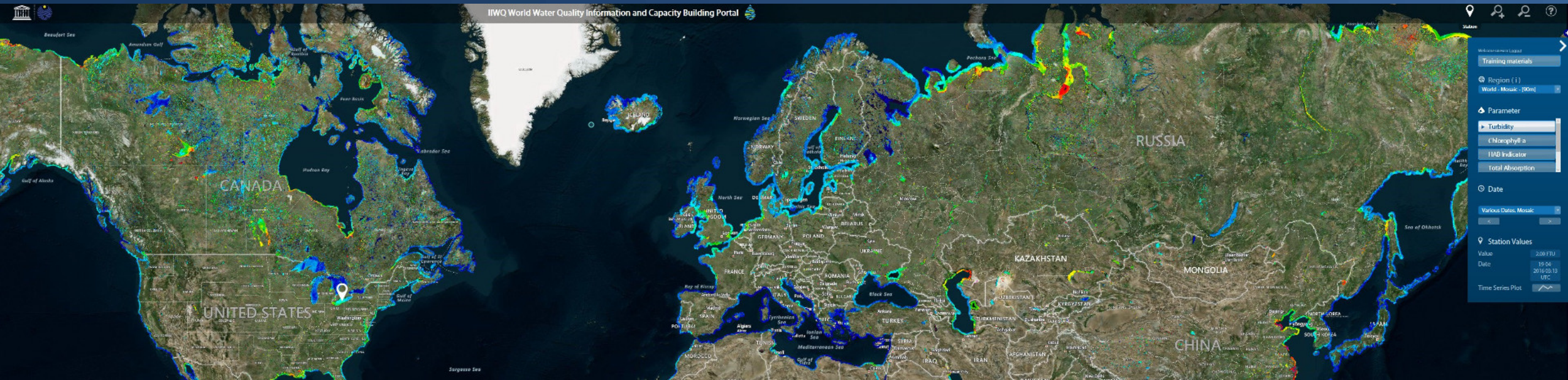


# Global water quality portal for UNESCO

Supporting SDG's & environment through actual global information

Peacefull use of outer space facilities: EO satellites

Dr. Thomas Heege, CEO  
EOMAP GmbH & Co.KG





# About: [www.worldwaterquality.org](http://www.worldwaterquality.org)

- First full global water quality information for lakes and rivers: Online available
- Tool for monitoring, reporting, understanding water interlinkages and impacts
- Capacity building for policy makers, agencies and water industry
- Supporting SDG's: 3,6,12: Health, Water, Production& Consumpt.
- Initiative of UNESCO-IHP-IIWQ and EOMAP



# About EOMAP

- ❑ Service provider to coastal and offshore industry, academia and governmental entities
- ❑ Mapping & monitoring aquatic environments worldwide
- ❑ Award winning cutting edge technology & services



EU SME  
champion



GEOSPATIAL  
WORLD  
AWARDS

Copernicus awards for  
outstanding technology



Information  
Program Partner



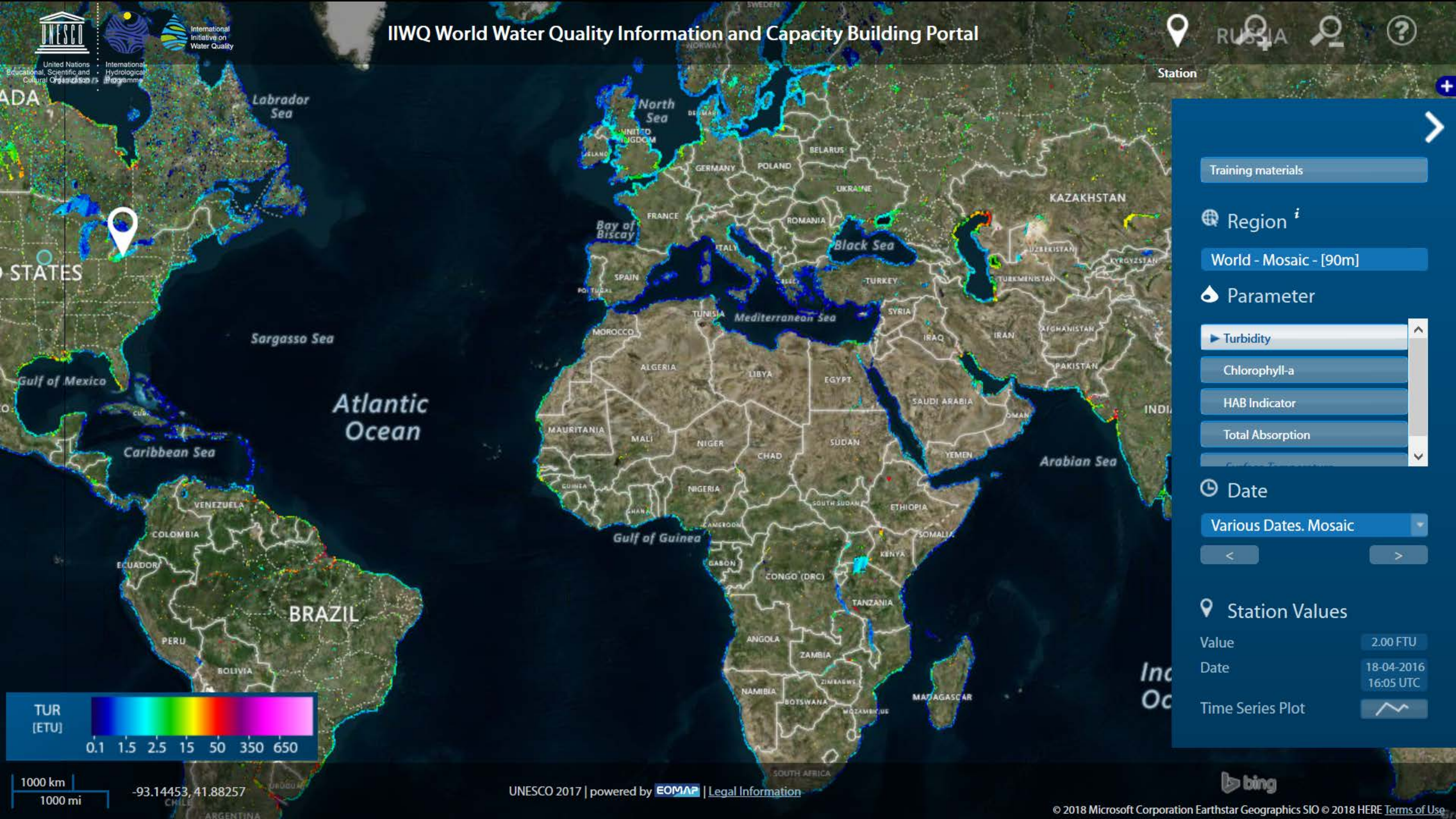
Solution  
partnership



Data  
provider

EOMAP HQ  
Seefeld/Germany





Training materials

Region <sup>i</sup>

World - Mosaic - [90m]

