3rd GEO DATA PROVIDERS WORKSHOP

DATA PROVIDERS MEET USERS

FRASCATI, ITALY
2-4 MAY 2018

GEO GROUP ON EARTH OBSERVATIONS

esa European Space Agency

UNIVERSITÉ DE GENÈVE

FGDC FEDERAL GEOGRAPHIC DATA COMMITTEE

#GEODATA18
bit.ly/GEOdataworkshop

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

International Initiative on Water Quality

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How EO data is critical in SDGs decision making

Sarantuyaa Zandaryaa, PhD / International Hydrological Programme / UNESCO

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Improving world water quality is essential to achieve the SDGs

United Nations Educational, Scientific and Cultural Organization · International Hydrological Programme

International Initiative on Water Quality

Ensure availability and sustainable management of water and sanitation for all

Ensure healthy lives and promote well-being for all at all ages

Ensure sustainable consumption and production patterns

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

SDG 6 – Water

Target 6.1 & 6.2

… access to safe water and sanitation

Target 6.3

… improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials…

SDG 3 - Health

Target 3.3 ***… combat water-borne diseases…***

Target 3.9 ***… reduce deaths and illnesses from hazardous chemicals … and air, water and soil pollution***

SDG 12 – Production & Consumption

Target 12.4

… significantly reduce release of chemicals to air, water and soil in order to minimize their adverse impacts on human health and environment

Water quality monitoring for the SDGs implementation and progress evaluation

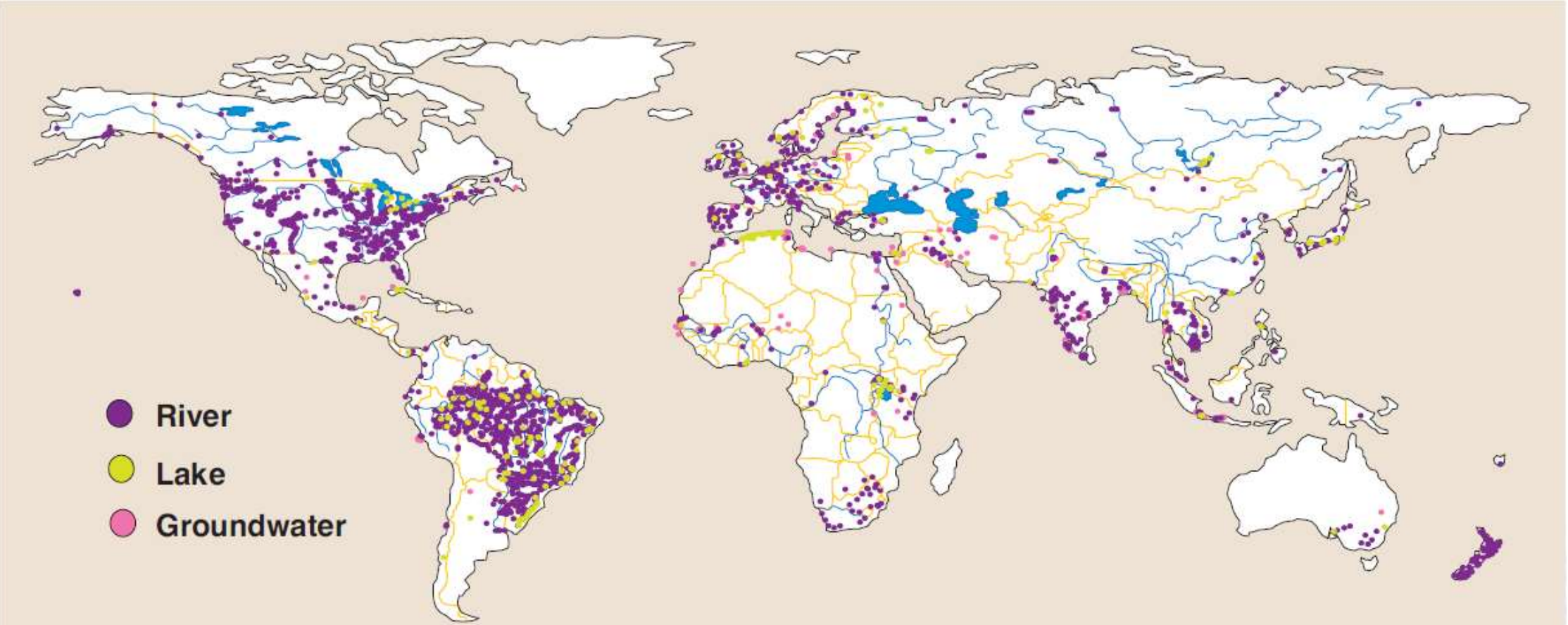
Lack of global water quality data and information

Lack of human and technical capacity for water quality monitoring

Need to evaluate and monitor progress towards SDGs achievement

An urgent need to enhance global water quality data and information, supported by capacity building on water quality monitoring

