

Sentinels for SDG 6 monitoring

Open & Operational Big Data for Transparent & Transboundary Information

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Sentinels Looking after Water



0 days 00 hours 00 minutes

Copernicus Space Component

Long term continuity space observations



2011

2015

2020

2030

Access to Contributing Missions

S-1 A/B/C/D

S-1 A/B 2nd Generation

S-2 A/B/C/D

S-2 A/B 2nd Generation

S-3 A/B/C/D

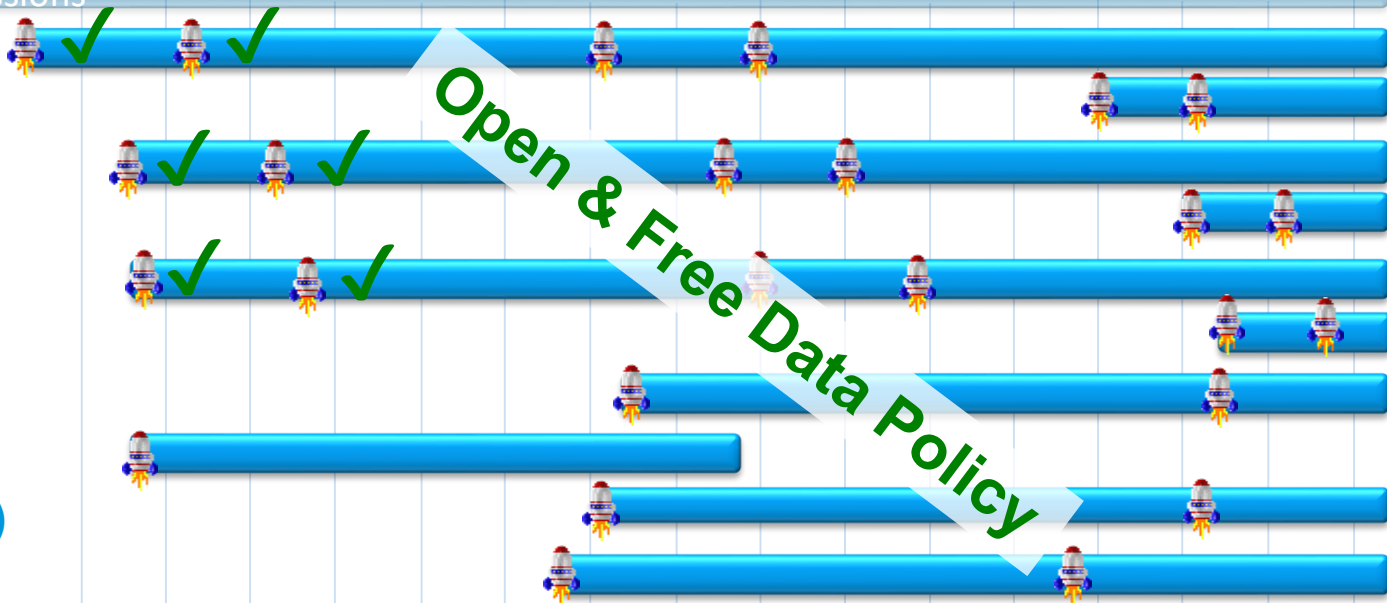
S-3 A/B 2nd Generation

S-4 A/B (on MTG)

S-5 Precursor

S-5 A/B/C (on MetOp-SG)