Parameter

Turbidity

Chlorophyll-a

HAB Indicator

Total Absorption

Date

Various Dates. Mosaic

< >

Station Values

Value 2.00 FTU

Date 18-04-2016  
16:05 UTC

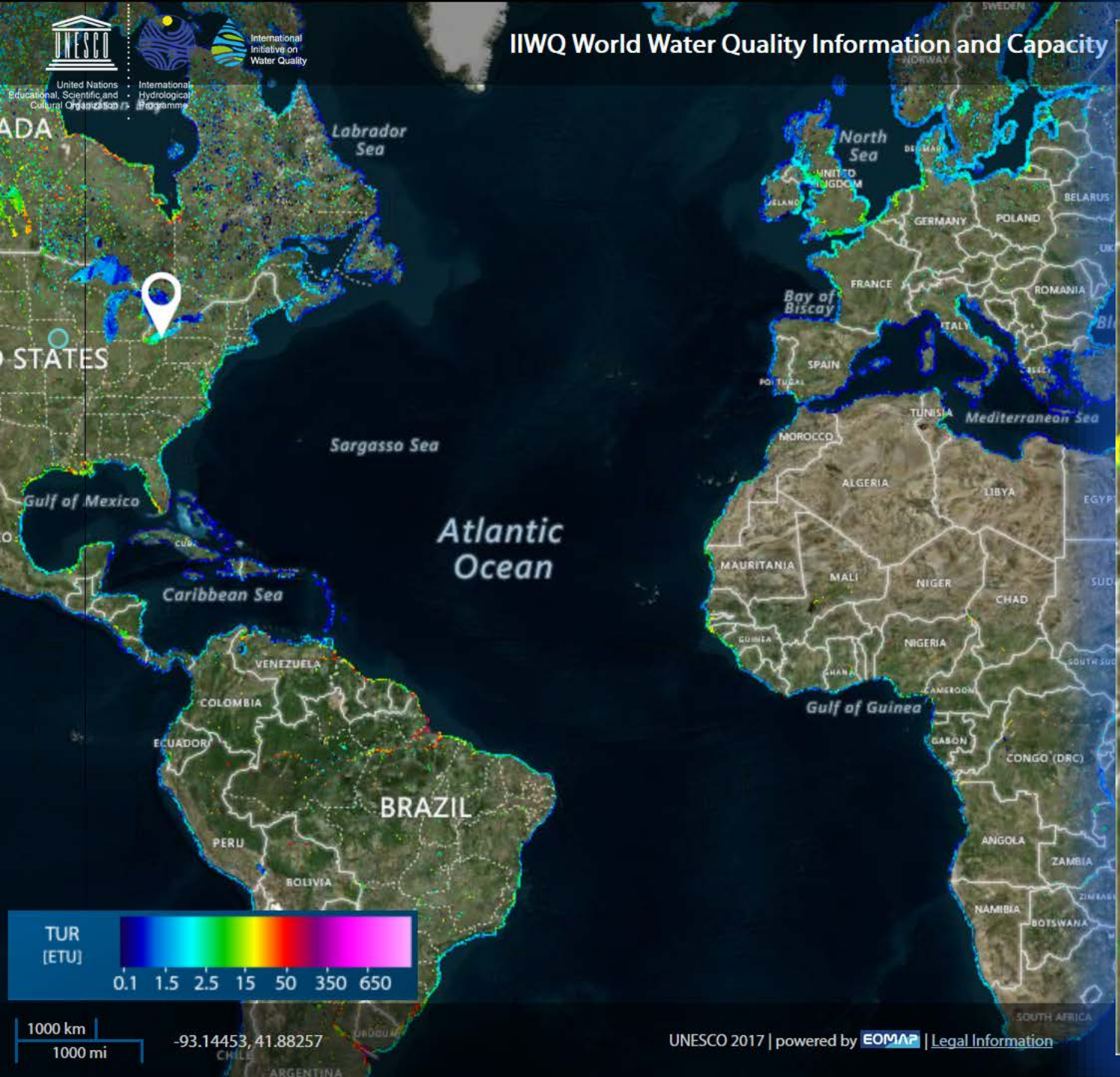
Time Series Plot 



1000 km  
1000 mi  
-93.14453, 41.88257



# IIWQ World Water Quality Information and Capacity



Station

Training materials

Region <sup>i</sup>

World - Mosaic - [90m]

Parameter

Turbidity

Chlorophyll-a

HAB Indicator





### Introduction

Welcome to UNESCO WaterQualityApp, a free online visualiser for global water quality products of all inland and coastal waters worldwide.

The online platform provides you with water quality based information for all continents including a merged global set of parameters in 90m resolution. You can also access time series products in 30m sampling resolution, for selected regions in each continent, covering the year 2016.

This application allows you to interactively browse the water quality products. Use the features on the right hand side to select your region of interest, select various water quality parameters, set any desired virtual sampling stations, gather values and time series information. A quick [information guide](#) gives a summary of how to use this portal, see also below.

To download an information booklet on these products, click [Information Booklet Water Quality Monitoring](#)

To download a training handbook covering main practical questions of using satellite based information products, click [Training handbook](#)

### How to use this Portal

Basic map tools for interacting with the map are provided on the right hand side of the top bar. Basic map tools include zooming and placing a virtual measuring station. A computer mouse can be used for panning and zooming or alternatively, interact on the touch screen of a mobile device. Virtual stations are created with a tap on the map and map sections can be moved by dragging the fingers across the screen.

The blue function bar includes the following:

- Select regions to explore individual dates and time series in 2016 or full world mosaic layers.
- Select water quality parameters (turbidity, chlorophyll-a, the harmful algae bloom indicator HAB, organic absorption or surface temperature).
- Once virtual station is set, a parameter value is shown in the value section. If you have selected the World Mosaic layer, you can view also the record date below the parameter value.

Welcome unesco: [Logout](#)

Training materials

Region <sup>i</sup>

World - Mosaic - [90m]

Parameter

Turbidity

Chlorophyll-a

HAB Index

Date

Value

2,000

Date

16:30

Time Series Plot

International Initiative on Water Quality



# IIWQ World Water Quality Information and Capacity Building Portal

## Introduction

Welcome to UNESCO WaterQualityApp, a free online visualiser for global water quality products of all inland and coastal waters worldwide.