GEMS/Water quality monitoring stations: Inadequate worldwide coverage

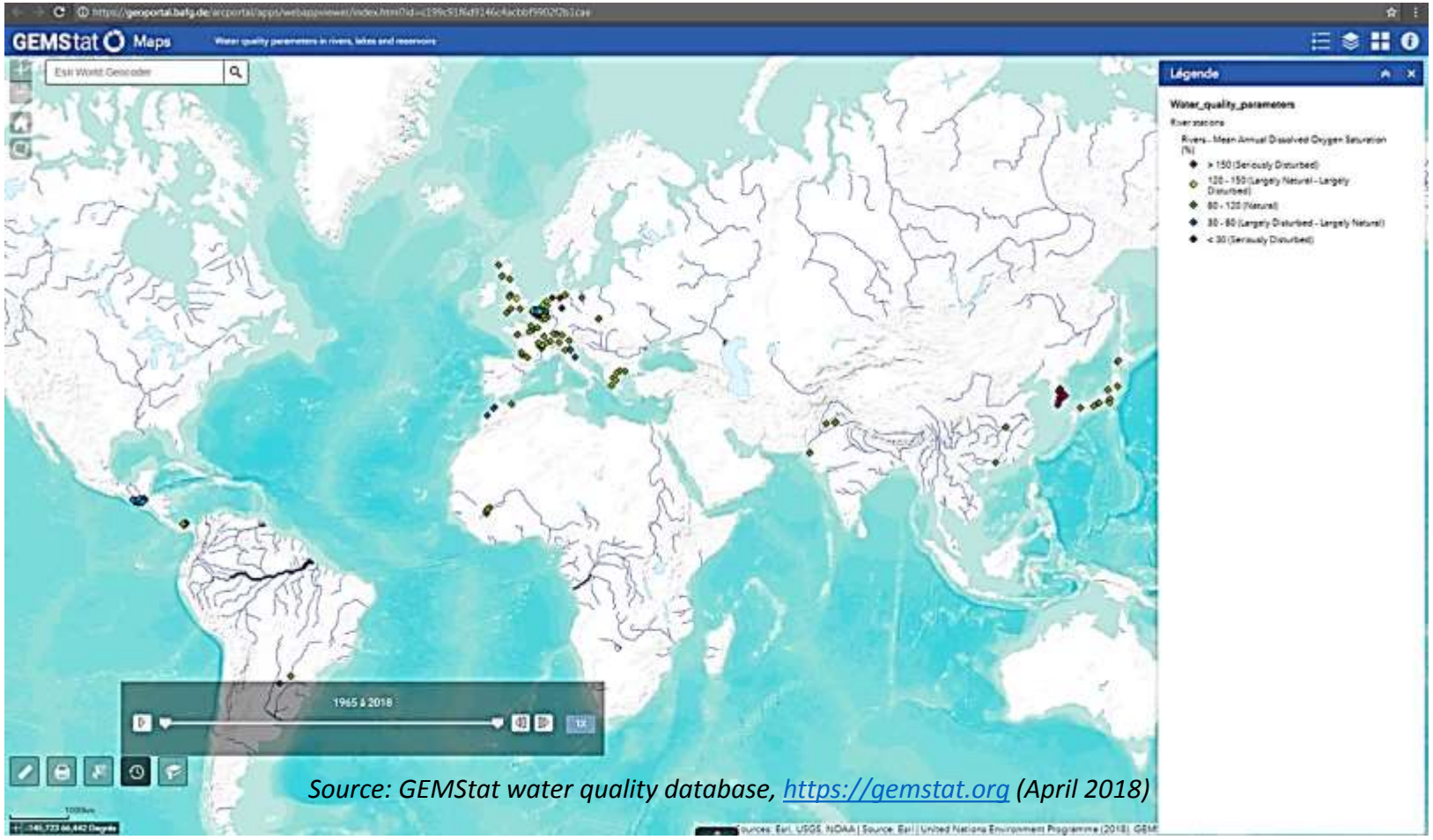


Source: Water Quality Outlook, 2007 (UNEP/GEMS Water Programme)

Lack of water quality monitoring stations and data in Africa, Asia, Small Island States, Latin America (except for Brazil)

GEMStat - The global water quality database

Scarce global water quality data



Source: GEMStat water quality database, https://gemstat.org (April 2018)

River water quality monitoring stations:
Mean annual dissolved oxygen (%), 1965-2018

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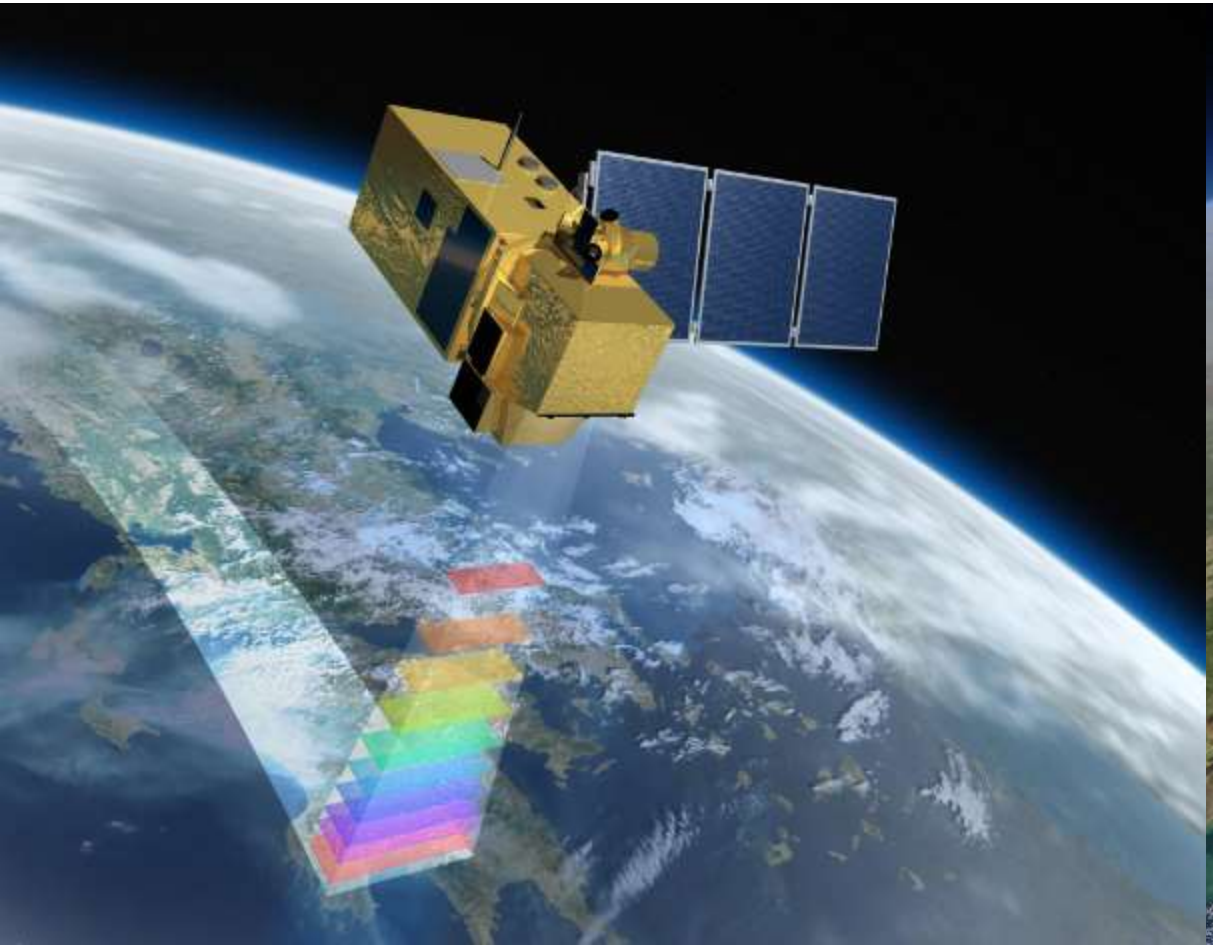
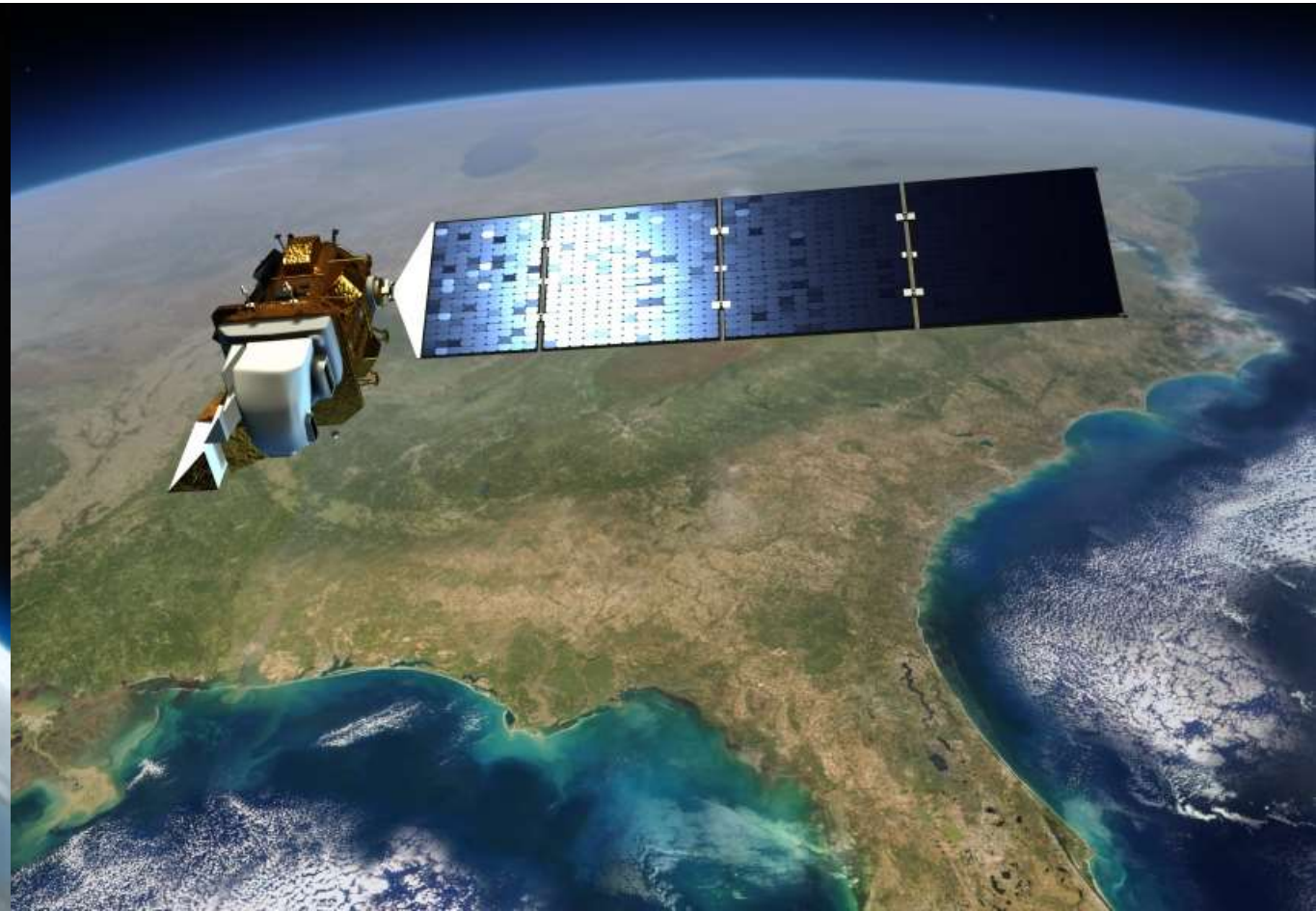
Can Earth Observation fill the global water quality data gap for the SDGs monitoring?





