

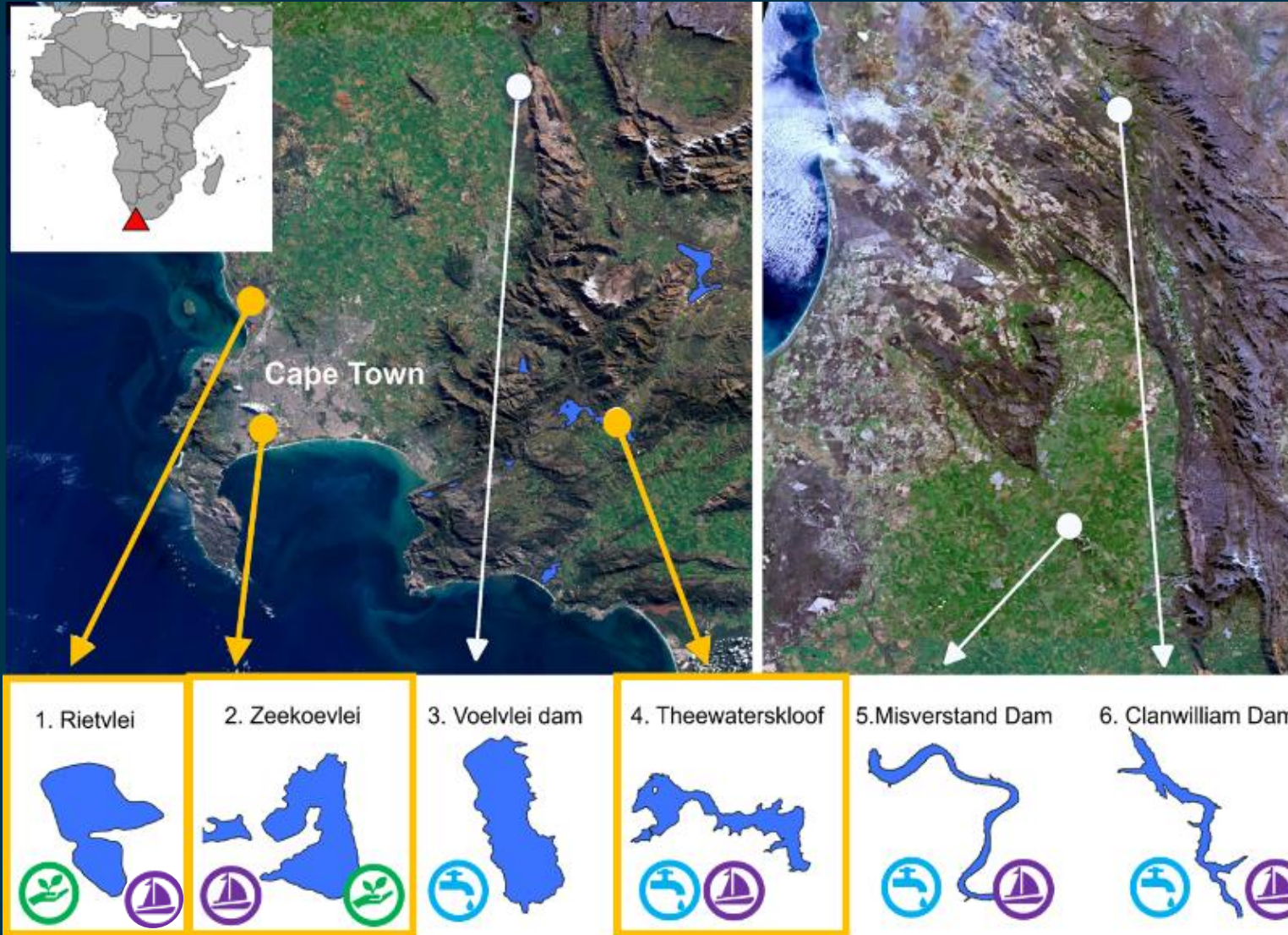
Sentinel 2 user-relevant water quality monitoring in small southern African water bodies



Water quality and sufficiency are fundamental for human health and economic development especially in countries facing water shortages such as South Africa, yet many important resources for water supply, recreation and biodiversity are too small to be fully resolved or included in existing environmental satellite products and datasets.

This study evaluated the use of Sentinel-2 for monitoring water quality in six small water bodies in the Western Cape, South Africa, leveraging existing in situ datasets of radiometric and biogeochemical measurements to assess the performance of open-source and well-documented algorithms for atmospheric correction (AC) and the derivation of Chlorophyll a (Chl-a) and Total Suspended Matter (TSM) concentration.

