



Quality Water for All

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Contact Information

If interested in joining our Technical or User-Oriented working groups, the Early Career Society, or just getting involved in GEO AquaWatch, please contact us at join@aquawatch.org

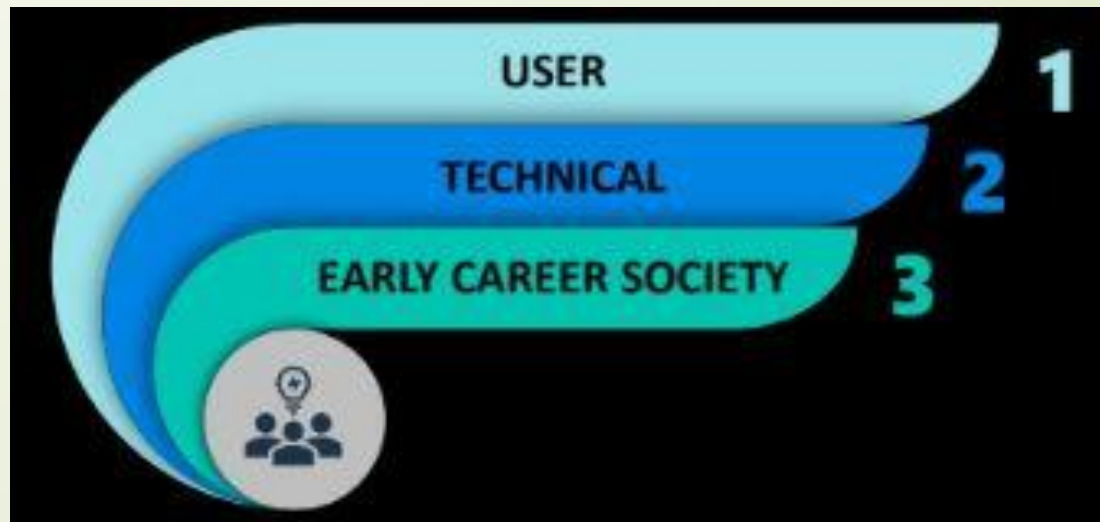
Visit our website :
www.geoaquawatch.org



AquaWatch Organizational Model



Community





A world map with countries colored in four categories: dark blue (Americas), light blue (Europe), green (Asia/Oceania), and yellow (Africa). The map shows the following distribution: Americas (dark blue) include Canada, the United States, Mexico, and countries in South America; Europe (light blue) includes all European countries; Asia/Oceania (green) includes countries in East Asia, Southeast Asia, and Australia; Africa (yellow) includes all African countries.

Africa: 27 - Asia/Oceania - 21, Europe: 34 - C.I.S: 7 - Americas: 16 **Total: 105**



GEO AquaWatch Goal

To develop and build the global capacity and utility of Earth Observation-derived water quality data, products and information to support effective monitoring, management and decision making. AquaWatch encourages activities to engage, and be led by, early career scientists.



Chesapeake Bay Buoy – NOAA Image



Lakes Mendota & Monona -University of Wisconsin SSEC image

Why?

- Water Quality is a critical global issue today
- Earth Observations (EO) are an underutilized trove of information.
- EO can frame issues and drive policy change and lead to better management practices
- New Missions, sensor technology, algorithms and processing capabilities enable remote sensing of coastal and inland waters
- Barriers to wider use include lack of knowledge about EO benefits and how to use it. Lack of products. Access is sometimes also an issue. More Capacity Building is needed.



In a survey conducted by EPA, "Almost unanimously, interviewees wanted assurance that the satellite product could be validated and include reported accuracy or error estimates for their particular waterbodies. Interviewees agreed that if a product was proved to provide an accurate measure in their particular waterbody of interest, they would be open to using those products for their monitoring, research, and assessments." (Schaeffer et al 2013)

Current AquaWatch Activities

To Strengthen Confidence in EO Water Quality Data

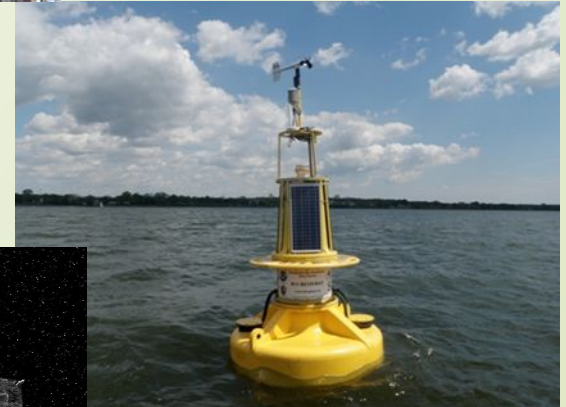
Aquatic Analysis Ready
Data

Compiling Existing Data
Sets (RealEarth Portal)

Generating New Data
Sets (Google Earth
Engine)

Coordination of Global
Validation Efforts

Development of
Knowledge Hub



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Development of Knowledge Hub

Analysis Ready Data satellite data that have been processed to a minimum set of requirements and organized into a form that allows immediate analysis with a minimum of additional user effort and interoperability both through time and with other datasets.