### The IIWQ World Water Quality Portal - Whitepaper -

#### UNESCO International Initiative on Water Quality

This document is accessible through the UNESCO IIWQ World Water Quality Portal. This brochure was prepared under the coordination of Dr. Sarantuyaa Zandaryaa, Programme Specialist for Water Quality, Division of Water Sciences, UNESCO. Supported by: EOMAP GmbH & Co.KG, Seefeld / Germany. Errors and technical modification subject to change. 22 January 2018

## User Guide

### How to use the UNESCO-IHP IIWQ World Water Quality Portal

#### General Information

The portal is a user-friendly and intuitive website, that can be used like similar websites that use maps to show specific information. Please note that the portal might need a while to load and show the desired information, since the data behind consist of large geospatial datasets that need to be loaded. This depends on the speed of the user's internet connection, the browser and its cache storage. It is recommended to stay patient while using the portal and not try to rush things, since each action is interpreted as a request to the data server and needs to be run in the background.



#### Navigation

Using a computer mouse with a wheel, moving (click and pan simultaneously) and zooming (scroll the mouse wheel) the map can be achieved as the user would expect it. The same holds true for the usage of touchscreens on mobile devices, where the map can be moved by tapping, holding and moving the finger, while zooming is either achieved with a double-tap or using two fingers that spread or are brought together. Virtual stations can be set by single mouse-clicks or a single finger-tap.

Alternatively, basic tools are provided on the top right in the header bar of the portal. Once clicked, single mouse-clicks or finger-taps perform the selected task (setting a virtual station, zooming in or zooming out).



#### Main Menu

On the right-hand side, a blue function bar is included, which serves as the main menu for the selection of the region of interest, the product that shall be shown as well as information about the current virtual station and the creation of time series plots and reports. It includes:

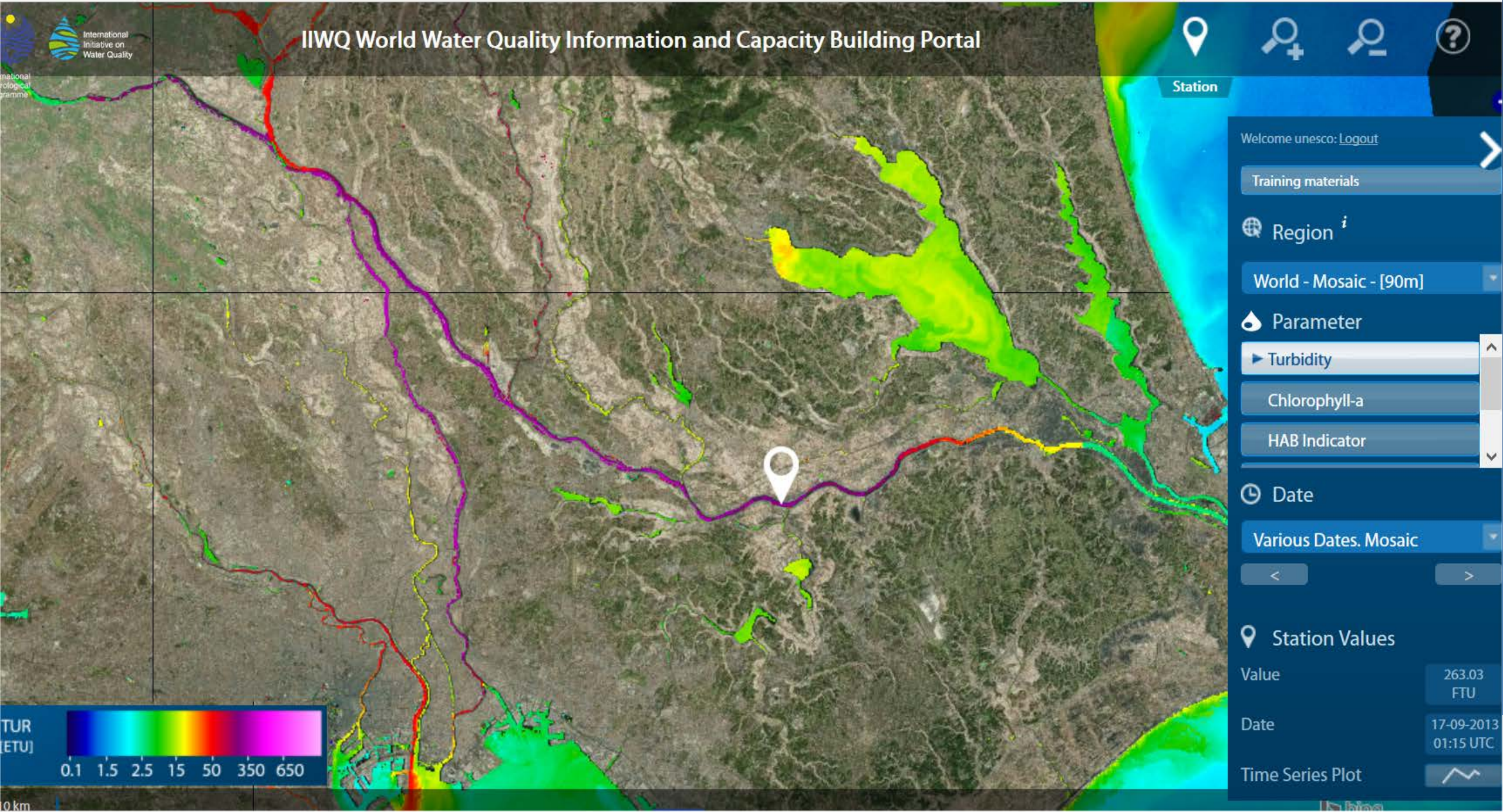


### Training handbook

"How to use Satellite-based Water Quality Information available at the UNESCO-IHP IIWQ World Water Quality Portal"

Comments from the UNESCO-IHP IIWQ Expert Advisory Group members and IHP Secretariat staff are gratefully acknowledged. This brochure was prepared under the coordination of Dr. Sarantuyaa Zandaryaa, Programme Specialist for Water Quality, Division of Water Sciences, UNESCO. Supported by: EOMAP GmbH & Co.KG, Seefeld /Germany. 22 January 2018





# IIWQ World Water Quality Information and Capacity Building Portal



Station

Location pin icon, Magnifying glass icon, Magnifying glass icon, Question mark icon

