

World Water Quality Alliance – Use Cases (UC)

Project setting

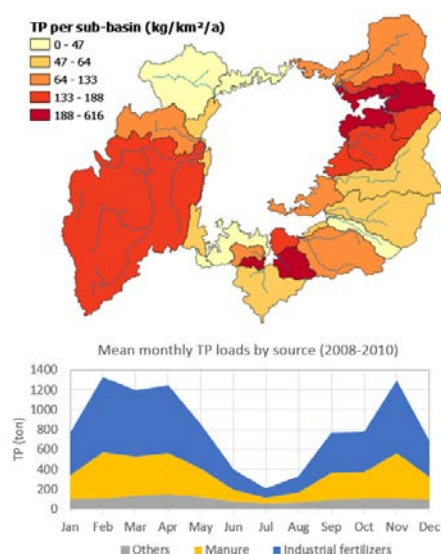
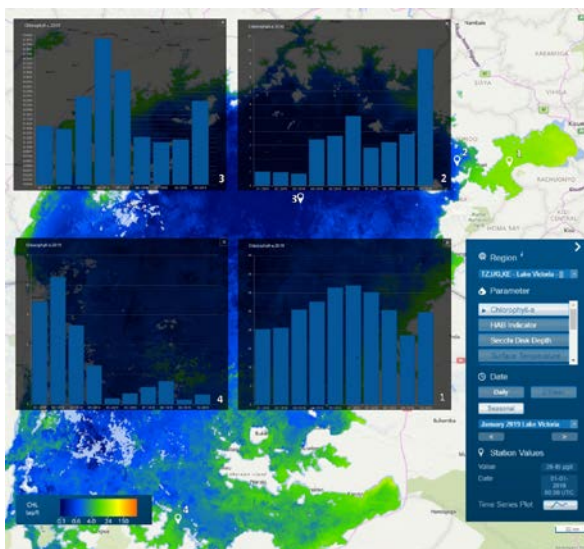
The central methodological challenge in the interlinked WWQA activities (Assessment & GlobeWQ and WWQA-UC projects) is the deep integration of data from in-situ monitoring, remote sensing-based Earth Observation and water quality modelling (so-called triangle approach) to assess the current state of freshwater quality (baseline). The objective is to provide an evidence base that links water quality hotspots to solutions and investment priorities. The aim of WWQA-UC is to set grounds for a stakeholder dialogue to be continued within the GlobeWQ project (2019-2022) wherein a Global Water Quality Analysis and Service Platform, holding and visualizing this integrated data, is being developed.

Proposed WWQA-UC activities on Lake Victoria

Coastal eutrophication – test case for the ‘triangle approach’ and application with riparian fisheries authorities:

Available data sources for an exemplary time frame will be assessed to indicate the potential of coastal eutrophication, including the identification of hot spots and potential seasonal patterns. This would include the joint use of:

- remote sensed earth observation (provided by EOMAP), incl. turbidity and chlorophyll-a values for the Lake,
- water quality modelling to determine total phosphorus (TP) inputs into the lake from identified sources such as the domestic sector, agriculture, background loadings etc. (provided by Ruhr-University Bochum, Germany)
- in-situ measurements provided to date (river/lake measurements of nutrients such as nitrate, phosphate etc.).



This demand driven tool shall be developed to characterise the potential of algal blooms to impact fisheries or to identify potential links between aquaculture and coastal eutrophication.

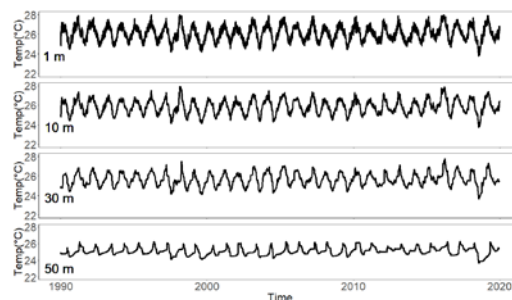
Global Water Quality & Analysis Platform

Within the multidisciplinary research project GlobeWQ (www.globe-wq.info), a web-based platform for hosting, visualizing and analysing the data from the triangle approach is developed. In particular, the platform enables (i) the visualization of the origin, state, trends and impacts of selected water quality variables and (ii) the delivery of consistent estimates for future development under scenario conditions. Further features as well as data upload options can be implemented in a co-design process according to the user demand. The platform will be maintained in the long term beyond the duration of the GlobeWQ project.

Long term water temperature and stratification dynamics based on 1D Lake Modelling

By using a freely available (open source) one-dimensional lake model (GLM = General Lake Model), variations of water temperature over time and depth can be simulated (provided by UFZ). This will inform about the extent of stratification and vertical mixing in the water column. As local meteorological conditions are available several decades back, we can establish simulations from the past until today. The modelling tool can be useful for several aspects:

- Characterisation of the pelagic zone (off-shore) of Lake Victoria with respect to hydrodynamic conditions and seasonal patterns in stratification
- Analysis of global warming effects on water temperature dynamics in Lake Victoria including both historic developments as well as future scenarios
- Open source modelling tool which is freely available for research institutions around the lake, including academic education and capacity building
- Starting point for a full water quality modelling of Lake Victoria including nutrient dynamics, algae dynamics and dissolved oxygen dynamics



Remote sensing product already available:

Earth Observation view of Lake Victoria: Seasonal Turbidity distribution 2019 at various EO sampling stations. Freely accessible at <http://sdg6-hydrology-tep.eu/>

Contact:

Lead: [Hartwig Kremer](#), [Andrew Gemmell](#) (UNEP)

Partner: [Ilona Bärlund](#), [Karsten Rinke](#) (UFZ), [Martina Flörke](#) (RUB), [Thomas Heege](#) (EOMAP)

GlobeWQ project (associated to the German BMBF funding measure Water as a Global Resource, GRoW): [Christian Schmidt](#) (UFZ)