UNESCO International Initiative on Water Quality (IIWQ)

Activities on water quality monitoring

UNESCO IIWQ International Symposium on Water Quality Monitoring (Kyoto, Japan - 2015)

Focus on scientific, technological and policy innovations for improved water quality monitoring in the SDGs framework

A Special Session on Water Quality Monitoring using GIS and Remote Sensing *co-convened with JAXA*

- The use of GIS and remote sensing technologies in water quality monitoring
- The potential use of satellite and remote sensing data in:
  - monitoring and assessing inland water quality, especially in inaccessible areas
  - collecting water quality data and information on systematic spatial and temporal scales.
- The role of Earth Observation in monitoring SDG targets related to water quality

UNESCO IIWQ Regional Consultation on Water Quality in Europe (Koblenz, Germany – 2015)

Focus on addressing water quality challenges and sharing and promoting best technical and policy practices

A Technical Session on Water Quality Data and Monitoring

- Water quality assessment, data and monitoring at national and regional scales.
  - ➢ Scarce water quality data in some sub-regions (Eastern European countries)
- Applications, capabilities and limitations of various water quality monitoring approaches
- Earth Observation tools for the interpretation and analysis of the quality of surface water resources
  - ➢ A decision was made to develop the UNESCO IIWQ World Water Quality Information and Capacity Building Portal

UNESCO-IHP International Initiative on Water Quality

UNESCO World Water Quality Portal

- **A demonstration project on water quality monitoring, using Earth Observation** under the *International Initiative on Water Quality (IIWQ)* of UNESCO-IHP
- **Aims at improving global water quality information**, focusing on inland freshwater resources
  - ➢ A valuable tool to obtain water quality data and information, especially in remote areas and developing countries (Africa, Asia, Latin America, and SIDS) where water quality monitoring networks and laboratory capacity are lacking
- **Promotes the use using innovative scientific approaches and technologies** for better water management
  - ➢ Demonstrates the capabilities and use of Earth Observation (satellite-based data) for monitoring water quality in inland freshwaters
- **Supports the implementation and monitoring of the SDGS** at the global, regional, national and local levels.

UNESCO-IHP International Initiative on Water Quality

UNESCO World Water Quality Portal

www.worldwaterquality.org

Water quality parameters

- Turbidity (sedimentation)
- *Chlorophyll-a*
- HAB indicator
- Total absorption
- Surface temperature

- **Global layer** (90-meter/mixed resolution)
- **Regional layers/demonstration basins** (30-meter resolution):
  - Lake Sevan in the Caucasus highlands - *Armenia, Azerbaijan*
  - Itaipu and Parana River Basins - *Argentina, Brazil, Paraguay*
  - The Mecklenburg Lake Plateau - *Germany*
  - River Nile and Aswan Reservoir - *Egypt, Sudan*
  - The Mekong Delta - *Vietnam*
  - Florida Lakes - *USA*
  - Zambezi River - *Zambia, Zimbabwe*

in partnership with

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International Hydrological Programme