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Training materials

Region <sup>i</sup>

World - Mosaic - [90m]

Parameter

Turbidity

Chlorophyll-a

HAB Indicator

Date

Various Dates. Mosaic

<

>

Station Values

Value	263.03 FTU
-------	------------

Date	17-09-2013 01:15 UTC
------	----------------------

Time Series Plot

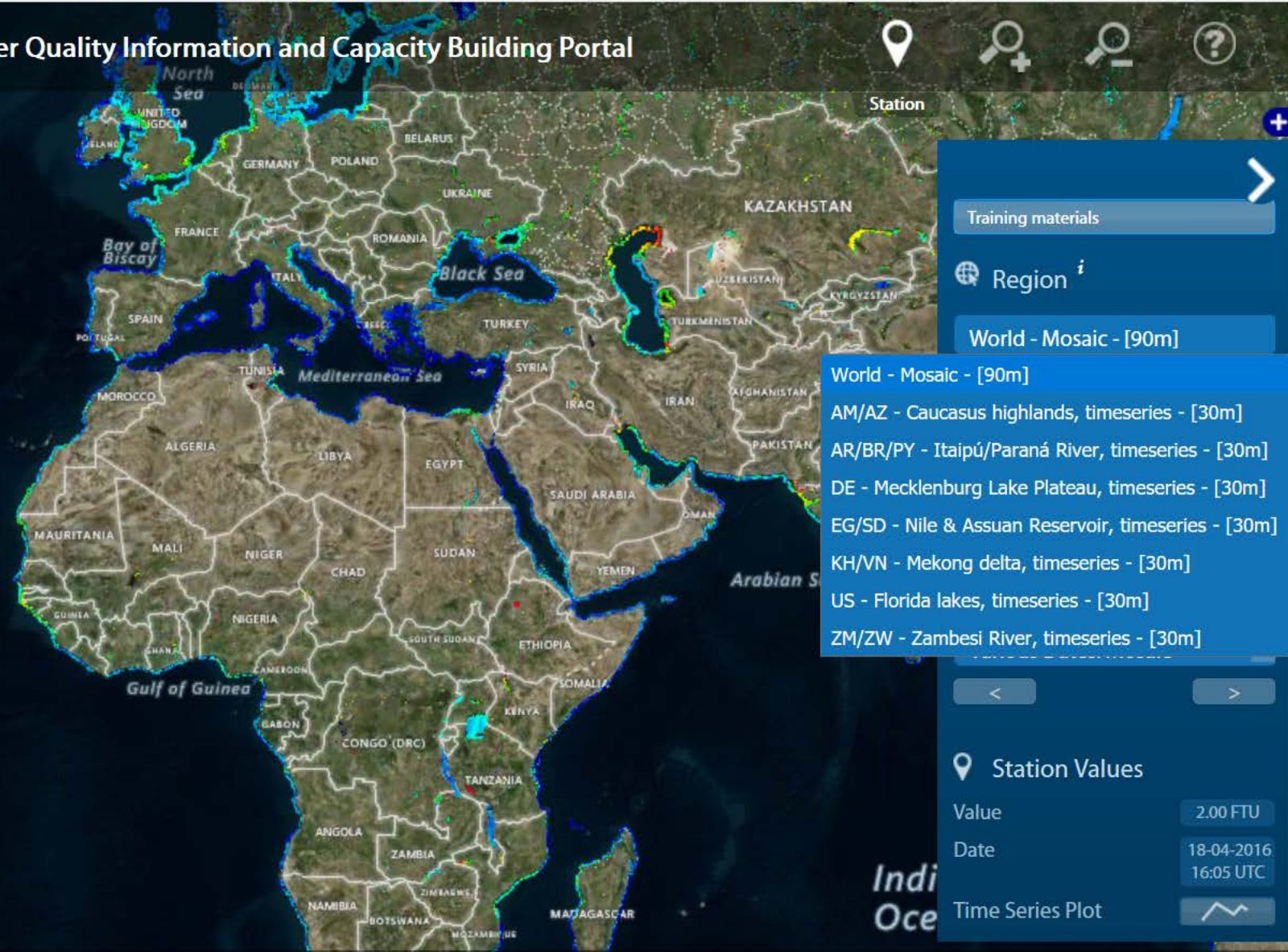


10 km





# IIWQ World Water Quality Information and Capacity Building Portal



- Training materials
- Region <sup>i</sup>
- World - Mosaic - [90m]

- World - Mosaic - [90m]
- AM/AZ - Caucasus highlands, timeseries - [30m]
- AR/BR/PY - Itaipú/Paraná River, timeseries - [30m]
- DE - Mecklenburg Lake Plateau, timeseries - [30m]
- EG/SD - Nile & Assuan Reservoir, timeseries - [30m]
- KH/VN - Mekong delta, timeseries - [30m]
- US - Florida lakes, timeseries - [30m]
- ZM/ZW - Zambesi River, timeseries - [30m]

< >

Station Values

Value 2.00 FTU

Date 18-04-2016 16:05 UTC

Time Series Plot





International Initiative on Water Quality

# IIWQ World Water Quality Information and Capacity Building Portal



Station

Welcome unesco: [Logout](#)

[Training materials](#)

[Region <sup>i</sup>](#)

[AM/AZ - Caucasus highlands, tim](#)

[Parameter](#)

Turbidity

**Chlorophyll-a**

HAB Indicator

Total Absorption

Surface Temperature

[Date](#)

[26-08-2016 07:37 Caucasus highl](#)

[Station Values](#)

Value 1.76 µg/l

Date 26-08-2016  
07:37 UTC

[Time Series Plot](#)

CHL  
[µg/l]



