

Obtaining water quality products in coastal waters

The big picture

Q: Why may we not want to process ourselves remote sensing data?

Q: At what level may we want to start processing?

The different levels of processing of remote sensing

Data Level	Description
Level 0	Reconstructed, unprocessed instrument and payload data at full resolution, with all communications artifacts removed.
Level 1A	Reconstructed, unprocessed instrument data at full resolution, time-referenced, and annotated with ancillary information, including radiometric and geometric calibration coefficients and georeferencing parameters (e.g., platform ephemeris) computed and appended but not applied to L0 data.
Level 1B	L1B data are L1A data that have been processed to sensor units.
Level 1C	L1C data are L1B data that include new variables to describe the spectra.
Level 2	Derived geophysical variables at the same resolution and location as L1 source data.
Level 2A	Contains information derived from the geolocated sensor data, such as ground elevation.
Level 2B	L2B data are L2A data that have been processed to sensor units.
Level 3	Variables mapped on uniform space-time grid scales, usually with some completeness and consistency.
Level 3A	L3A data are generally periodic summaries (weekly, ten-day, monthly) of L2 products.
Level 4	Model output or results from analyses of lower-level data (e.g., variables derived from multiple measurements).

Obtaining water quality products in coastal waters

1. Why may we not want to use Giovanni or distributed NASA products in coastal environments?
2. Where are products for coastal waters?
3. What satellites missions distribute coastal data?
4. What are the steps we need to do to obtain such products?
5. What is available for us to perform those steps?

What satellites missions distribute coastal data?

1. Landsat (5,7,8) – EarthExplorer.
2. Sentinel 2A&B – ESA, Copernicus/Creodias.
3. Exploration tool: Sentinel Playground
4. Tool to get data: getOC
(<https://github.com/OceanOptics/getOC/tree/features/module>)

What other data do you think you may need?

Latency

From ESA:

The Near Real Time (NRT) timeliness implies a delivery in less than 3 hours after data acquisition. This timeliness is mainly used for marine meteorology and ocean-atmosphere gas transfer studies.

The Non-Time Critical (NTC) timeliness is typically defined for deliveries within 1 month after data acquisition. This additional delay allows consolidation of some auxiliary or ancillary data (e.g. precise orbit data) and the data are mainly used for geophysical studies and operational oceanography.

What environment would you use to process data?

1. NASA's SeaDAS.
2. ESA's SNAP.
3. Acolite.
4. Polymer (no GUI).

Other?

What do we have to think about

1. Vicarious calibration. Atmospheric correction.
2. Masks (land, clouds, cloud shadows). Flags.
3. Adjacency effects.
4. Glint.
5. Sun angle.
6. Algorithms to extract products.

Most important: validation data

Getting water quality parameters from Sentinel 2 – in Acolite

1. Highest resolution.
2. Generate products as well as Rrs.
3. Subset region.
4. Has default atmospheric parameters that can be changed.

Getting temperature from Landsat 8 – in Matlab

1. Why should you care about SST?
2. What are the data sources for SST?
3. Example: running script to obtain temperature for Collin's buoy (Level 2 collection 2).