The best performing algorithm combinations were applied to ten years of Sentinel-2 data and assessed against climate, meteorological and vegetation indices to assess their relative contributions to variability in Chl-a and TSM.



BioSCAPE
sampling sites



Important reservoirs



Important recreational sites



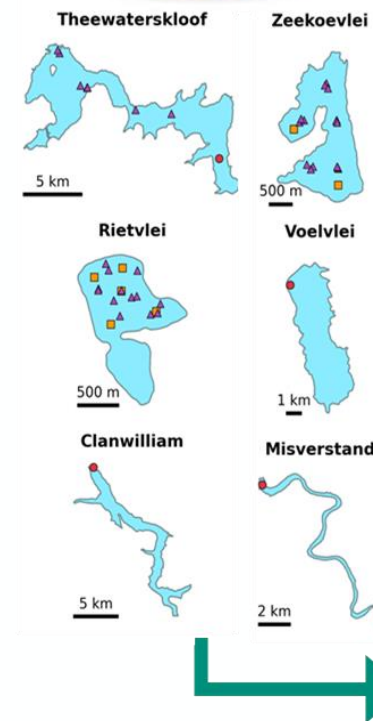
Important biodiversity sites

The best performing algorithm combinations, namely ACOLITE-RAdCor + Mixture Density Network for Chl-a, and C2X-Complex + Jiang et al (2023) for TSM, are recommended for both operational and long-term data processing.

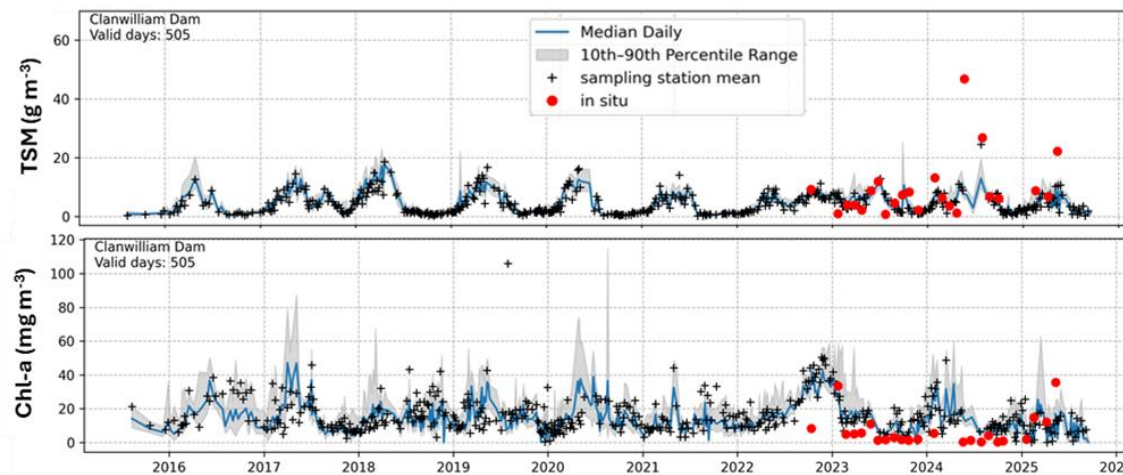
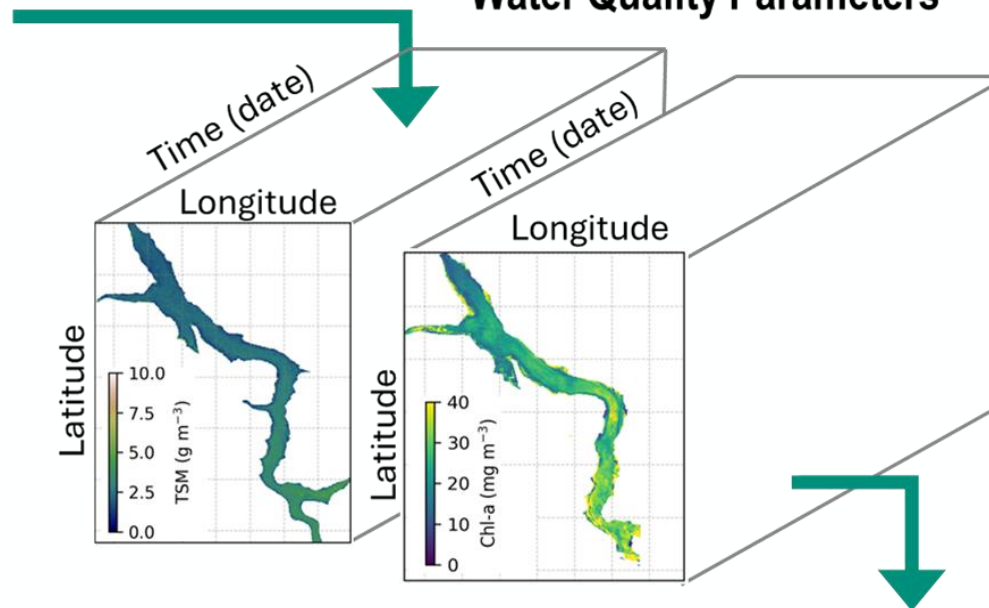
Timeseries of Chl-a and TSM products were derived for ten years (Aug 2015- Aug 2025) of Sentinel-2 data for all six water bodies. Analysis showed that climate (i.e. drought and El Nino events) was the main factor associated with changes in water quality within the study area.