S-6 A/B

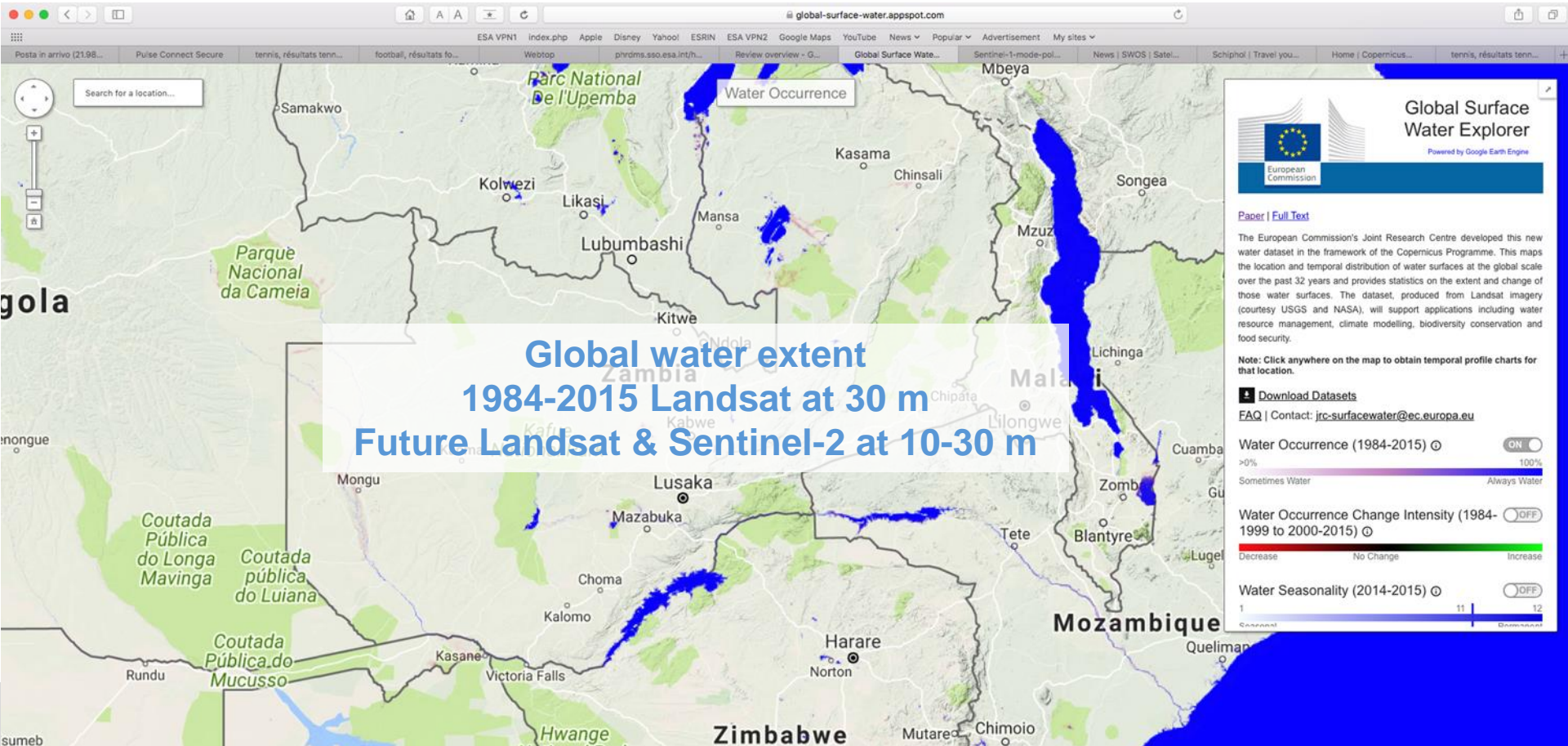


ESA UNCLASSIFIED - For Official Use



European Space Agency

SDG 6.6: Long-term Changes in Water Extent



SDG 6.6: Monitoring of Water Extent



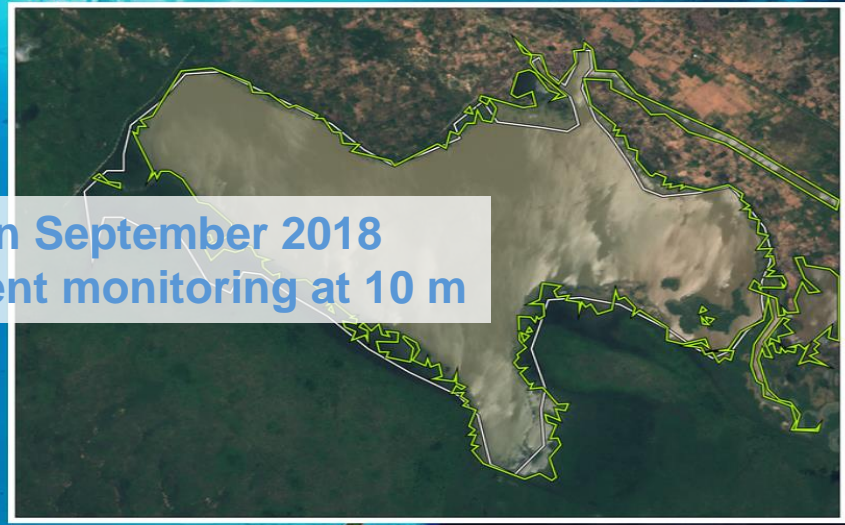
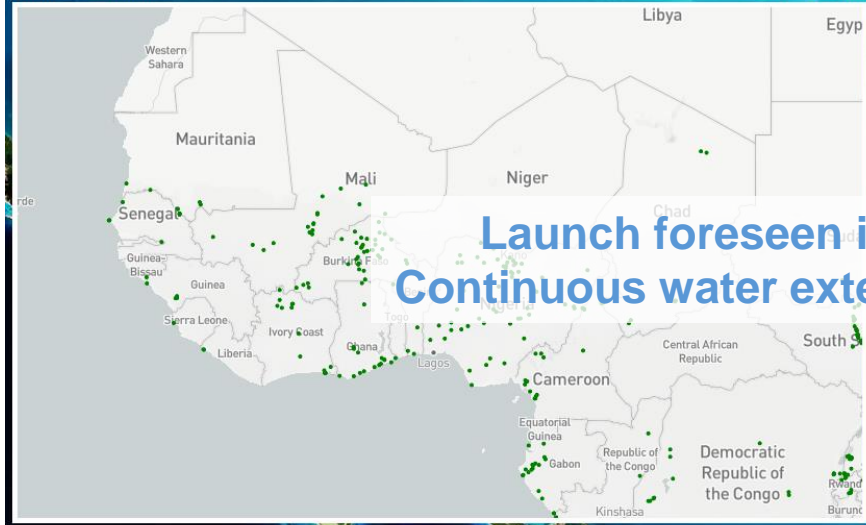
BLUEDOT