International Initiative on Water Quality

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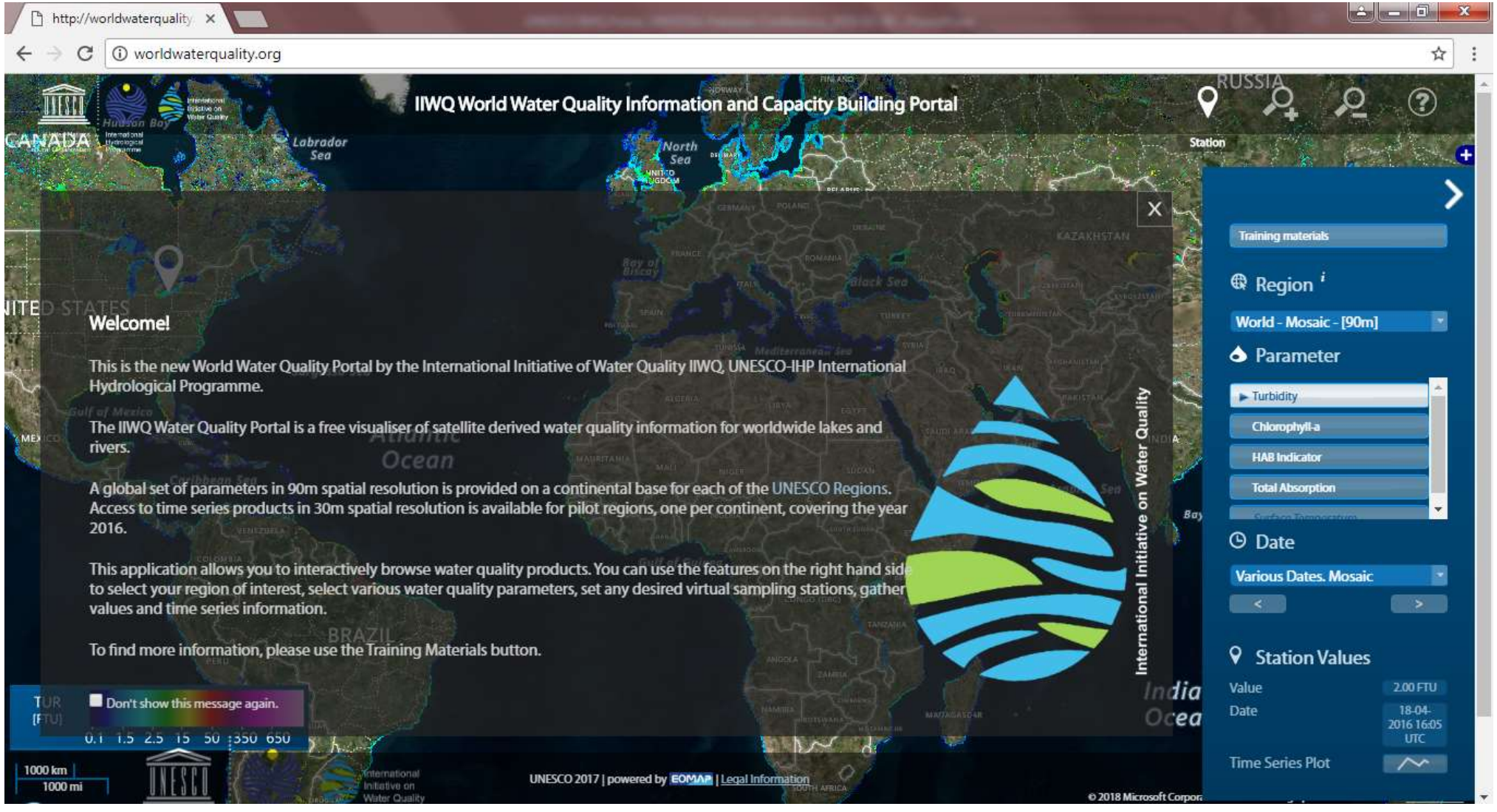
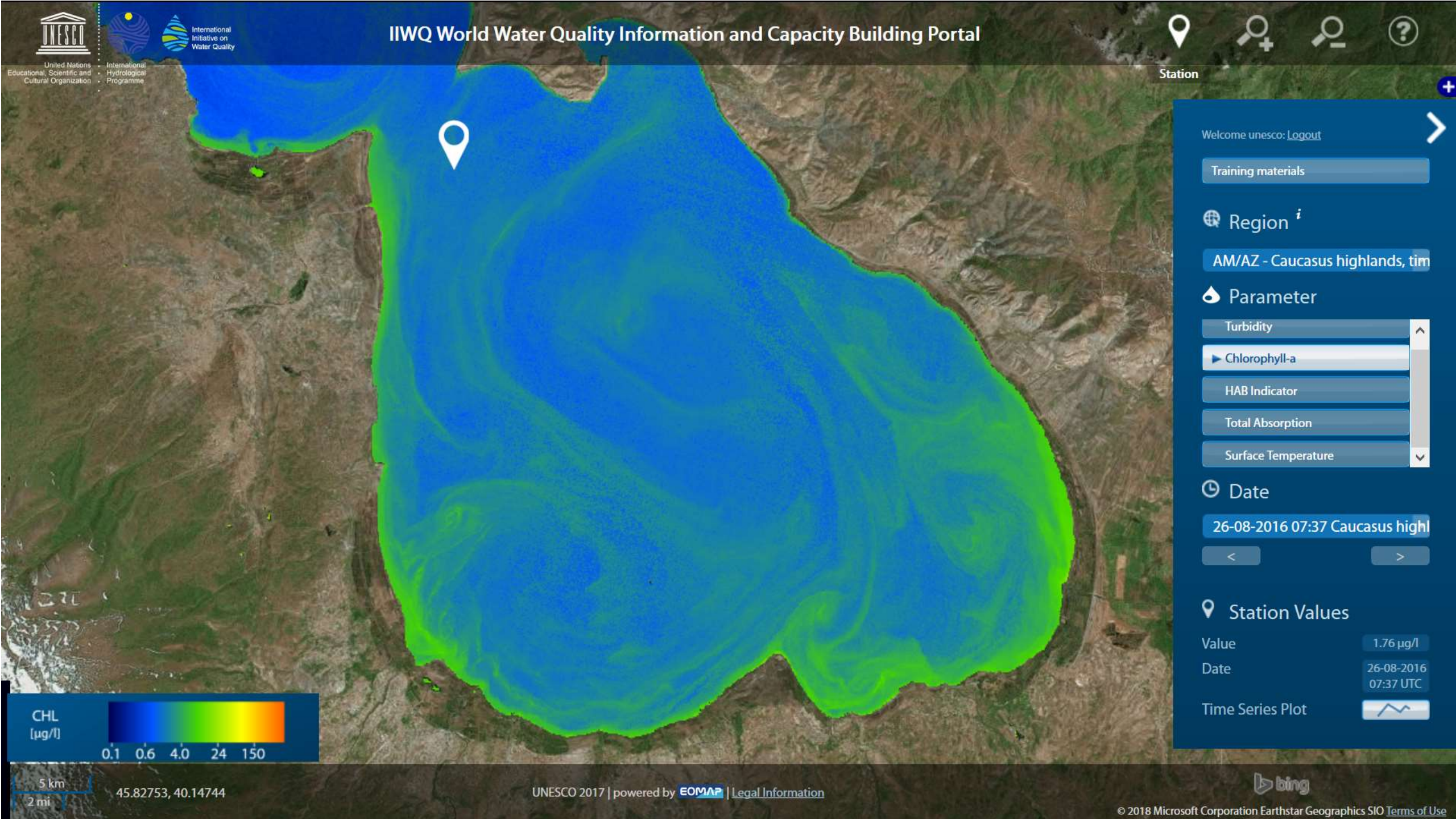


