Monitoring Water Quality of Inland Lakes using Remote Sensing

July 18, 20, & 25, 2023

10:00-12:00 or 15:00-17:00 EDT (UTC-4)

This advanced-level training will focus on using remote sensing observations from Landsat 8 and 9, Sentinel-2, and Sentinel-3 for assessing water quality parameters, including chlorophyll-a concentration, turbidity, and Total Suspended Solids (TSS) in inland lakes. This training will also highlight the importance of in situ measurements of these parameters, coincident with satellite observations, in developing methodologies for operational water quality monitoring. Participants will perform hands-on exercises in Google Earth Engine (GEE) to access satellite data and develop methodologies to assess water quality parameters. In addition, an overview of Cyanobacteria Assessment Network (CyAN), an early warning system to assess algal blooms in freshwater lakes will be provided.

Part 1: Overview of Remote Sensing Observations to Assess Water Quality

Trainers: Amita Mehta and Sean McCartney

- Describe state-of-the art, high spatial and spectral resolution observations and their access using GEE
- Describe open source, in situ measurements of water quality parameters
- Provide information about upcoming NASA missions useful for water quality monitoring

Demonstration and Exercise:

- Introduction to GEE
- Access Landsat 8 and Sentinel-2 surface reflectance data using GEE
- Access Sentinel-3 top of the atmosphere reflectance data using GEE
- Explore and download in situ measurements of water quality parameters (chlorophyll-a concentration, turbidity, and TSS) for selected lakes

Part 2: Cyanobacteria Assessment Network (CyAN)

Trainers: Bridget Seegers, Blake Schaeffer, and Amita Mehta

- Overview and Applications of CyAN

Demonstration and Exercise:

- Explore CyAN website

Part 3: Assess Water Quality using Satellite and In Situ Observations

Trainers: Sean McCartney and Amita Mehta

- A brief review of methodologies to assess water quality from remote sensing
- Benefits and limitations of various satellite sensors for water quality monitoring
- Training summary

Demonstration and Exercise:

- Calculate spectral indices as indicators of water quality from Landsat, Sentinel-2, and Sentinel-3 observations
- Develop statistical coefficients to derive water quality parameters based on remote sensing and in situ data

ARSET empowers the global community through remote sensing training.