WATER OBSERVATORY

No. of observations: 58

Alau Dam (Nigeria) 1.93%

2018/08/10



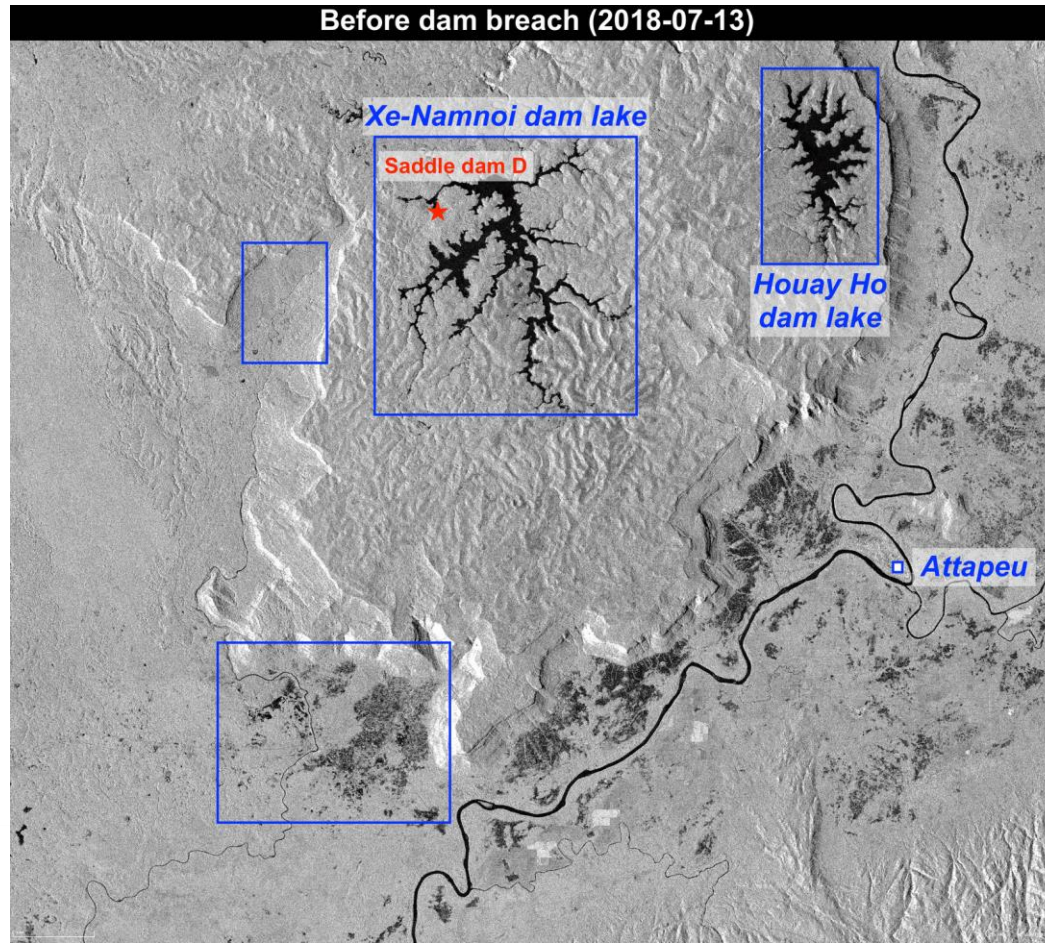
Launch foreseen in September 2018
Continuous water extent monitoring at 10 m