in partnership with

EOMAP


United Nations Educational, Scientific and Cultural Organization
International Hydrological Programme
International Initiative on Water Quality
IIWQ World Water Quality Information and Capacity Building Portal
Station
Welcome unesco: Logout
Training materials
Region
AM/AZ - Caucasus highlands, tim
Parameter
Turbidity
Chlorophyll-a
HAB Indicator
Total Absorption
Surface Temperature
Date
26-08-2016 07:37 Caucasus highl
<
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Station Values
Value
1.76 µg/l
Date
26-08-2016 07:37 UTC
Time Series Plot
CHL [µg/l]
0.1 0.6 4.0 24 150
5 km
2 mi
45.82753, 40.14744
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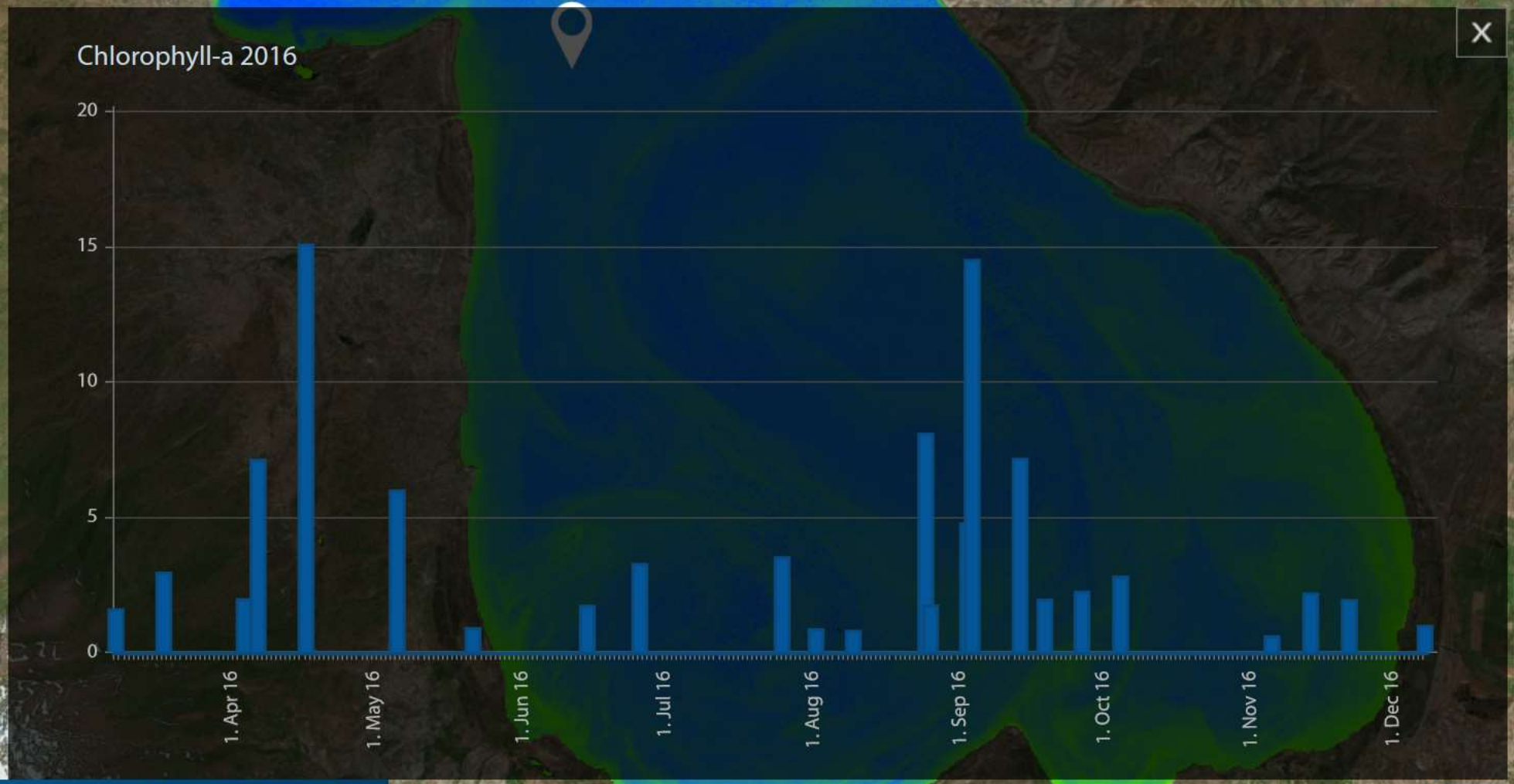

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< >
Station Values
Value 1.76 µg/l
Date 26-08-2016 07:37 UTC
Time Series Plot
Click here to generate a time series plot.
Report

CHL [µg/l]
0.1 0.6 4.0 24 150

5 km
2 mi
45.80624, 40.14691

WATER QUALITY REPORT

Generated at: 2018-01-21 Time 17:41:40
Parameter: Chlorophyll-a
Unit: µg/l
Product: eoWater (satellite based)

Region: AM/AZ - Caucasus highlands, timeseries - [30m]
Station lat/lon: 40.41433 / 45.26688
Year: 2016
Median: 2.24
Mean: 3.97
Minimum value: 0.62
Bottom quintile: 1.38
Top quintile: 6.46
Maximum value: 15.09

Trophic State Index (according to Carlson 1977): Oligotrophic
Oligotrophic: 54.17%
Mesotrophic: 33.33%
Eutrophic: 12.50%

Report

CHL [µg/l]
0.1 0.6 4.0 24 150

5 km
2 mi
45.80624, 40.14691

Welcome unesco: Logout

Training materials

Region

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Parameter

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26-08-2016 07:37 Caucasus highl

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Date 26-08-2016 07:37 UTC
Time Series Plot

Click here to generate a time series plot.

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- A useful tool to assess the interlinkages between the human and natural (ecological) systems.