Increases the use and impact of satellite data and removes the data preparation burden for less experienced data users

Promotes data quality and consistency through defined specifications



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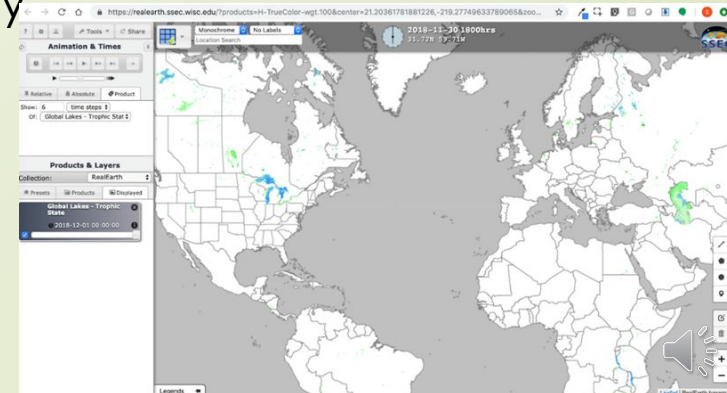
Compiling Existing Data Sets (RealEarth Portal)

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Coordination of Global Validation Efforts

Development of Knowledge Hub

- Bring together data of varying file formats, naming conventions, and columns, and transforming it into one cohesive data set
- Grab samples, buoy data, satellite products
- Visual display, time series, scroll across sources for data comparison
- Embedded in AquaWatch Website and linked to GEOSS
- Updated hourly



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Development of Global Water Quality Geospatial Products and Tools

A collaborative project between GEO AquaWatch, the World Bank, Conservation International, UNESCO and Google Earth Engine

The goal of this project is to provide a global-scale, open access, freely available fit-for-purpose chlorophyll-a, total suspended solids and colored dissolved organic matter (CDOM) water quality information for inland and coastal waters to be used by multiple end users including the science community, water resource managers, industry and the general public.



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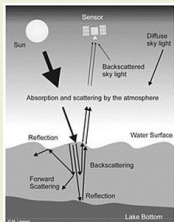
Development of Knowledge Hub

Validation of Satellite-derived Optical and Water Quality Parameters for Coastal and Inland Waters
A NASA sponsored workshop

Goal: To build a global-scale validation network

The workshop will cover a number of aspects related to validation including standardization of protocols, instrumentation needs, current validation research and operational efforts, validation metrics, interoperability of validation data.

Experts within both the remote sensing and in situ observational community



Tentatively Set for June 2021!



Current AquaWatch Activities

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Coordination of Global Validation Efforts

Development of Knowledge Hub

- Capacity Building and Training Effort
- A web-based resource where a compilation of documentation and tools are accessible and freely open to all in the water community.
- This will be a place where people from around the globe, working across this subject matter, go to exchange knowledge,
- experiences, ideas,
- and increase one's expertise.

Fair Standards

Findable
Accessible
Interoperable
Reusable

Resource types

Publications

Sources

Post-prints with DOI stored

Code, models and tools

Open source in Github with DOI. Backups.

Remote sensing data

GEOSS Platform and/or Cloud descriptions

In situ data

GEOSS Platform, Data Repository, and/or KH database

Results and products

GEOSS Platform, Data Repository, and/or KH database

Videos, Other

Directly stored in the Knowledge Hub (preferably).



Summary

- ❑ Water Quality continues to be a critical issue locally and globally
- ❑ Multiple streams of Water Quality data products generated on a daily basis.
- ❑ Acceptance of this new technology will require data quality assurances
- ❑ GEO AquaWatch is providing an important platform and forum at a critical time to address these needs