5 km  
2 mi

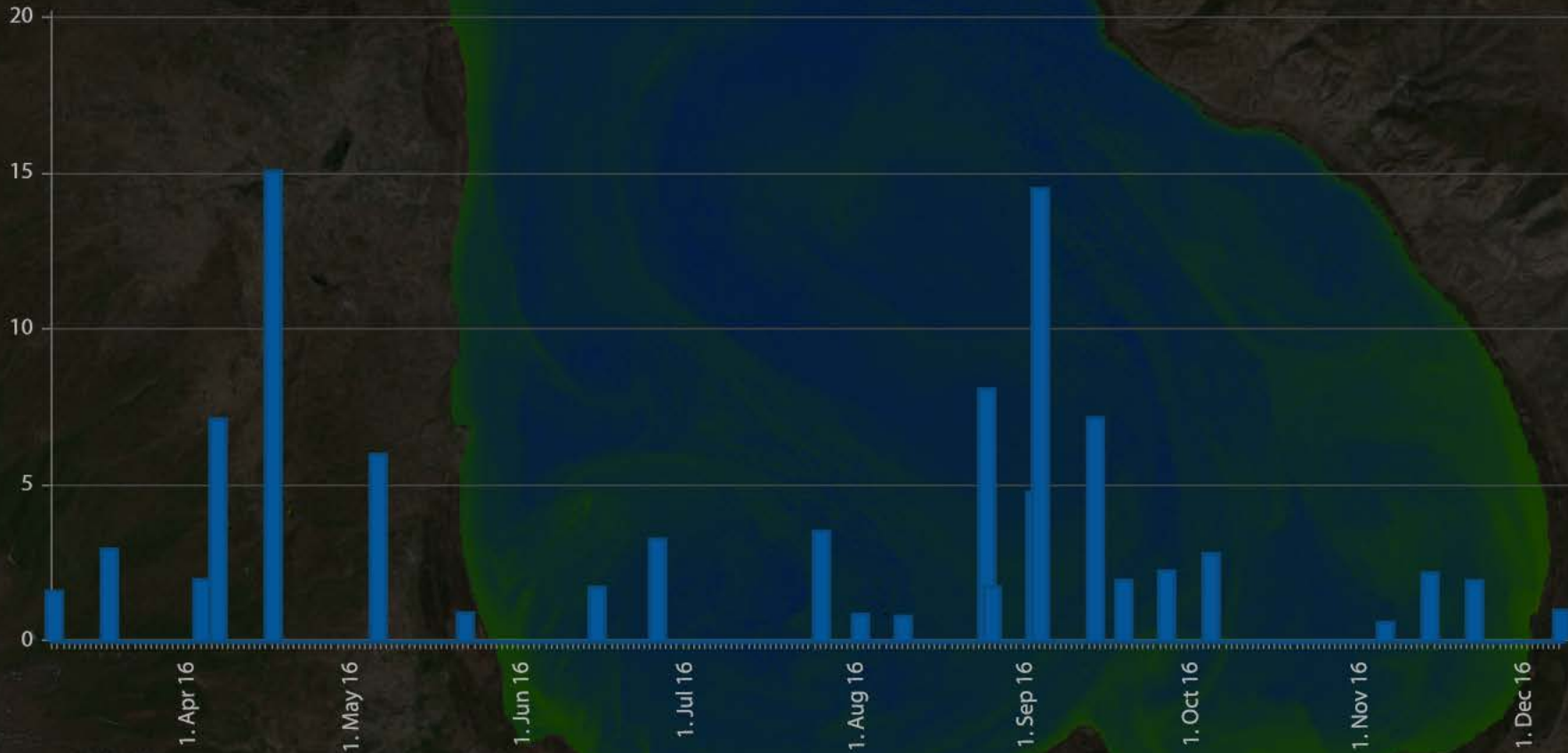
45.82753, 40.14744





Station

### Chlorophyll-a 2016



Report

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[Training materials](#)

[Region <sup>i</sup>](#)

[AM/AZ - Caucasus highlands, tim](#)

[Parameter](#)

- Turbidity
- Chlorophyll-a**
- HAB Indicator
- Total Absorption
- Surface Temperature

[Date](#)

26-08-2016 07:37 Caucasus highl

< >

[Station Values](#)

Value 1.76 µg/l  
Date 26-08-2016 07:37 UTC

[Time Series Plot](#)

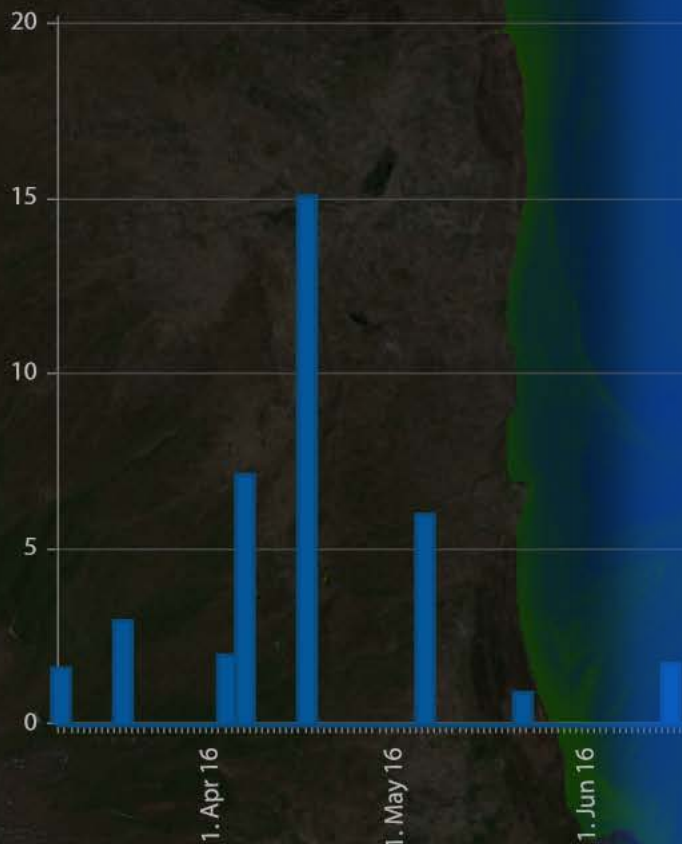
[Click here to generate a time series plot.](#)





