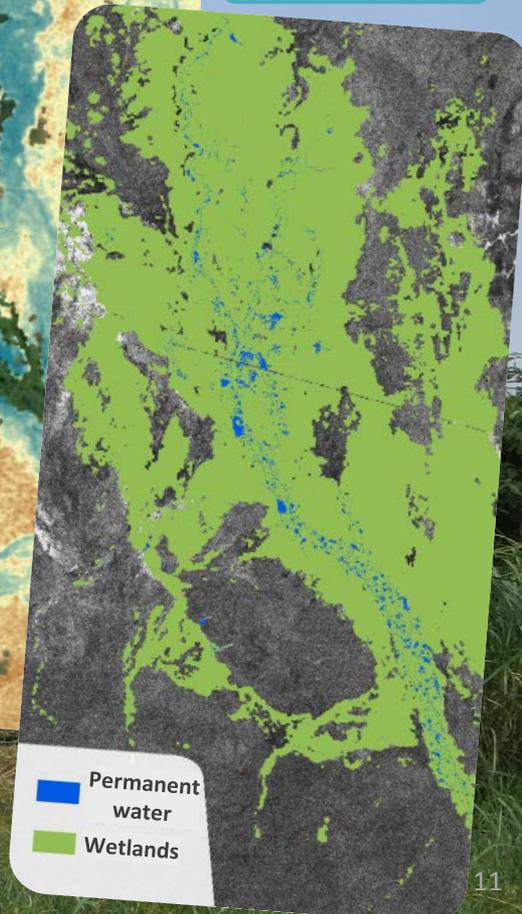
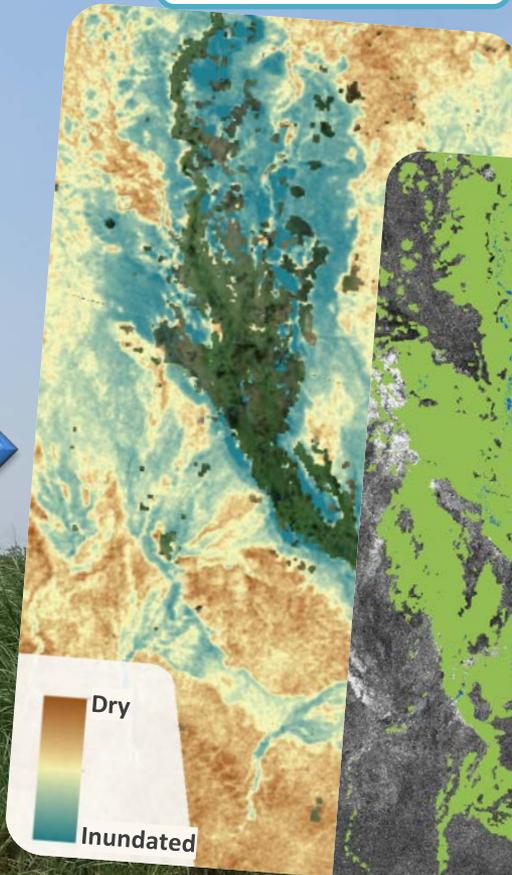
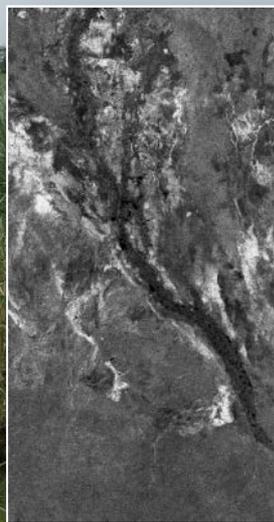
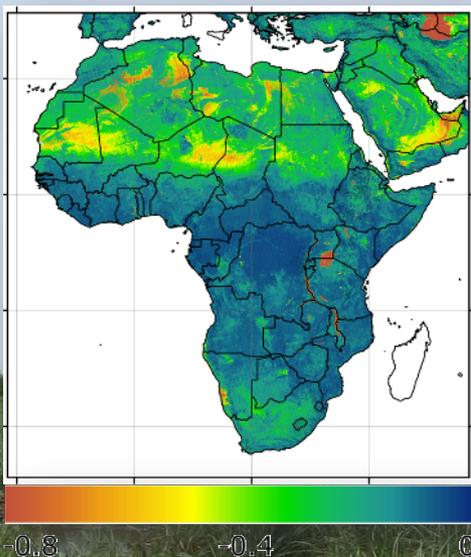
Wetland delineation & water cycle regimes

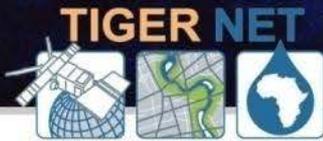
Wetland Mapping

Permanent Water

Slope parameter database (based on ENVISAT)

Sentinel 1 WS 10m





Further information

- 💧 **Project website** available under <http://www.tiger-net.org>
- 💧 **TIGER-NET Water Portal** as universal access point for more detailed information on the WOIS demonstration cases with the African Water authorities
- 💧 **WOIS source codes** are public and can be accessed via the online repository GitHub <https://github.com/orgs/TIGER-NET/people>



Thank you for your attention!

contact: Christian Schleicher (schleicher@geoville.com)