Yahara River, WI. Credits: S. Greb/U. Wisconsin



WDNR photo



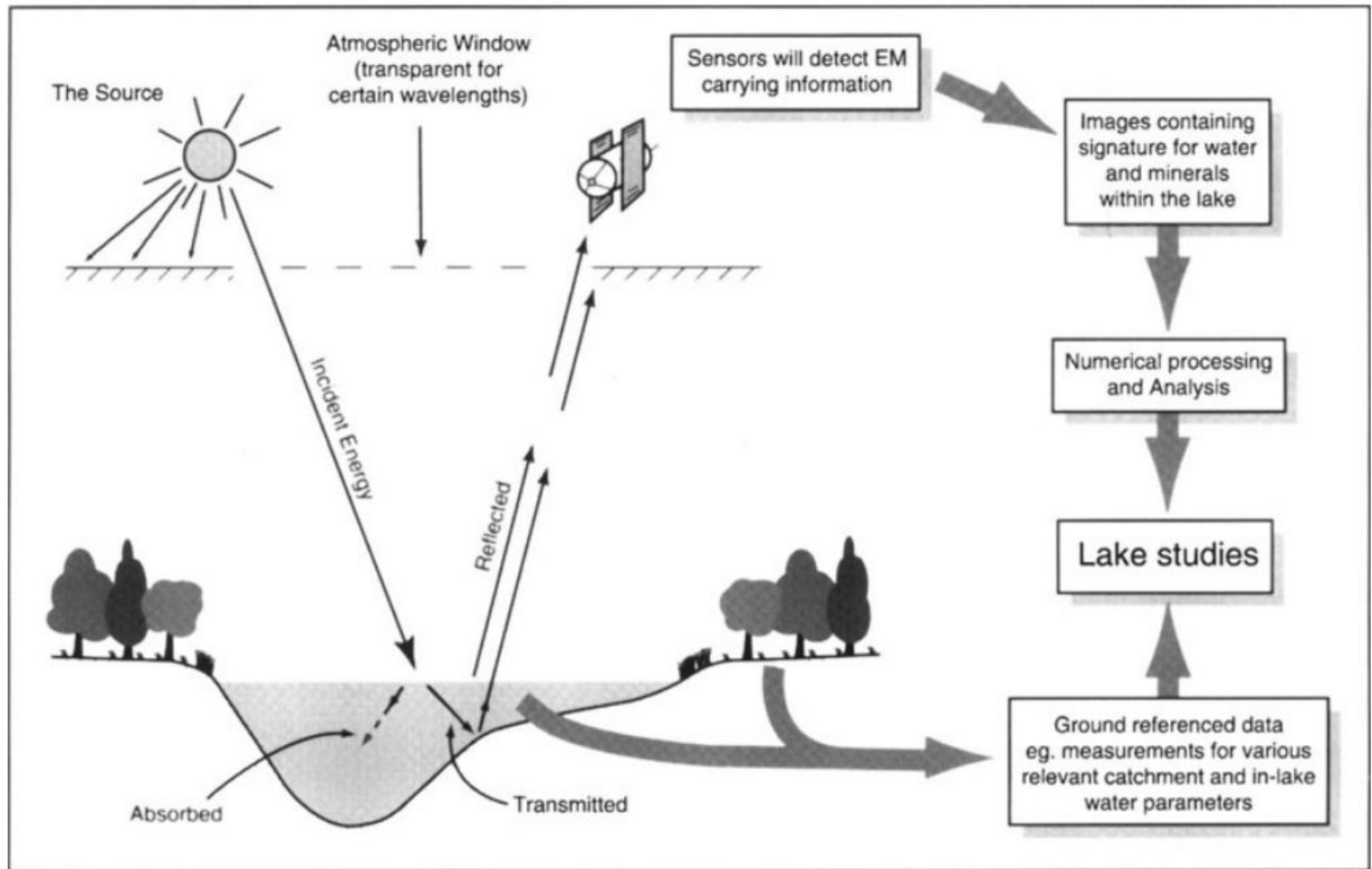
Comparison of Earth observation sensors

Comparison of Earth observation sensors suitable for water quality assessment with public access data policy

	Landsat-7	Landsat-8	Sentinel-2	Sentinel-3
Satellite and sensor details				
Satellite sensor system	ETM+	OLI/TIRS	MSI	OLCI
Spatial resolution (m)	15, 30, 60	15, 30, 100	10, 20, 60	300
Spectral Bands	8	11	12	21
Revisit cycle (days)	16	16	5	2
Swath width (km)	185	185	290	1270
Launch date	April 1999	February 2013	June 2015	Feb 2016
Years in orbit/minimum design life (years)	18/5	4/5	2/7	1/7
Suitability for water quality assessment ●-Highly Suited; ●-Suitable; ●-Potential				
CHL	●	●	●	●
CYP	●	●	●	●
TSM	●	●	●	●
CDOM	●	●	●	●
SD	●	●	●	●
K _d	●	●	●	●

CHL – Chlorophyll, **CYP** – Cyanophycocyanin, **TSM** – Total Suspended Matter, **CDOM** – Colored Dissolved Organic Matter, **SD** – Secchi Disk Transparency, **K_d** – Vertical Attenuation of Light

Suitability for water quality assessment from Dekker, A.G. & Hestir, E. L. (2012) *Evaluating the Feasibility of Systematic Inland Water Quality Monitoring with Satellite Remote Sensing*. CSIRO: Water for a Healthy Country National Research Flagship



From Baban, 1999