Click on an observation to display it



Credit: Sinergise, EO-Research, Sentinel Hub
SINERGISE

SDG 6.6: Monitoring of Water Extent



SDG 6.3: Water Quality Monitoring

Lake Turkana, Maximum Chlorophyll Index

2015-12-09

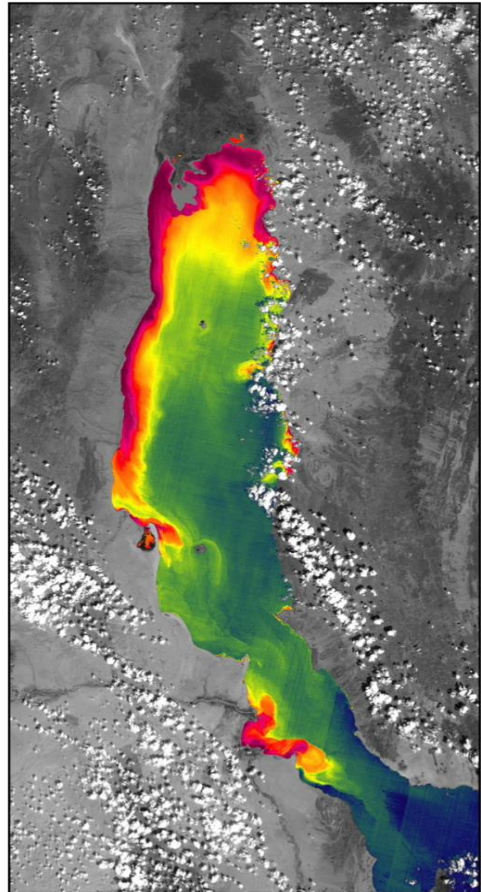
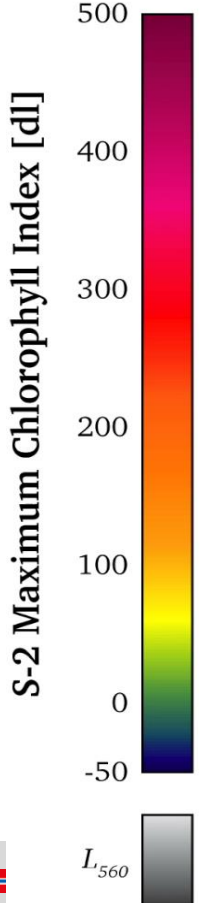


Getintravel



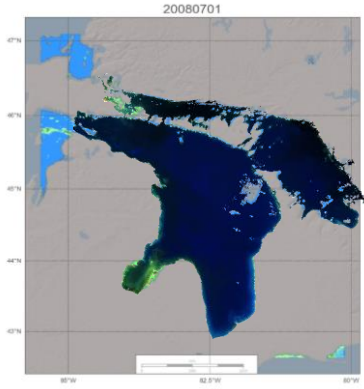
Contains modified Copernicus Sentinel data [2016]

ESA UNCLASSIFIED - For Official Use

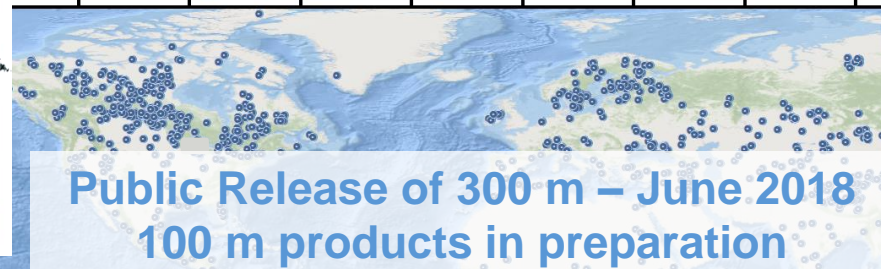


SDG 6.3: Copernicus Global Land Service – Water

<http://land.copernicus.eu/global>

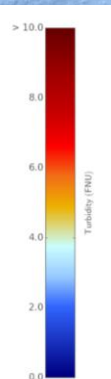
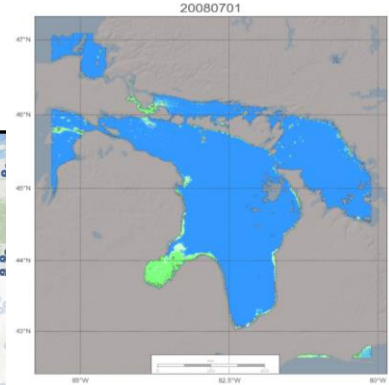


