
My NASA Data - GLOBE Connections

GLOBE Protocol Bundle: Water Quality



Water Quality

Water quality in general cannot be measured using remote sensing, so the data that GLOBE scientists, teachers, and students collect are vital and help us to become better informed and engaged stewards for the water in our environment. By taking measurements following the protocols in this bundle the GLOBE community will learn about water in their local environment and can collaborate with others around the world. There is no end to what we can achieve through collaboration and cooperation! ([Source: GLOBE Water Quality Bundle](#))

Related Earth System Data Explorer datasets:

Explore the MND GLOBE Connections Datasets spreadsheet to review the range of datasets available to integrate with GLOBE Protocol Bundle research by visiting the [link](#).

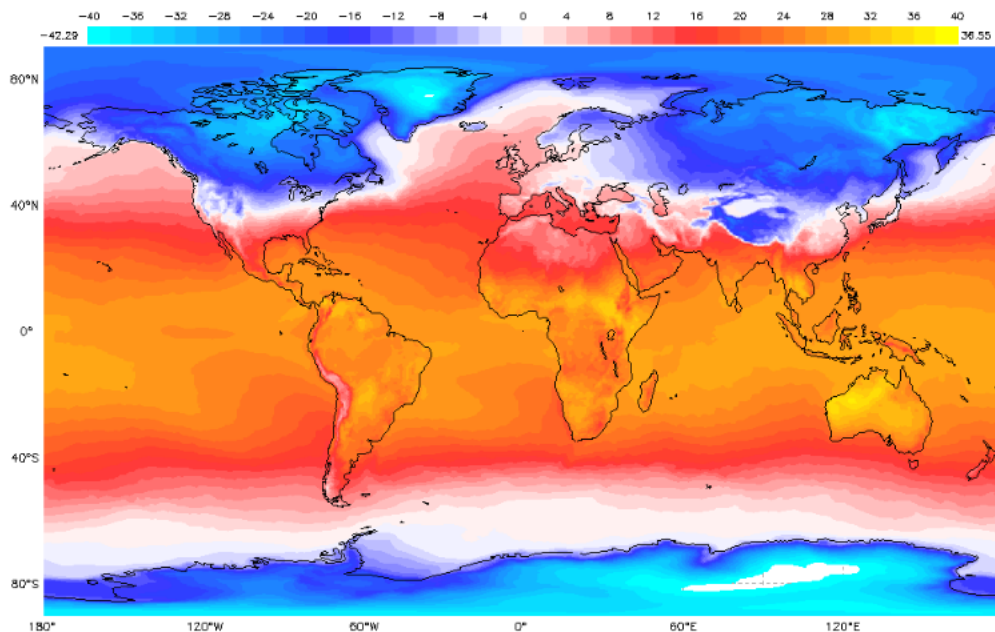
GLOBE Protocol & Protocol Bundles and Related Earth System Data Explorer Datasets

Sphere/Data Set	Air Quality	ENSO	Mosquitos	Oceans	Rivers and Lakes	Soil	Urban	Water Cycle	Water Quality	Weather
Atmosphere										
Monthly Water Vapor in the Atmosphere	X	X	X	X	X	X	X	X	X	X
Daily High Cloud Coverage	X	X	X	X	X	X	X	X	X	X
Daily Low Cloud Coverage	X	X	X	X	X	X	X	X	X	X
Daily Total Cloud Coverage	X	X	X	X	X	X	X	X	X	X
Daily Surface Air Temperature	X	X	X	X	X	X	X	X	X	X
Daily Middle Cloud Coverage	X	X	X	X	X	X	X	X	X	X
Daily Precipitation Amount	X	X	X	X	X	X	X	X	X	X
Monthly Aerosol Optical Depth	X			X						
Monthly Air Column Concentration of CO	X									
Monthly Air Column Concentration of NO2	X									
Monthly Air Column Concentration Anomaly of NO2	X									
Monthly Air Column Concentration of SO2	X		X	X	X				X	
Monthly Albedo Measured from Space										
Monthly Concentration of CO2 in Troposphere										
Monthly Low Cloud Coverage	X	X	X	X	X	X	X	X	X	X

Dataset Recommendations and Rationale:

Air temperature and surface data sets allow students to explore monthly temperature averages for air and Earth's surface. They can also investigate relationships between water temperature, air temperature and surface temperatures.