- Provides information on impacts and pressure on water quality from other sectors:
  - urban areas,
  - agriculture
  - energy sectors (dams and reservoir management)
  - climate change

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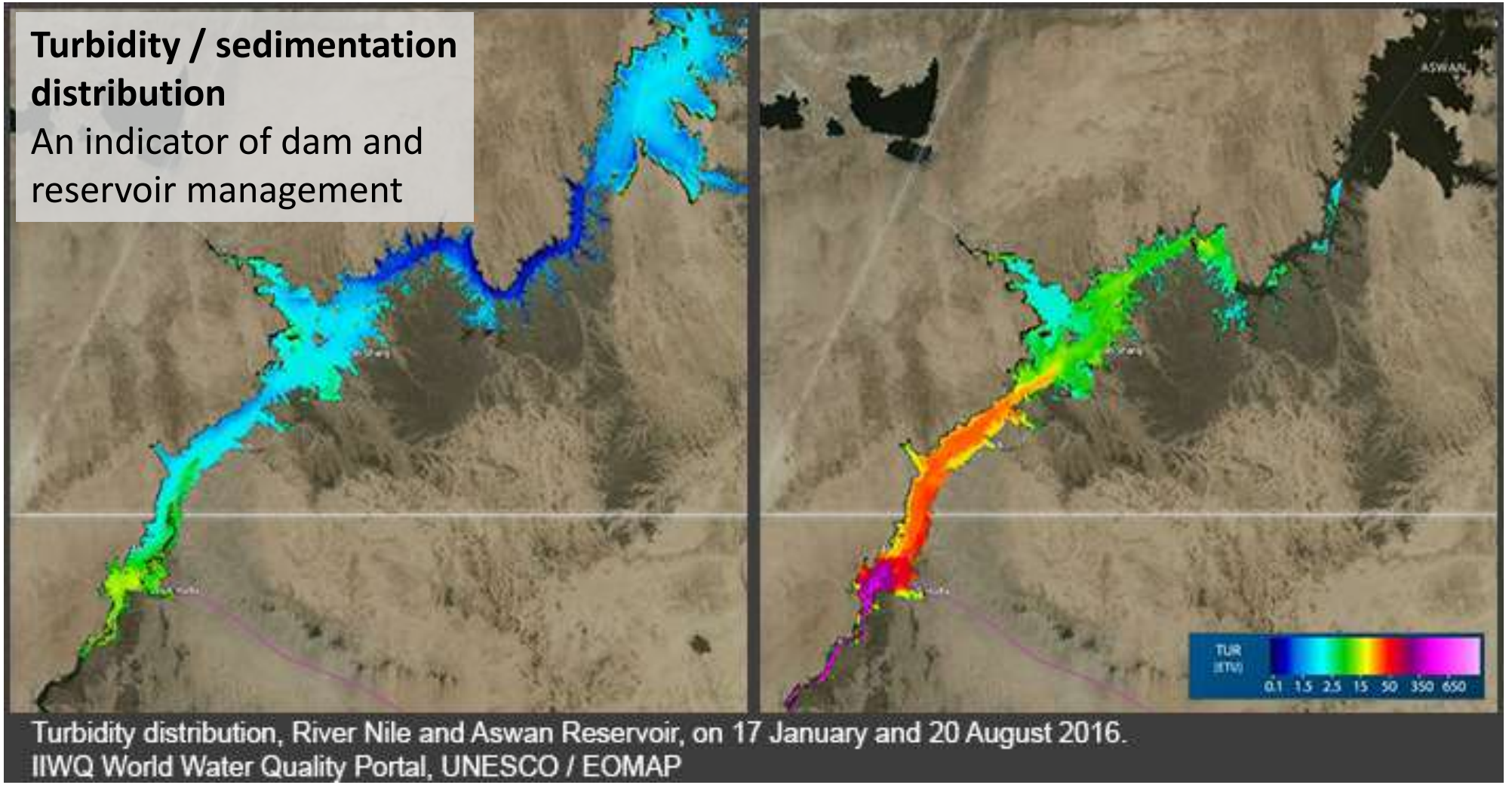
Turbidity / sedimentation distribution

An indicator of dam and reservoir management



Turbidity distribution, River Nile and Aswan Reservoir, on 17 January and 20 August 2016.
IIWQ World Water Quality Portal, UNESCO / EOMAP

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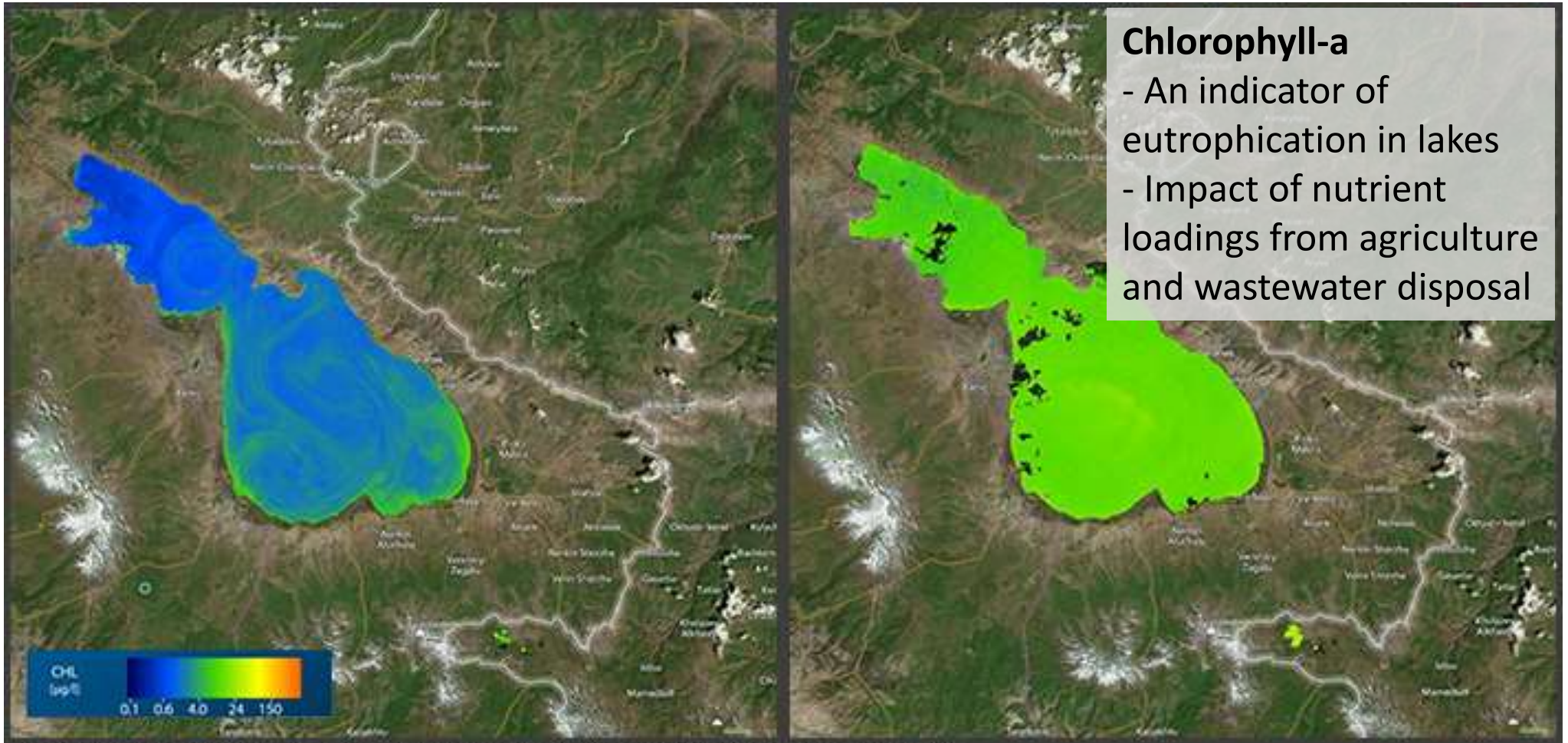