Water Leaving Reflectances

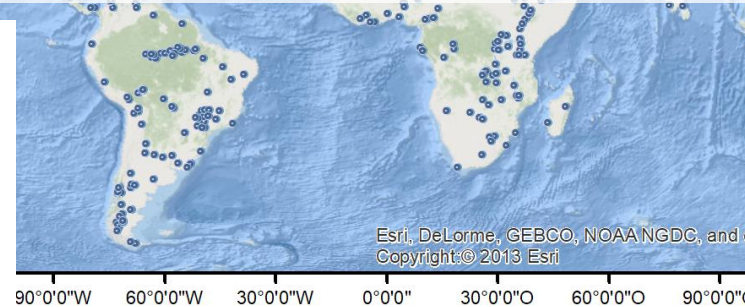


Trophic State Index

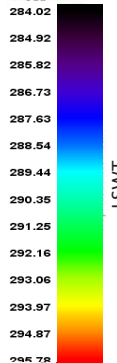
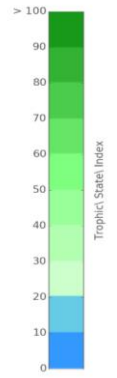
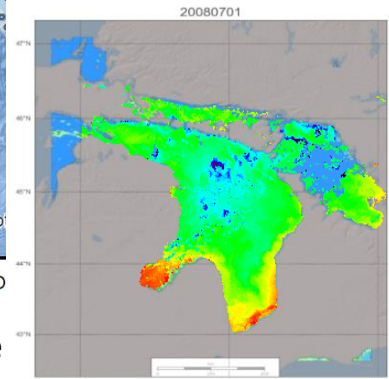
Public Release of 300 m – June 2018
100 m products in preparation



Turbidity

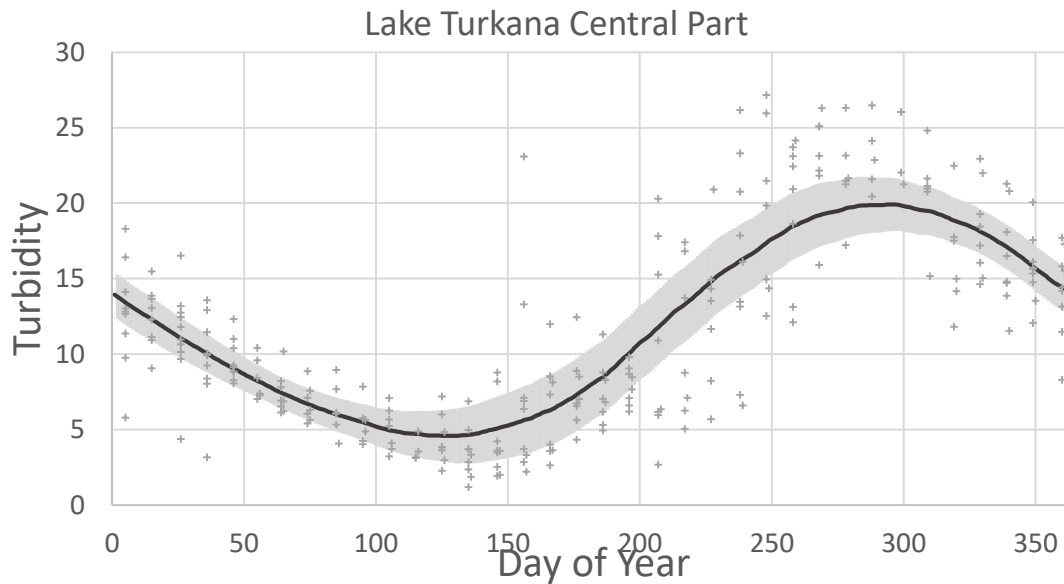
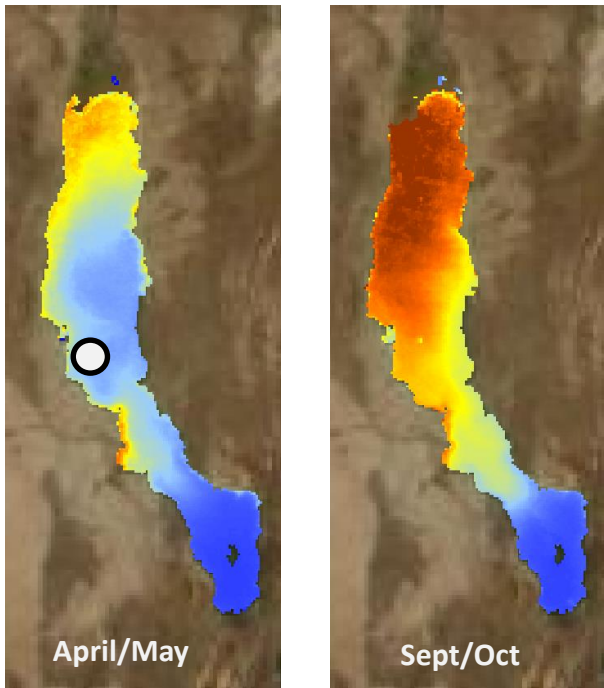