Station

### Chlorophyll-a 2016



## 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

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Training materials

Region <sup>i</sup>

AM/AZ - Caucasus highlands, tim

Parameter

Turbidity

▶ Chlorophyll-a

HAB Indicator

Total Absorption

Surface Temperature

Date

26-08-2016 07:37 Caucasus high

Station Values

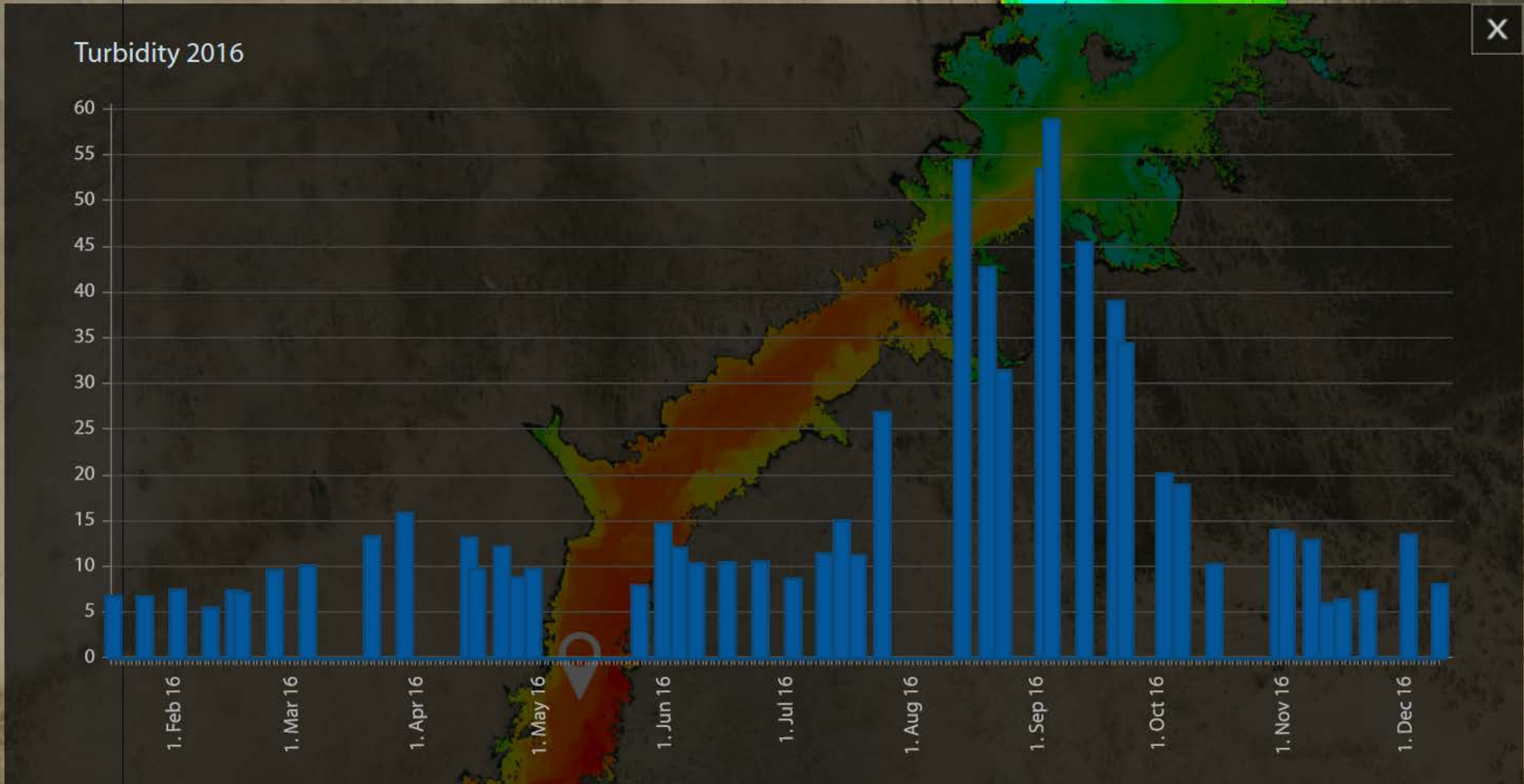
Value 1.76 µg/l

Date 26-08-2016 07:37 UTC

Time Series Plot

Click here to generate a time series plot.





Report

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[Training materials](#)

[Region <sup>i</sup>](#)

[EG/SD - Nile & Assuan Reservoir](#)

[Parameter](#)

- Turbidity
- Chlorophyll-a
- HAB Indicator
- Total Absorption
- Surface Temperature

[Date](#)

20-08-2016 08:19 Nile & Assuan R

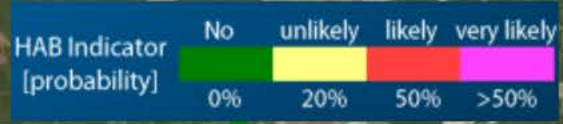
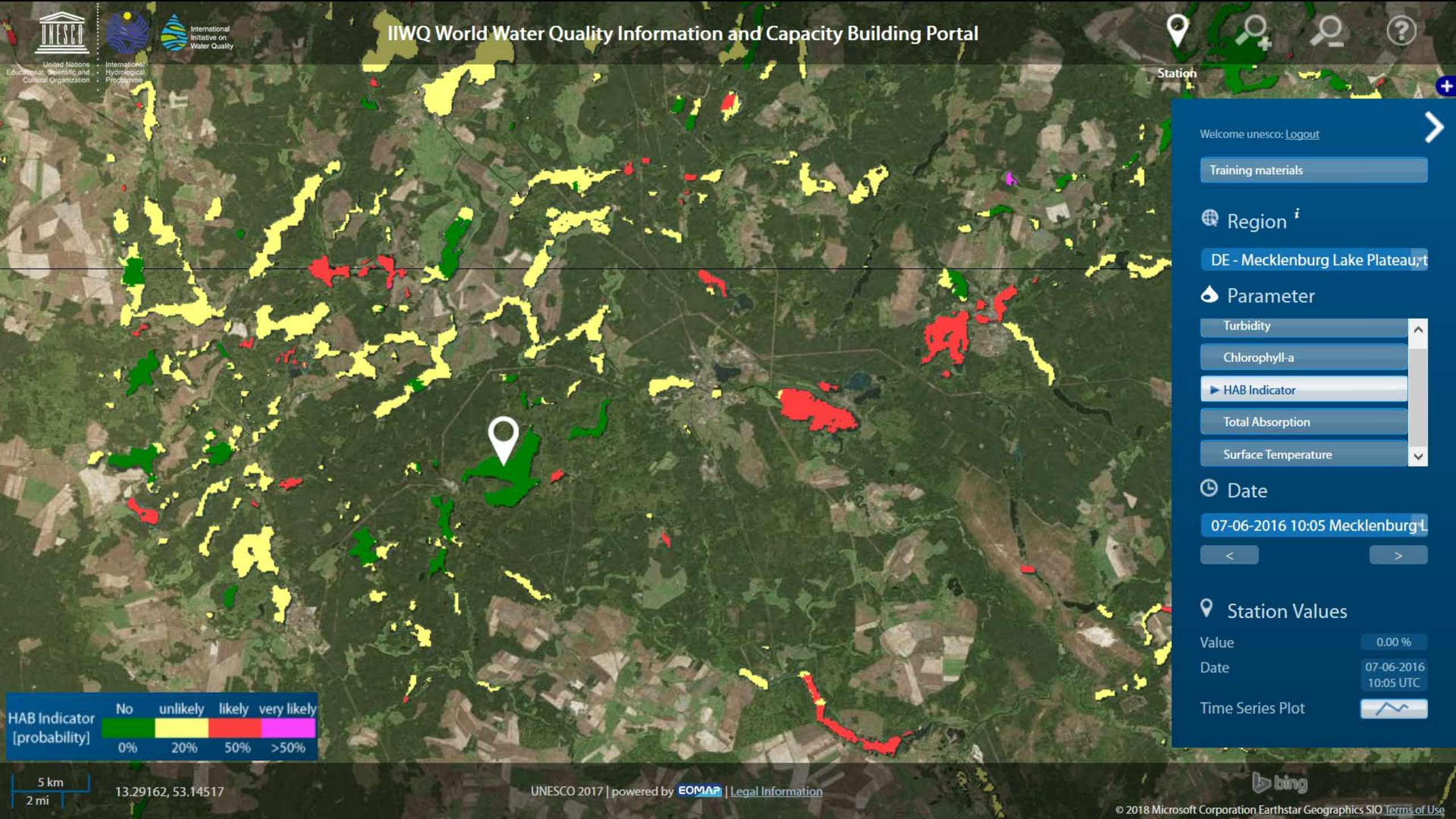
[Station Values](#)