Chlorophyll-a levels in Lake Sevan on 26 August and 04 September 2016.
IIWQ World Water Quality Portal, UNESCO / EOMAP

Chlorophyll-a

- An indicator of eutrophication in lakes
- Impact of nutrient loadings from agriculture and wastewater disposal

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Florida Lakes (USA)

Harmful Algae Bloom (HABs)

- An indicator of antropogenic nutrient enrichment / Eutrophication in surface waters
- Impact of agricultural activities and wastewater discharges on water quality

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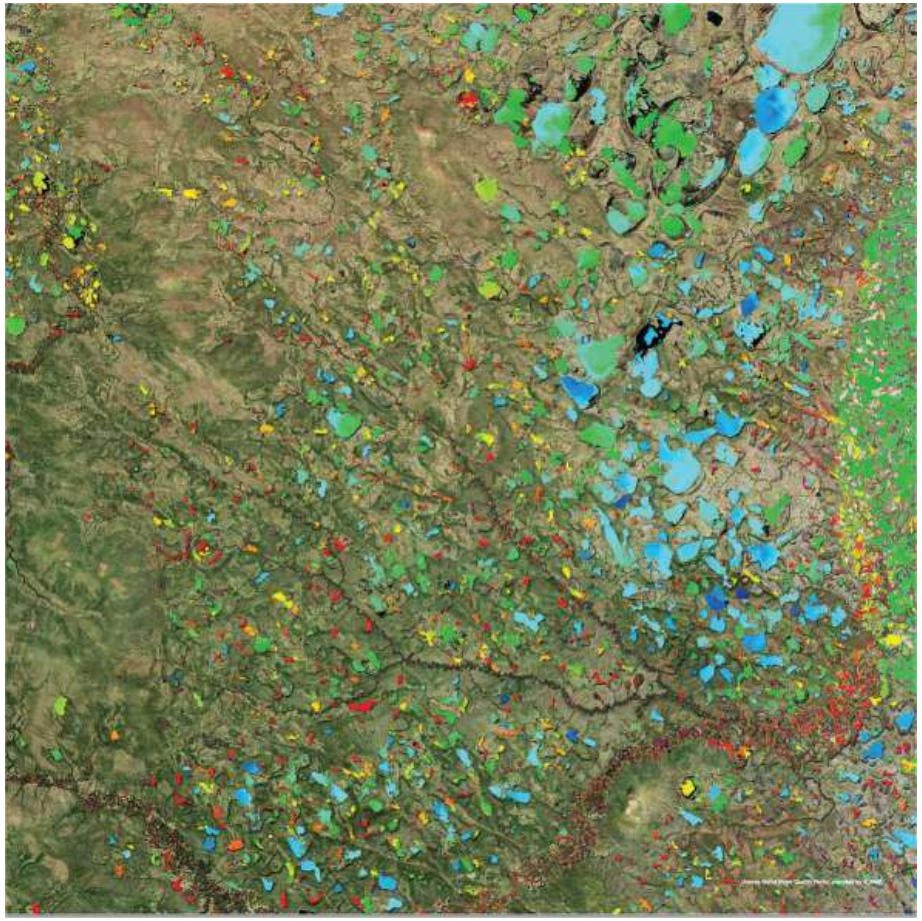

The Sakha Region (Russia)

Dissolved organic substances

- Permafrost melting
- Impact of climate change on water quality

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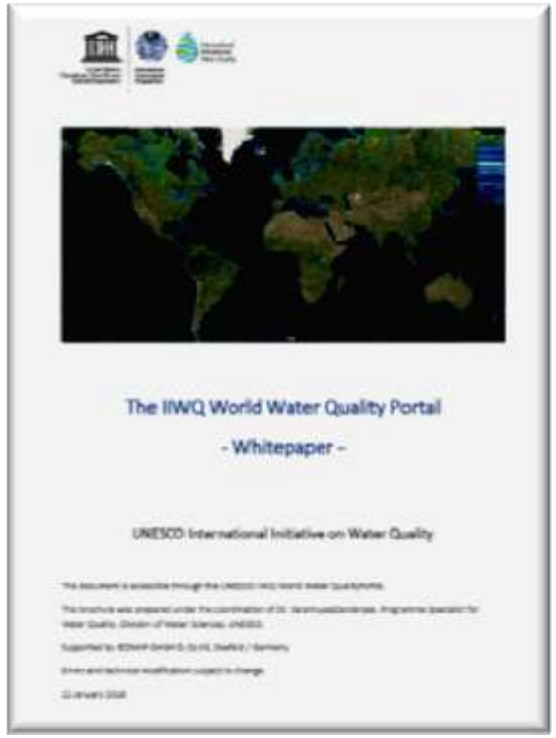
Capacity building and training on monitoring water quality using Earth Observation



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Supporting the SDGs monitoring and implementation

Targets	Indicators
6.3: **Improve water quality by reducing pollution**, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.2: Proportion of bodies of water with good ambient water quality
6.6: **Protect and restore water-related ecosystems**, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1: Change in the extent of water-related ecosystems over time • spatial extent • quantity of water • state if ecosystem health (water quality)
14.1: Prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and **nutrient pollution**	14.1.1: Index of **coastal eutrophication** and floating plastic debris density