Lake Surface Temperature



SDG 6.3: Lake Turkana – finding events

Long-term average situation

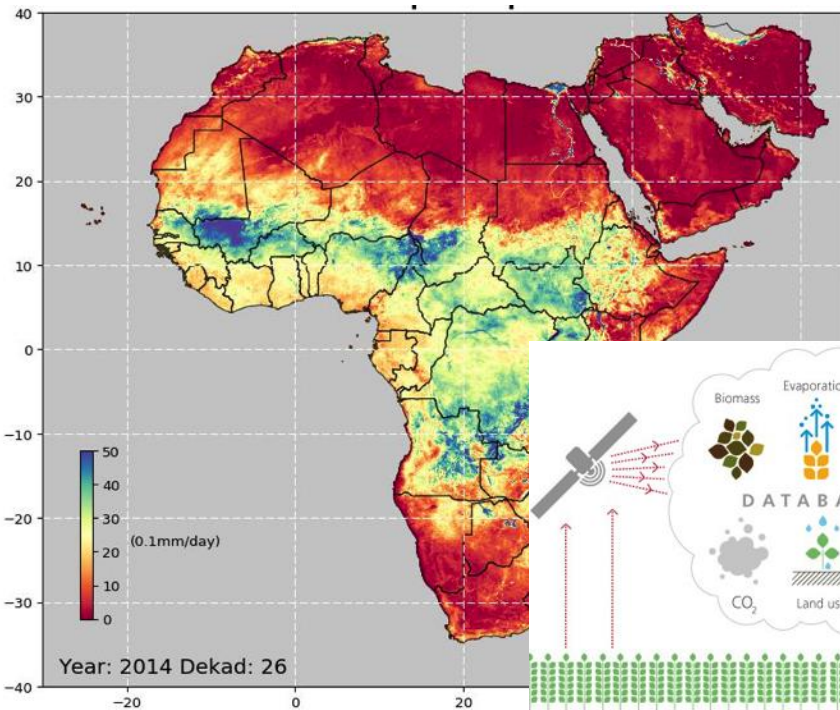


**Archive Turbidity data over 10 years,
seasonal trends**

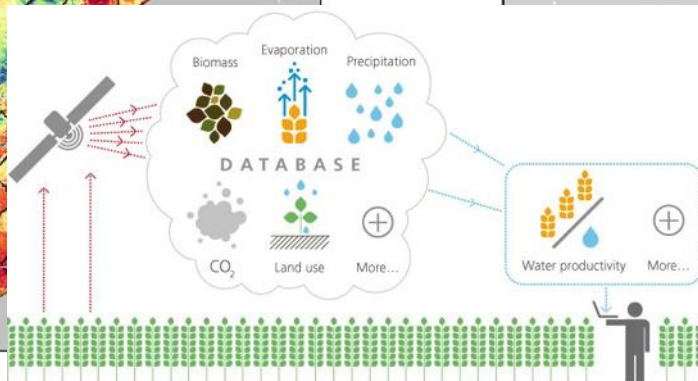
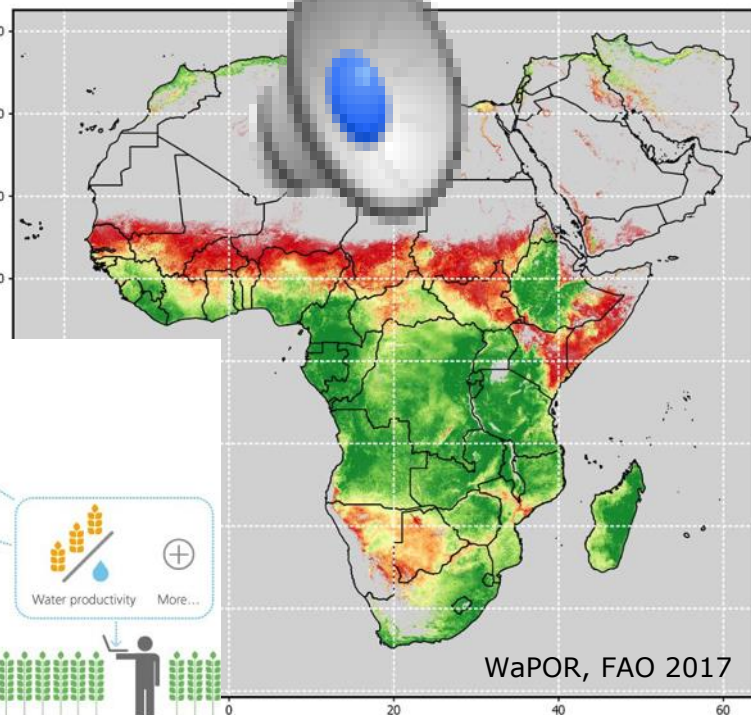
SDG 6.4: Water Productivity Monitoring

WaPOR - FAO portal to monitor Water Productivity

Actual Evapotranspiration



Water Productivity



Hydro-TEP – Cloud Computing for Water



- 💧 Collaborative & open platform for large data volume processing & sharing for IWRM
- 💧 Hydrological modeling, flood mapping, small water bodies mapping, water quality & water level
- 💧 Supports algorithm development, sharing of data, tools & knowhow

