

Finding Microbe Needles in a Haystack of Oceans

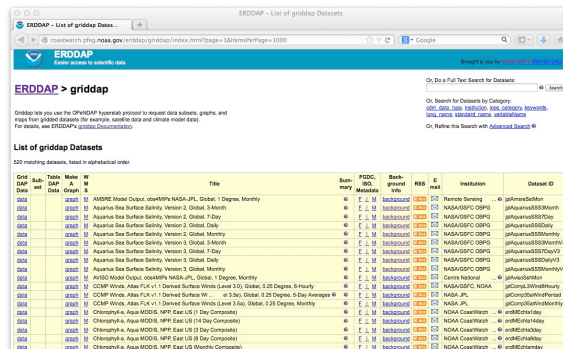
QUESTION: How do scientists locate specific types of ocean microbes when the ocean is so big?

HYPOTHESIS: _____

TEST YOUR HYPOTHESIS:

Download a NOAA Coast Watch Sea Surface Temperature (SST) Map for the area of interest. (See *Coastwatch SST Map Directions Handout*.)

1. Go to the Coastwatch webpage to locate the map area you want to use in this activity: coastwatch.pfeg.noaa.gov/erddap/griddap/index.html?page=1&itemsPerPage=1000 (Screenshot)



The screenshot shows the ERDDAP web interface with a search bar and a list of datasets. The list includes columns for Grid, Date, File, and Dataset ID. The datasets listed include AVHRR Model Output, Aquarius Sea Surface Salinity, and various NOAA datasets.

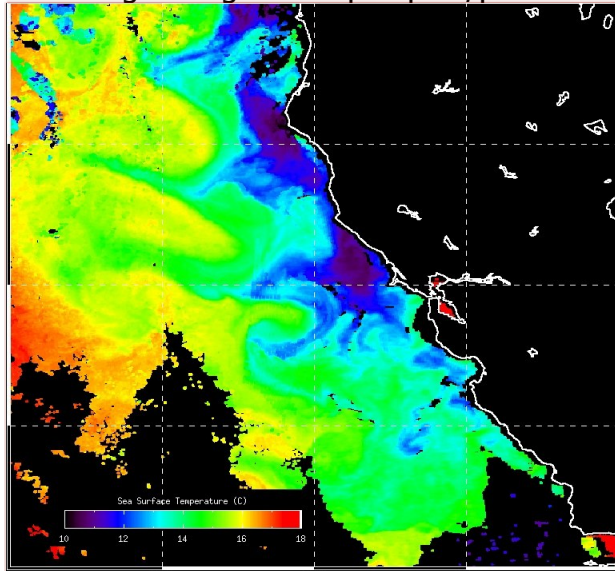
Grid	Date	File	Dataset ID
0502	0502	AVHRR Model Output, coastwatch NOAA_P1, Global, 1 Degree, Monthly	g05Avhrr0502m01
0502	0502	Aquarius Sea Surface Salinity, Version 2, Global, 3 Month	g05Aquarius0502m03
0502	0502	Aquarius Sea Surface Salinity, Version 2, Global, 1 Day	g05Aquarius0502d01
0502	0502	Aquarius Sea Surface Salinity, Version 2, Global, Monthly	g05Aquarius0502m01
0502	0502	Aquarius Sea Surface Salinity, Version 3, Global, 3 Month	g05Aquarius0502m03
0502	0502	Aquarius Sea Surface Salinity, Version 3, Global, 1 Day	g05Aquarius0502d01
0502	0502	Aquarius Sea Surface Salinity, Version 3, Global, Monthly	g05Aquarius0502m01
0502	0502	AVHRR Model Output, coastwatch NOAA_P1, Global, 1 Degree, Monthly	g05Avhrr0502m01
0502	0502	OSMP Week, Atlas FLX V1, 1 Degree Surface, Level 200, Global, 2 1/2 Degree, 6 Hourly	g05OSMP0502w01
0502	0502	OSMP Week, Atlas FLX V1, 1 Degree Surface, Level 200, Global, 2 1/2 Degree, 5 Day Averages	g05OSMP0502w05
0502	0502	Chlorophyll-a, Aqua MODIS, NPP, East US (1 Day Composite)	g05Chlorophyll0502d01
0502	0502	Chlorophyll-a, Aqua MODIS, NPP, East US (14 Day Composite)	g05Chlorophyll0502d14
0502	0502	Chlorophyll-a, Aqua MODIS, NPP, East US (3 Day Composite)	g05Chlorophyll0502d03
0502	0502	Chlorophyll-a, Aqua MODIS, NPP, East US (3 Day Composite)	g05Chlorophyll0502d03
0502	0502	Chlorophyll-a, Aqua MODIS, NPP, East US (Monthly Composite)	g05Chlorophyll0502m01

2. Scroll through the list to locate the region and data set you will use to generate your map. **Locate and Select:** *SST, POES AVHRR, LAC, West US, Day and Night (1 Day Composite)* **GRAPH** to review the scale and data being projected in the image. Copy and paste the image below:

Helpful Hints:

- ★ Synecococcus: Low nutrient environments
- ★ Prochlorococcus: Low nutrient environments
- ★ Diatoms: High nutrients, including iron (released through volcanic activity, erosion from land, and upwelling - especially along wide continental shelves)

ANALYZE YOUR RESULTS: Use your knowledge of SST and Satellite Mapping to help you identify the best locations to find various microbial organisms on the map below. (Correlate the latitude and longitude readings using the map copied/pasted above.)



Use "Helpful Hint" Cards with the SST Map(s) to determine the most likely areas where each species of phytoplankton would be found. Place markers for each species on the map and note the latitude and longitude coordinates where the ship should transit for investigation. Record your data in the table:

Microbial Organism	Latitude	Longitude
Synechococcus		
Prochlorococcus		
Diatoms		

DRAW CONCLUSIONS: (Readdress the lab question and your hypothesis, then describe your findings. Key terms/concepts: remote sensing, satellites, Sea Surface Temperature (SST), microbial organisms, biogeochemical cycles)