Study results indicate that the spatial and temporal resolution from Sentinel-2, when combined with appropriately configured satellite algorithms, can assist operational water quality monitoring and strategic management of small inland water resources in the South African context.

Sentinel-2 L1C data



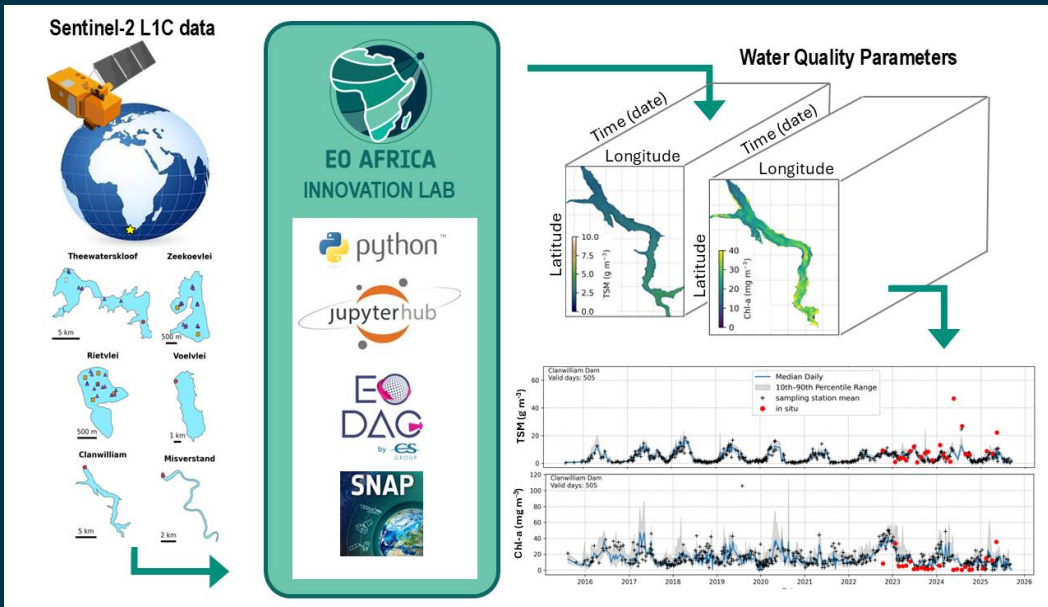
Water Quality Parameters



Layout for social media posts

Recommended image resolution 1200 x 675 pixels - landscape format

Post in LinkedIn: 600-630 characters including links



The SWAM project, a **University of Stirling & Council for Scientific and Industrial Research** collab, integrates cloud-based processing of Sentinel-2 satellite data with co-located computational infrastructure, using advanced atmospheric correction and robust biogeochemical algorithms. This integrated framework generates 10-year time series of Chlorophyll-a and Total Suspended Matter at 20 m spatial resolution to support systematic water quality assessments and strategic management of small, heterogeneous, and strategically important water bodies in South Africa's water-scarce Western Cape region.

Project datasets: <https://doi.org/10.5281/zenodo.18670504>

Project code: <https://github.com/DalinJiang/EO-Africa-SWAM>

Post for BS and X (max 230 characters including hashtags)

We use cloud-based computing & #Sentinel2 data, robust atmospheric correction & biogeochemical algorithms to produce 10-year 20m resolution #WaterQuality datasets for small, diverse, strategically important water bodies in South Africa's water-scarce Western Cape