[Sign in](#) [Register](#) [Contact](#)



hydrology
tep

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[Information Processing](#)

[Community](#)

[Partners](#)

Water Quality

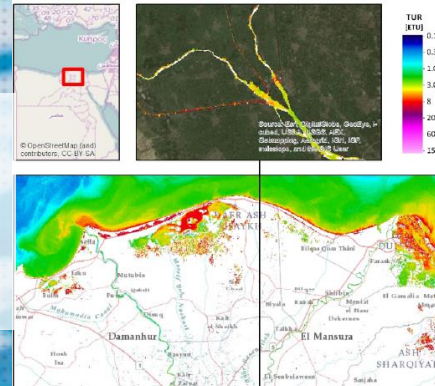
Our Community

The Thematic Exploitation Platform (TEP) for hydrology is an heterogeneous community of scientific users, river basin organisations and service providers. The main objective is to exchange data, services and knowledge through a common collaboration framework.

[Become a Member](#)

National Pilot for SDG 6.3 planned:

1. Water body inventory
2. Water Quality indicator monitoring
3. National reporting



Monitoring of SDG 6 from Space

Benefits of satellite Earth Observation



- 💧 **Consistency** – monitoring over space and time
- 💧 **Transboundary** – from national to basin scale to global
- 💧 **Transparency** – for independent reporting
- 💧 **History** – long term trend analysis, e.g. climate change
- 💧 **Sustainability** – open & free operational data

- 💧 **EO for SDG 6 Partnerships** – UN-Environment, Ramsar, FAO, UN-Water, UNDP-CapNet, GEF/Development Banks, GEO-Water



Backup



WATER AND SANITATION THE PATHWAY TO A SUSTAINABLE FUTURE

THE NEGOTIATION OF A NEW SET OF GLOBAL DEVELOPMENT GOALS IN 2015 PROVIDES A UNIQUE OPPORTUNITY TO MAP A PATHWAY TO A BETTER FUTURE FOR THE PLANET AND ALL OF ITS PEOPLE.

GOAL 6 — ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL — IS CENTRAL TO REALISING THIS VISION

SEE BELOW HOW MEETING INDIVIDUAL TARGETS IN GOAL 6 WILL DRIVE PROGRESS ACROSS THE WHOLE SPECTRUM OF SOCIAL, ENVIRONMENTAL AND ECONOMIC SDGS.

6.1 SAFE DRINKING WATER

EVERY 15 SECONDS A CHILD DIES FROM A PREVENTABLE WATER BORNE DISEASE
200 MILLION HOURS — THE TIME WOMEN & GIRLS SPEND FETCHING WATER EVERY DAY



6.6 WATER-RELATED ECOSYSTEMS

GROUNDWATER PROVIDES DRINKING WATER TO AT LEAST 50% OF THE GLOBAL POPULATION
THE EFFECTS OF CLIMATE CHANGE & URBANIZATION WILL IMPACT THE WATER-CYCLE — INCLUDING VITAL GROUNDWATER RESERVES



6.2 SANITATION AND HYGIENE

MORE THAN 1 IN 3 PEOPLE HAVE NO ACCESS TO IMPROVED SANITATION, 1 IN 7 STILL PRACTICE OPEN DEFECATION
SOME COUNTRIES LOSE AS MUCH AS 7% OF GDP BECAUSE OF INADEQUATE SANITATION



6.5 INTEGRATED WATER RESOURCES MANAGEMENT

2/3 OF THE WORLD'S POPULATION COULD FACE WATER STRESS BY 2025
ACCESS TO WATER POSES THE BIGGEST SOCIAL AND ECONOMIC RISK OVER THE NEXT TEN YEARS



6.3 WATER QUALITY

OVER 80% OF WASTEWATER WORLDWIDE IS DUMPED — UNTREATED — INTO WATER SUPPLIES
2 MILLION TONS — AMOUNT OF HUMAN WASTE DISPOSED IN WATER COURSES EVERY DAY



6.4 WATER EFFICIENCY

70% — AMOUNT OF TOTAL WATER CONSUMPTION USED FOR AGRICULTURE
85% — INCREASE IN WATER DEMANDS CAUSED BY RISING ENERGY PRODUCTION BY 2035