Value: 42.77 FTU

Date: 20-08-2016 08:19 UTC

[Time Series Plot](#)





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[Training materials](#)

[Region <sup>i</sup>](#)

[DE - Mecklenburg Lake Plateau, t](#)

[Parameter](#)

- Turbidity
- Chlorophyll-a
- HAB Indicator**
- Total Absorption
- Surface Temperature

[Date](#)

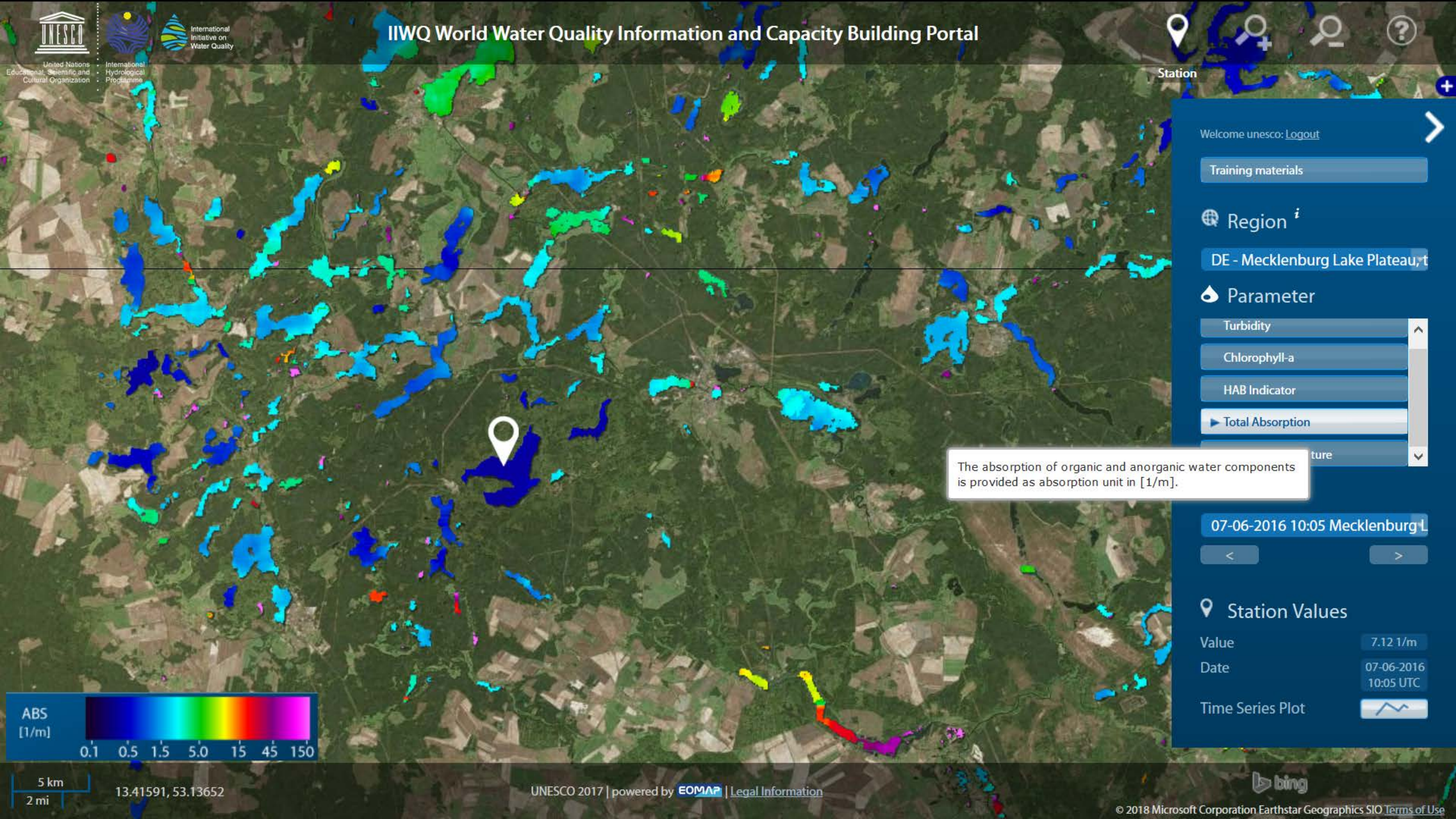
[07-06-2016 10:05 Mecklenburg L](#)

[Station Values](#)

Value	0.00 %
Date	07-06-2016 10:05 UTC

[Time Series Plot](#)





The absorption of organic and anorganic water components is provided as absorption unit in [1/m].



