

Partners:

The Secretariats of the Ramsar regional initiatives in Africa, their wetland observatories and scientific partners | National Focal Points from African Ramsar Contracting Parties and their national initiatives (i.e. environmental conservation agencies, wetlands managers, technical and scientific advisors) | African River Basin Authorities | International environmental and conservation organisations / partnerships active on the African continent.

Contact us:

Marc Paganini | Technical Officer, ESA | marc.paganini@esa.int

Paul Ouédraogo | Senior Advisor for Africa, Ramsar | ouedraogo@ramsar.org

Christian Tøttrup | Project Manager, DHI GRAS | cto@dhigroup.com

See also:

www.globwetland-africa.org



Development team



→ GLOBWETLAND AFRICA

Implementing Earth Observation based
Sustainable Wetland Monitoring Capacity in Africa

→ OBJECTIVE

GlobWetland Africa is a large Earth Observation application project initiated to facilitate the exploitation of satellite observations for the conservation, wise-use and effective management of wetlands in Africa and to provide African stakeholders with the necessary Earth Observation (EO) methods and tools to better fulfil their commitments and obligations towards the Ramsar Convention on Wetlands.

As a principal objective GlobWetland Africa is providing an open source and free-of-charge software toolbox for the end-to-end processing of a large portfolio of EO products and the subsequent derivation of spatial and temporal indicators on wetland status and trends, from local to basin scales.

→ GLOBWETLAND AFRICA IN A NUTSHELL

- Access “freely available” satellite observations from the Sentinel missions of the European Copernicus initiative.
- Open source software toolbox for inventory, assessment and monitoring of wetlands using satellite observations.
- Wetland information products and indicators developed in close collaboration with partner organisations involved in wetland management, protection and planning.
- Regional trainings to enhance the capacity of African stakeholders to develop national and regional wetland observatories with support from Earth Observation.

→ PARTNERSHIP

GlobWetland Africa is being implemented in close partnership with a large number of partner organisations involved in the implementation of the Ramsar Convention of Wetlands in Africa, to enable them to make the best use of satellite-based information for better measuring the ecological state of wetlands and hence their capacity to support biodiversity and provide ecosystem services.



The European Earth Observation Programme Copernicus and its Sentinel fleet of satellites offer an unprecedented land surface monitoring capacity.

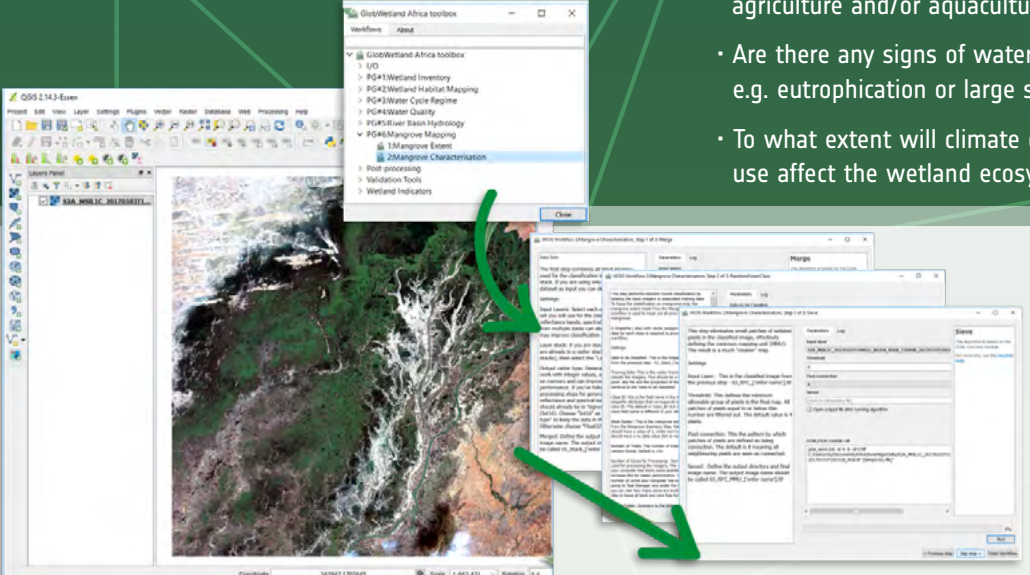
The GlobWetland Africa project provide wetland practitioners with the necessary EO methods and tools to make the best use of the Copernicus satellite observations for wetlands inventory, assessment and monitoring.



