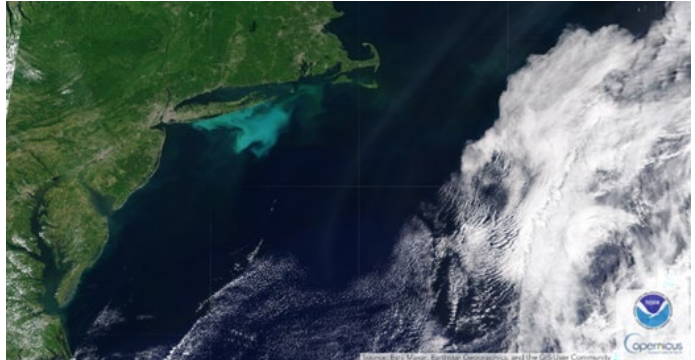


CDAT Tutorial: Ocean Color & Water Quality

Create a map of Chlorophyll in Long Island Sound and analyze how chlorophyll changes from west to east across the sound.

Chlorophyll-a is a widely used proxy for phytoplankton biomass and an indicator for changes in phytoplankton production. As an essential source of energy in the marine environment, the extent and availability of phytoplankton biomass can be highly influential for fisheries production. Changes in phytoplankton biomass are predominantly affected by changes in nutrient availability, through either natural (e.g., turbulent ocean mixing) or anthropogenic (e.g., agricultural runoff) processes.



Research Question:

How does chlorophyll-a concentrations across Long Island sound spatially vary during the summer bloom? Does increased nutrient loading in the western section derive a larger bloom?

DOWNLOAD DATA

1. Download the exercise dataset from the [class website](#) under “Participant Exercise 1: CDAT Files.” The CDAT Files folder contains:
 - a. LIS_WQ_exercise_1_June2022 **netcdf file**
 - i. This dataset is a monthly composite of water quality parameters (chlor_a, cdom, doc, spm) retrieved from the OLCI instrument on the Sentinel-3 satellite over the month of June 2022.
 - b. LIS_subregions **zip file**
 - i. This is a shapefile (vector data format) containing three polygons that partition the Long Island Sound into three subregions, the Eastern LIS, Central LIS and Western LIS (which includes the Narrows and West LIS). These subregions are based on the [Save the Sound reporting regions](#).
2. Unzip (extract) the LIS_subregions zip file, producing a folder containing the components of the shapefile.
3. Make of note of where you placed the data file and the shapefile folder.

CREATE MAP

1. Open the CoastWatch Data Analysis Tool (CDAT) application.
2. Open the file: LIS_WQ_exercise_1_June2022.nc
 - a. Select the variable: chlor_a
 - b. Select a color palette of your choosing.
 - c. Set the min and max range of data values so regions of low and high chlorophyll can be easily distinguished. Explore whether a linear or log10 function works better to display the data. You may need to reset the min and max depending on your function choice. *There is no right answer: your display or analysis needs dictate how the data should be shown.*
3. Zoom/pan to show Long Island Sound.
4. Add overlays.
 - a. Add a coastline.
 - b. Add the shapefile as an overlay: LIS_subregions.shp
 - c. Decide if you want to add latitude-longitude gridlines.
 - d. Set overlay line colors and other overlay properties.

Use the Help buttons if you get stuck. If you get really stuck, use the raise hand feature in the video conference, and the instructors will set up a breakout group to provide help.

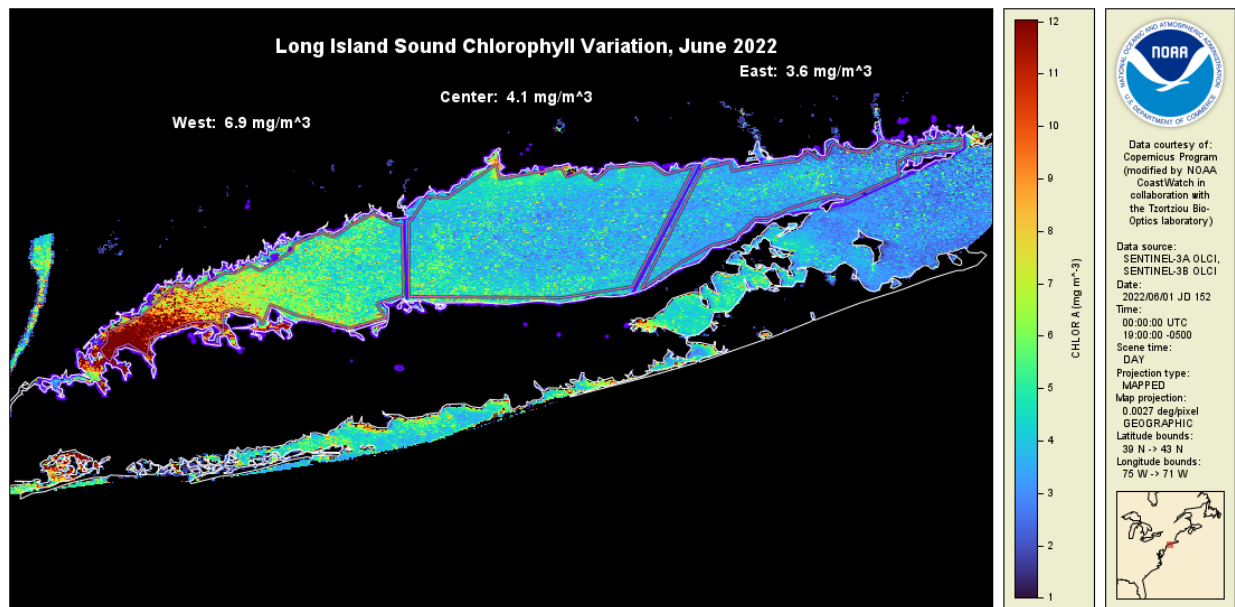
DATA ANALYSIS

1. Survey each of the 3 regions by drawing a polygon (approximately) around or within each region. It is your decision how exact or approximate to be.
 - a. Using the survey results tab, make a note of the mean chlorophyll value for each of the 3 polygon surveys.
2. Use a line survey to draw a transect from west to east across the sound. By selecting the line survey's Plot tab, view how chlorophyll changes along the sound. This is for your information and is not part of the map you are creating.
3. Add text annotations to the map to describe your analysis results
 - a. Write the mean chlorophyll value for each region onto your map.
 - b. Add a title for your map/analysis project.
 - c. If needed, add descriptive information for your audience to understand the data source or the goals of this analysis. For example, "Sentinel-3 OLCI chlorophyll from the Tzortziou lab, CUNY". Remember the satellite, sensor, date and other information will be automatically supplied in the

information legend when exporting the map to an image format (but you can deselect the information legend using Export > Options).

EXPORT THE MAP & COMPLETE THE EXERCISE

1. Export the map as a PNG image.
2. Complete the exercise by emailing your PNG image to coastwatch.info@noaa.gov with the Subject line: **CWTRAINING** (case sensitive).
3. Here is a sample of what your map could look like, but please make your map your own. There is no need to copy exactly what is shown here. *Note: your regional chlorophyll averages will likely be different than shown here.*



If you do not finish in the allotted exercise time, please send what you have. You can return to this guide another time. And the software and Help resources are always available for you to explore tools and features of the software.