5 km  
2 mi

13.41591, 53.13652

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[Training materials](#)

[Region <sup>i</sup>](#)

DE - Mecklenburg Lake Plateau, t

[Parameter](#)

- Turbidity
- Chlorophyll-a
- HAB Indicator
- Total Absorption**
- ture

07-06-2016 10:05 Mecklenburg L

< >

[Station Values](#)

Value	7.12 1/m
Date	07-06-2016 10:05 UTC

[Time Series Plot](#)



# Trophic state analysis on waterbodies larger than 0,05 km<sup>2</sup> in Europe (orange = majority)

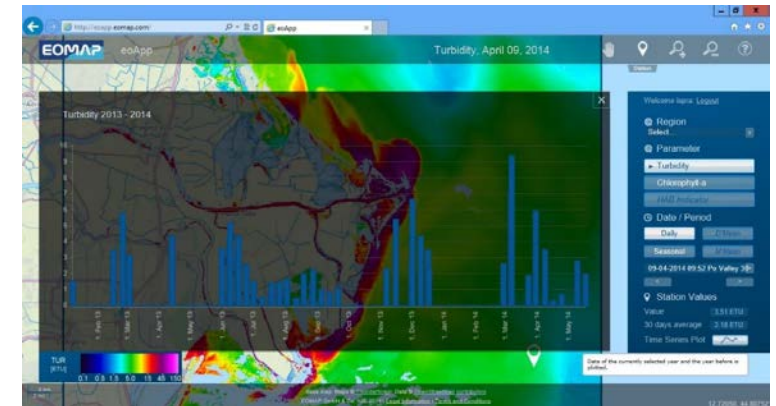
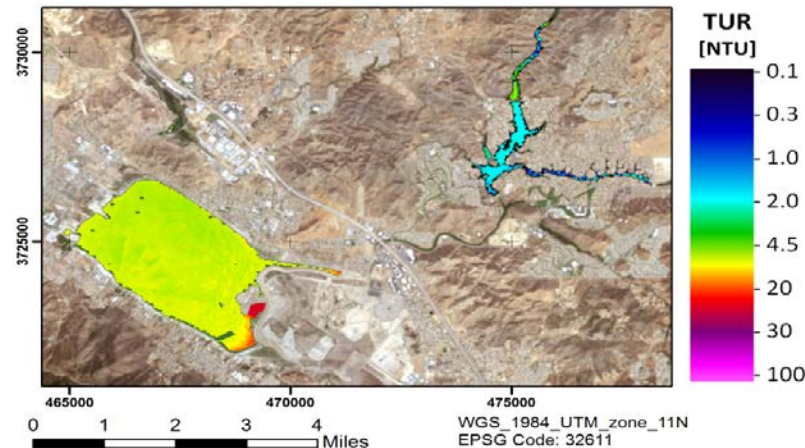
	oligotroph	mesotroph	eutroph	Hypereutroph	Count
Albania	0.00%	50.67%	40.67%	0.00%	150
Andorra	75.00%	25.00%	0.00%	0.00%	4
Armenia	0.00%	0.00%	100.00%	0.00%	1
Austria	13.90%	58.45%	16.90%	0.16%	633
Belarus	8.13%	41.80%	20.20%	0.18%	3852
Belgium	3.82%	58.36%	26.55%	0.36%	550
Bosnia & Herzegovina	3.37%	46.07%	31.46%	0.00%	89
Bulgaria	1.75%	36.86%	40.05%	0.16%	1256
Croatia	3.13%	46.18%	28.13%	0.00%	288
Cyprus	0.00%	35.48%	19.35%	0.00%	31
Czech Republic	1.17%	30.07%	48.02%	0.00%	429
Denmark	5.35%	59.59%	28.67%	0.00%	579
Estonia	13.87%	59.28%	19.24%	0.89%	447
Faroe Is.	0.00%	0.00%	0.00%	0.00%	7
Finland	50.01%	42.12%	6.11%	0.16%	23201
France	4.24%	40.29%	43.64%	0.50%	6223
Georgia	50.00%	0.00%	25.00%	0.00%	4
Germany	6.12%	66.75%	21.42%	0.11%	7596
Greece	7.89%	52.63%	28.95%	0.00%	114
Hungary	0.59%	27.55%	56.87%	0.22%	1354
Iceland	9.82%	43.52%	43.03%	1.45%	1650
Ireland	43.10%	28.57%	4.16%	1.14%	1225
Isle of Man	0.00%	50.00%	50.00%	0.00%	2
Italy	12.85%	52.81%	24.85%	0.00%	1191
Latvia	9.68%	66.11%	15.83%	0.56%	1074
Lithuania	9.55%	74.81%	11.48%	0.00%	1612
Luxembourg	8.33%	50.00%	8.33%	0.00%	12
Macedonia	3.57%	75.00%	14.29%	0.00%	28
Moldova	0.00%	8.44%	71.92%	0.00%	723
Montenegro	0.00%	74.19%	12.90%	0.00%	31
Netherlands	3.79%	43.11%	27.87%	0.16%	3136
Norway	45.27%	39.81%	6.49%	0.46%	14660
Poland	2.36%	60.68%	28.05%	0.05%	5476
Portugal	7.58%	45.49%	27.80%	0.00%	277
Romania	6.07%	37.27%	40.68%	0.32%	939

Trophic classification	Trophic State Index	Chlorophyll-a range	Color (R-G-B)
Oligotrophic	0	0.04	blue 0-0-139
	10	0.12	blue 0-0-205
	20	0.34	blue 0-0-238
	30	0.94	cyan 0-139-139
Mesotrophic	40	2.6	green 0-205-0
	50	6.4	green 0-238-0
Eutrophic	60	20	yellow 255-255-0
	70	56	orange 255-165-0
Hypereutrophic	80	154	red 238-0-0
	90	427	red 139-0-0
	100	1183	magenta 139-0-139



# Use cases: eoWater environmental monitoring services

- **Impact Assessment:** e.g. of a power plant in river Po/ Italy, for the National Italian Institute for Environmental Protection and Research – ISPRA Italy
- **Water Quality Monitoring:** Long-term monitoring of trophic status in lakes for Amec-Foster-Wheeler / USA
- **Environmental evaluation** of seasonal sediment flows for hydropower planing in Georgia for Stucky Ltd./Switzerland
- **Disaster Impact assessment** of Rio Doce Disaster for Lactec/Brazil





# Key drivers to exploit the use of space facilities

## Innovate & practical use of new environmental analytics

- ✓ **Awareness**, capacity building, marketing, e.g. global flagship showcases
- ✓ **Exchange/access to public financed data**: e.g. GEOSS, worldwaterquality portal, ...
- ✓ **Alignment** to demand
  - => Reliable, cost-efficient and quality assured products and services
  - => Push on further innovation: Market driven rather than institutional driven!
  - => Push on global comparability, standards, QC



# Roles & strength

- Public/commercial users
- Service industry
- Research institutions
- Space-Agencies
- Policy makers
- UN institutions

*Demand driver*  
*Innovation driver*

*Service-designer*

*Contractor*

*Efficiency driver*

*Basic research*

*Basic data provider*

*Capacity building*

*Pilot studies*

*Policy frame*

*International cooperation concept*

*Free market economy <> governmental services (e.g. Copernicus)*



THANK YOU

WELCOME TO:  
EOMAP HQ near Munich

EOMAP HQ  
Schloss Seefeld, DE