→ **GEOINFORMATION PRODUCTS**

Central to GlobWetland Africa is a portfolio of geoinformation products for characterizing wetland status and trends, and supporting wetland management decisions and planning by answering questions such as:

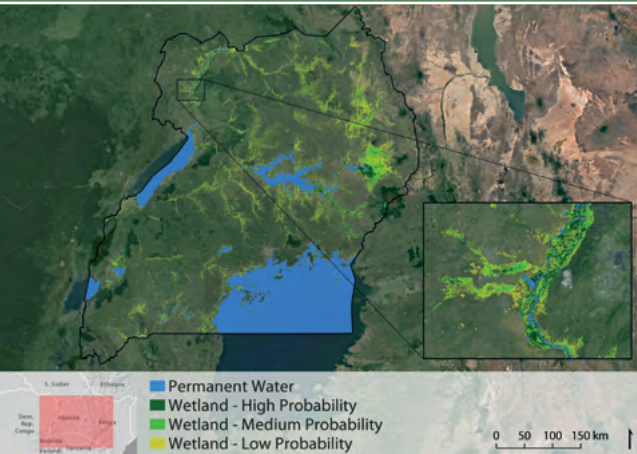
- What is the wetland extent and how has it changed over time?
- How does the inundation regime change within and between years?
- Is the wetland under threat from urbanization, agriculture and/or aquaculture?
- Are there any signs of water quality deterioration e.g. eutrophication or large sediment loads?
- To what extent will climate change and upstream water use affect the wetland ecosystem?



The GlobWetland Africa toolbox provides users with all the necessary functionality to monitor, assess and inventory wetlands and their surrounding areas. This includes end-to-end processing workflows for wetland delineation, wetland habitat mapping, monitoring of inundation regimes and water quality and for river basin hydrology assessments.

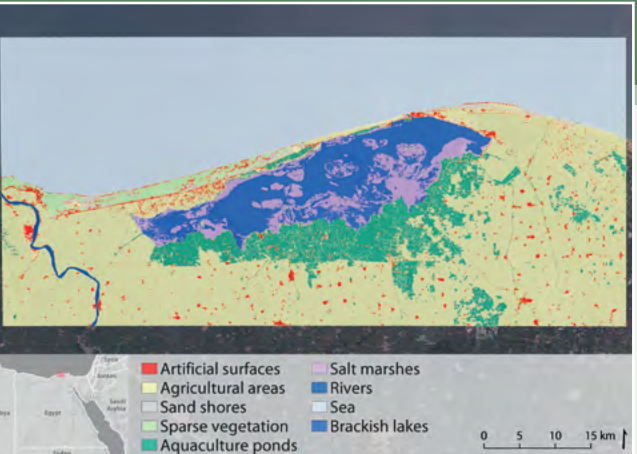
WETLAND INVENTORY

The wetland inventory product serves the needs of national/regional agencies interested in exploring the possibilities to reduce costs associated with large wetland inventories, and with a particular relevance for the monitoring requirements under the sustainable development goals (cf. indicator 6.6.1 "change in extent of water-related ecosystems").



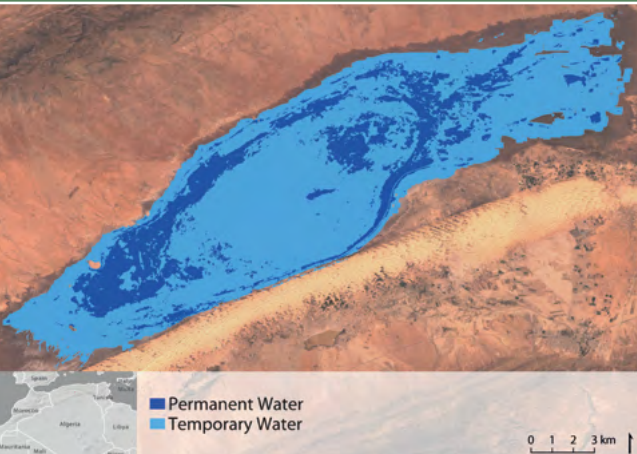
WETLAND HABITAT MAPPING

The wetland habitat mapping provides users with a detailed map of wetlands and their surrounding areas. From historic EO data, information on land use changes can be obtained and from which wetland threats (e.g. agriculture or urban pressures) and their impacts over time can be assessed.



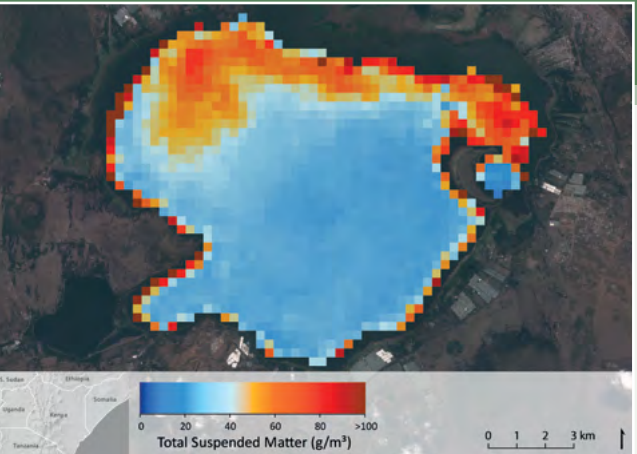
INUNDATION REGIME

Time-series of EO data allow for the characterization of the inter- and intra-annual variations of the water tables, to monitor the dynamics of water retention and flow and to assess how these changes in the inundation regime may affect the overall wetland ecosystem.