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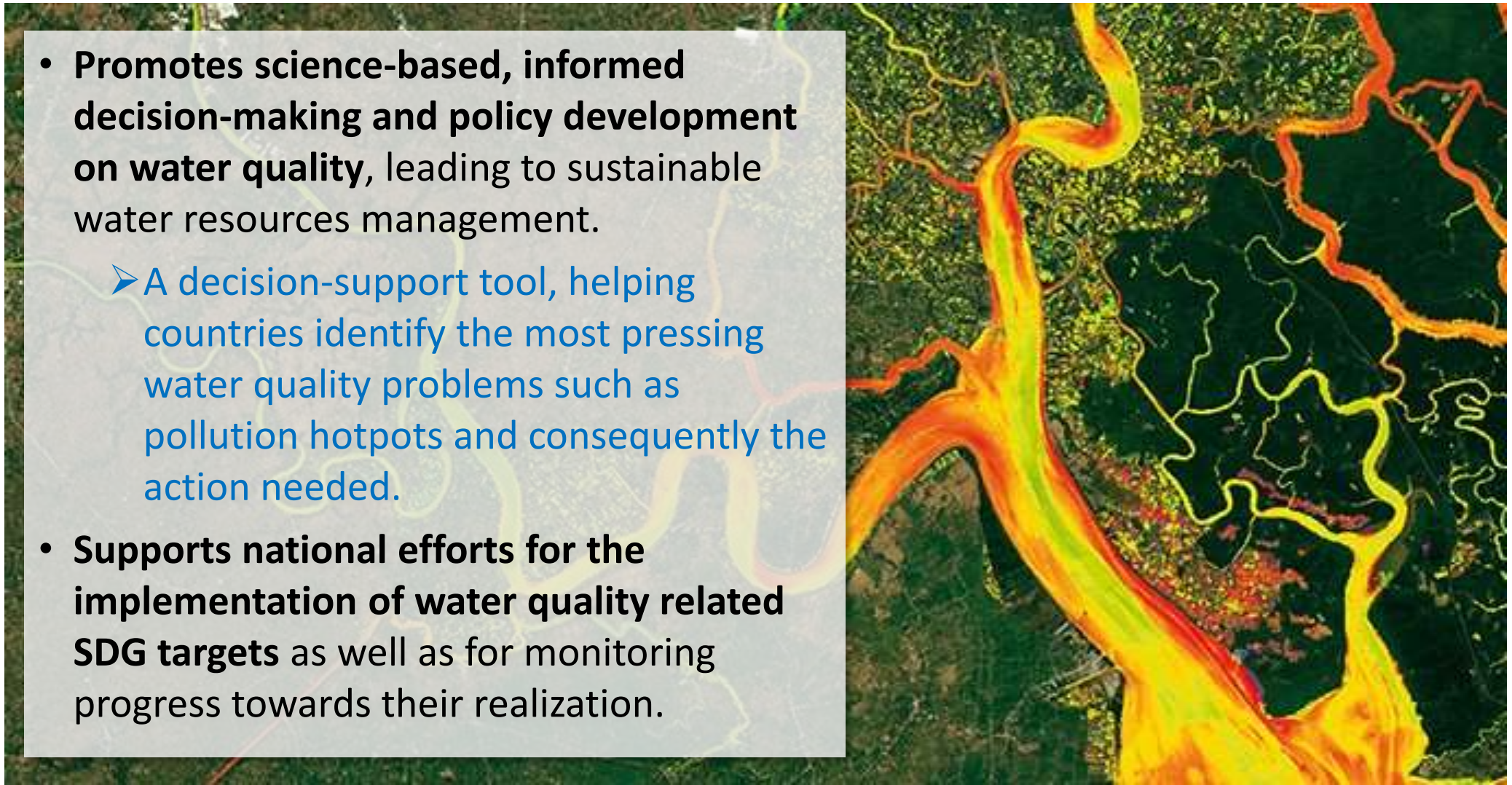
UNESCO World Water Quality Portal:

Supporting science-based decision-making



- **Promotes science-based, informed decision-making and policy development on water quality**, leading to sustainable water resources management.
  - A decision-support tool, helping countries identify the most pressing water quality problems such as pollution hotpots and consequently the action needed.
- **Supports national efforts for the implementation of water quality related SDG targets** as well as for monitoring progress towards their realization.

For more information

UNESCO World Water Quality Portal

www.worldwaterquality.org

UNESCO International Initiative on Water Quality

http://en.unesco.org/waterquality-IIWQ

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

International Initiative on Water Quality (IIWQ)

Sarantuyaa Zandaryaa (s.zandaryaa@unesco.org)

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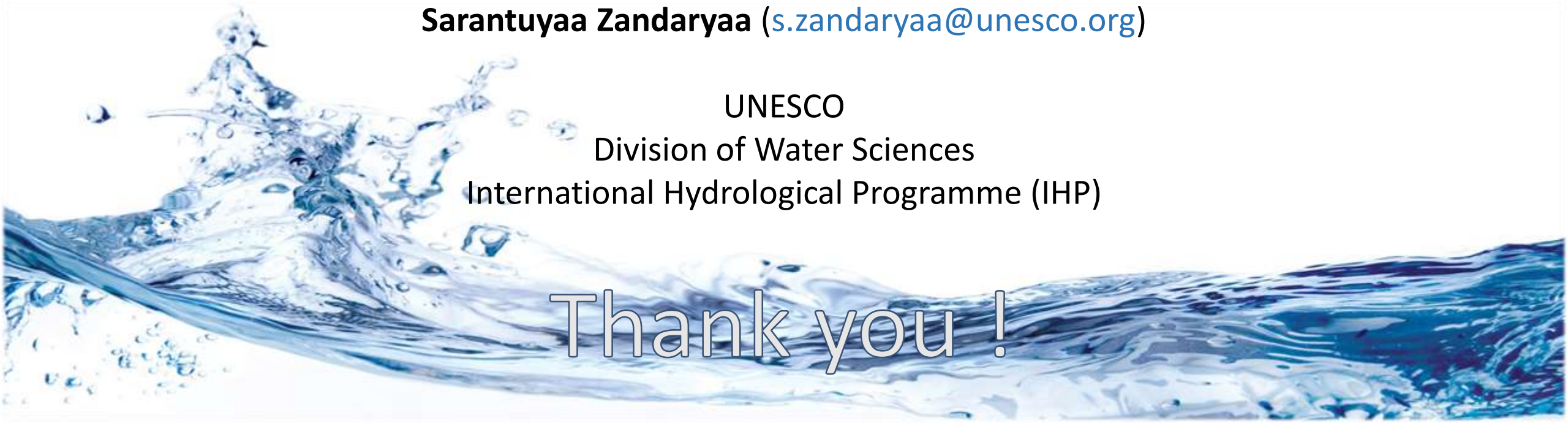
International Hydrological Programme (IHP)



Thank you !