- **Daily Surface Air Temperature**
- **Monthly Surface Air Temperature**
- **Monthly Surface Air Temperature Anomaly**
- **Monthly Daytime Surface (Skin) Temperature**
- **Monthly Nighttime Surface (Skin) Temperature**

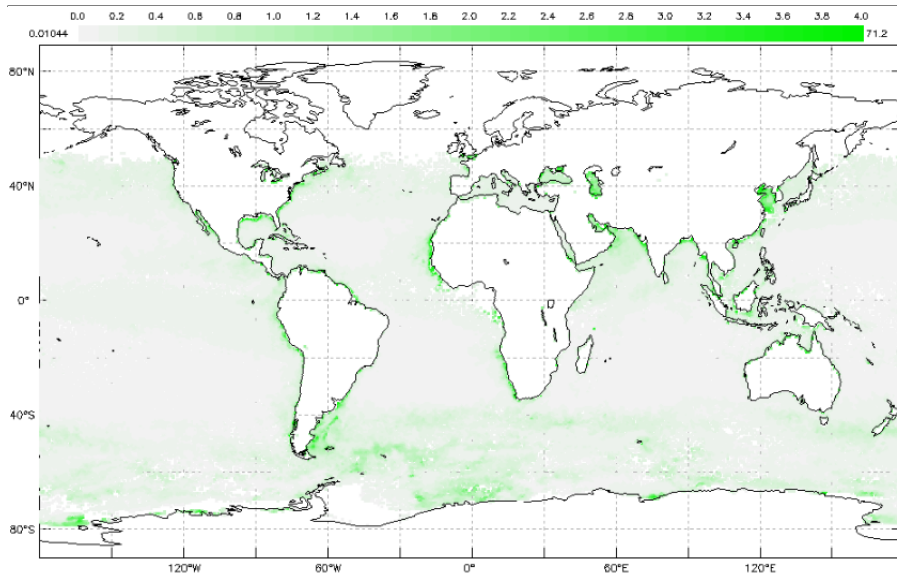


Earth System Data Explorer -

Monthly Surface Air Temperature - February 2019

Dissolved oxygen, nitrates and transparency are related to chlorophyll levels.

- **Monthly Chlorophyll Concentration**

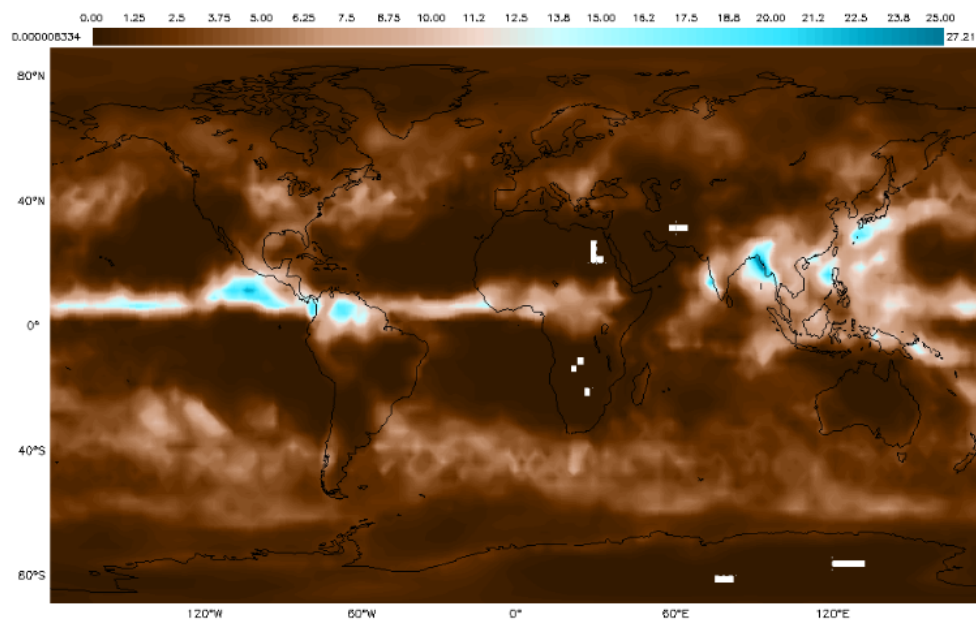


My NASA Data - Monthly

Chlorophyll Concentration January 2019

Precipitation can impact water quality. These data are complemented by cloud data and water vapor data.