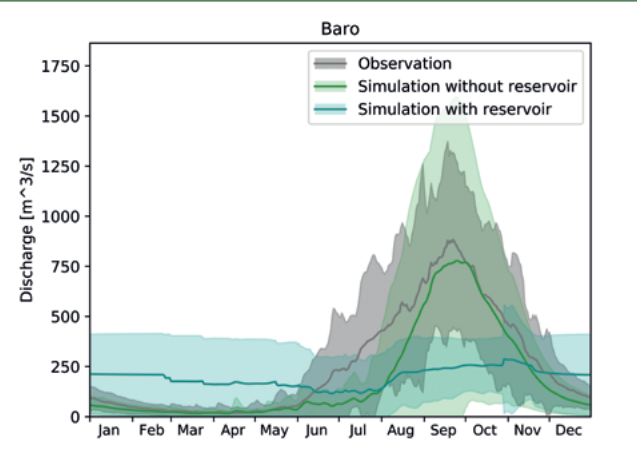
WATER QUALITY

Earth Observation derived water quality parameters such as chlorophyll-a concentrations and total suspended sediments allow users to monitor wetland ecosystem contamination such as water body eutrophication due to excessive nutrients from urban and industrial waste discharge or increased levels of suspended sediments caused by deforestation and soil erosion.



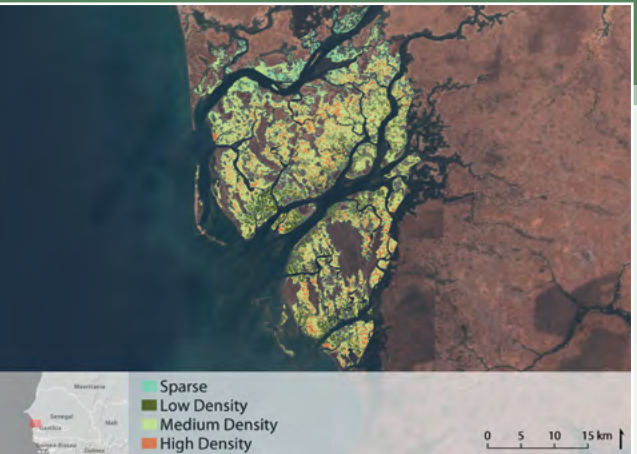
RIVER BASIN HYDROLOGY

The River Basin Hydrology is a hydrological modelling framework using Earth Observation data and in-situ observations for assessing the water balance and analysing the changes in the inflow hydrographs to selected wetlands in response to e.g. climate change, land use changes, and hydropower.



MANGROVES MAPPING

This product supports full inventorying of mangrove areas i.e. mapping of the mangrove extents and the characterization of the spatial distribution and the geometrical/structural arrangements of mangroves.



→ **GLOBWETLAND AFRICA TOOLBOX**

- Retrieve, manage and process EO data as well as integrate in-situ data
- Extensive geoprocessing framework with +500 algorithms for raster and vector processing
- Step-by-step processing workflows for deriving wetland information products and indicators
- Open source i.e. free to share, easy to modify and adaptable for future applications and demands

The Wetland identification for the territory of Uganda is based on multi-temporal EO data exploiting the full time series of Sentinel-1 (radar) and Sentinel-2 (optical) between 2015 and 2017. Using a hybrid sensor approach that combines optical and radar observations, it provides a robust wetland delineation maximising observation capacity of optical imagery for its sensitivity to the vegetation cover and radar imagery for its weather-independent information on soil moisture and surface water.

Lake Burullus is a shallow, saline lagoon in Egypt along the Mediterranean coast. Major pressures on the wetland include reclamation for agriculture, aquaculture and urbanization. Currently there is no systematic way to characterize and monitor threats and impacts on Lake Burullus. GlobWetland Africa support the management planning with EO information about the status, trends and threats to the Lake Burullus wetland.

Temporal water detection over the Chott de Zehrez Chergui wetland located in the Atlas Tellien and Atlas Saharien mountains (Algeria). The seasonality and long-term trend in the inundation regime bears some important perspectives for the functioning of this wetland, which is extensively used for pasturage and plays an important role in groundwater recharge and flood control.

Lake Naivasha in Kenya is a designated Ramsar site providing many societal benefits, but there are concerns about its future as increasing water demand and land use changes contributes to a decline in water levels and aquatic contamination. Dedicated EO processing workflows available in the GlobWetland Africa Toolbox can help the authorities to monitor the water quality in Lake Naivasha for better understanding of eutrophication processes and for identifying point source pollution.

Earth Observation offers a unique possibility to obtain observations in poorly gauged or remote areas and with the potential to inform and constrain hydrological models. In GlobWetland Africa, a hydrological model over the Niger basin was developed to evaluate the impact of new hydraulic infrastructure on the inner Niger delta the largest inland wetland in West Africa.

The mangroves in the Delta du Saloum (Senegal) provide many benefits including coastal protection, flooding control and provision of fresh water. Still, the delta has been heavily degraded and since the 1950s 30% of the mangroves has been lost. The GlobWetland Africa toolbox can assist wetland conservation and restoration planning in the Saloum delta by delivering monitoring information on e.g. the extent, state and evolution of Mangrove forest