SDG 6 Indicators

6.3.2 Proportion of bodies of water with good ambient water quality

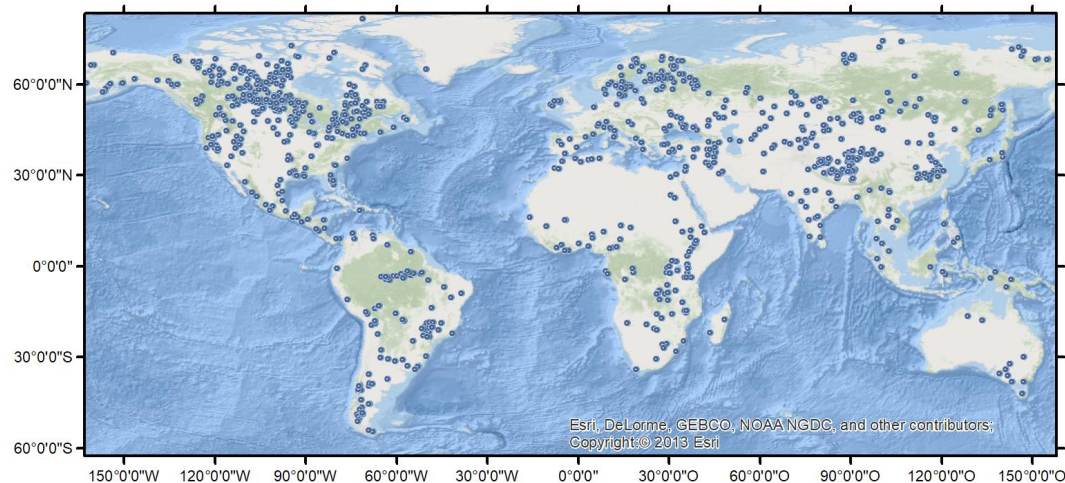
6.4.1 Change in water use efficiency over time

6.6.1 Change in the extent of water-related ecosystems over time

Copernicus Land Service: Water product specifications



- Parameters
 - Lake Surface Reflectance (all bands)
 - Lake turbidity
 - Trophic state (based on CHL concentration)
 - Lake Water Temperature
- Spatial resolution
 - 300m, 1km
 - 100m (in evolution)
- Temporal aggregation
 - 10days for water LSWT, TUR and TSI
 - Best spectrum within 10days for LSR
- Time span
 - 2002-2012 (MERIS + AATSR)
 - 2016-ongoing (OLCI + SLSTR)
- Service
 - NRT (3 days after last day of decade)
- Status
 - Public release June 2018 (300m, 1km)



LSWT = Lake Surface Water Temperature

TUR = Turbiditiy

TSI = Trophic State Index

LSR = Lake Surface Reflectances



Sentinels – World Class EO Systems

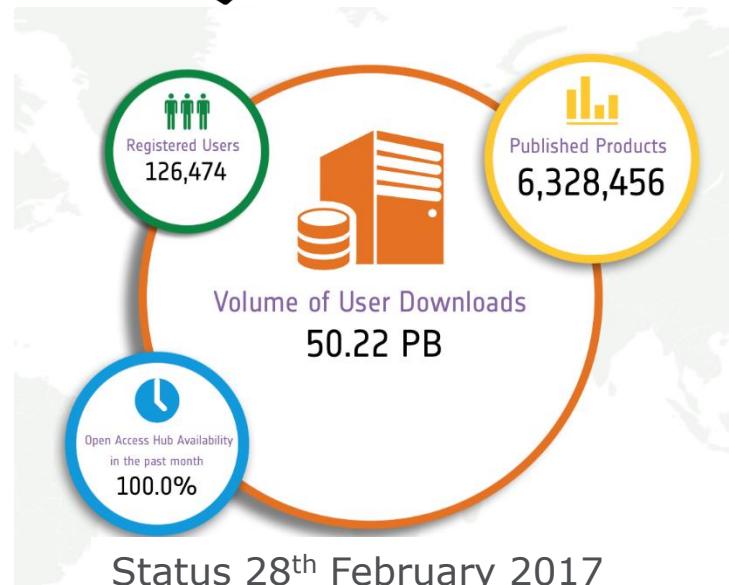
Reference missions: Class leading data quality

Requirement	Description	Measured performance
Absolute geolocation (without ground control points)	The geo-location uncertainty shall be better than 20 m at 2σ confidence level (without Ground Control Points).	< 11 m at 95.5% confidence (baseline 02.04)
Multi-spectral registration	The inter-channel spatial co-registration of any two spectral bands shall be better than 0.30 of the coarser achieved spatial sampling distance of these two bands at 3σ confidence level.	< 0.3 pixel at 99.7% confidence
Absolute radiometric uncertainty	The absolute radiometric uncertainty shall be better than 5% (goal 3%).	B1 to B12, excl. B10: < $5\% \pm 2\%$
SNR	The Signal-to-Noise Ratio (SNR) shall be higher than specified values (see Table 2-6 in this document)	All bands compliant with > 27% margin

Reliable Data Quality – Prerequisite for Water Monitoring

S1  **>5.8 TB daily**

S2  **>3.2 TB daily**



Monthly Data Quality reports:
<https://sentinels.copernicus.eu/web/sentinel/missions/sentinel-2/data-quality-report>