- **Daily High Cloud Coverage**
- **Daily Low Cloud Coverage**
- **Daily Middle Cloud Coverage**
- **Daily Total Cloud Coverage**
- **Monthly Low Cloud Coverage**
- **Monthly Total Cloud Coverage**
- **Monthly Water Vapor in the Atmosphere**
- **Daily Precipitation Amount**
- **Monthly Average Precipitation Rate**



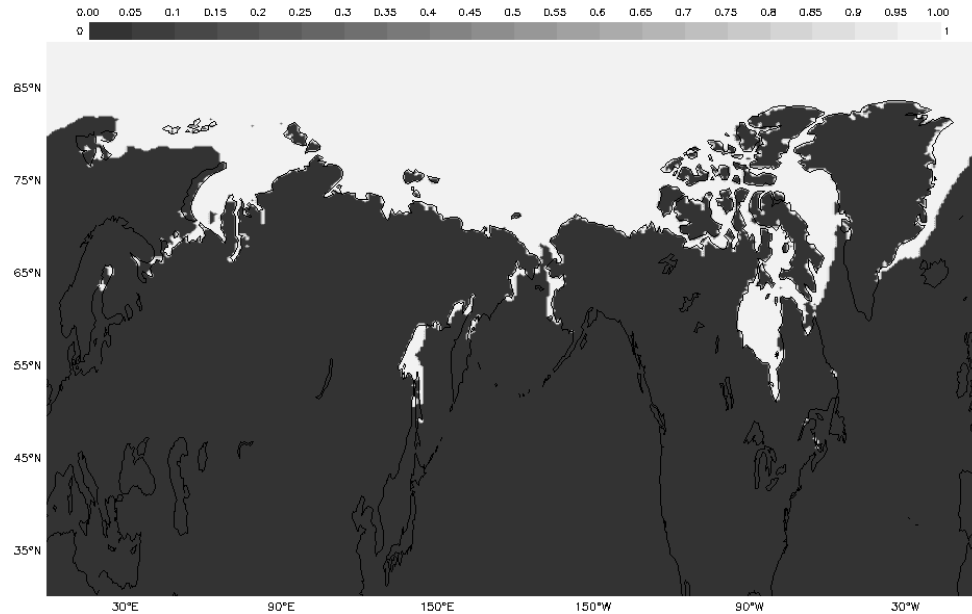
Earth System Data Explorer -

Monthly Precipitation - June 2018

Salinity can be influenced by sea ice melt among other factors. These data show the monthly

average sea ice extent across the Northern Hemisphere. The areas in white are where ice is at least partially covering the ocean surface (at least 15% coverage). The formation of sea ice greatly increases the salinity and density of the water at remaining at the surface of the ocean, causing the water to sink.

- **Monthly Sea Ice Extent (Northern Hemisphere)**
- **Monthly Sea Surface Salinity**



My NASA Data - Monthly Sea

Ice Extent - December 2017

GLOBE Protocols Included:

- Atmosphere
 - [Precipitation](#) (including pH) - To determine the amount of moisture input to the local environment by measuring rain and snowfall and to measure the pH of precipitation.
- Hydrosphere
 - [Alkalinity](#) - Students will measure the alkalinity of water using an alkalinity test kit.
 - [Conductivity](#) - Students will measure the electrical conductivity of water at freshwater hydrology sites.
 - [Dissolved Oxygen](#) - Students will measure dissolved oxygen in the water at their site using a dissolved oxygen test kit or probe.
 - [Freshwater Macroinvertebrates](#) - Students will collect, identify, and count macroinvertebrates at freshwater hydrology sites.
 - [Nitrates](#) - Students will measure the nitrate/nitrogen content of water using a nitrate test kit.
 - [pH](#) - Students will measure the pH of the water using either pH paper or a pH meter.
 - [Salinity \(Including Titration\)](#) - Students will measure the salinity of a salty or brackish water sample using a hydrometer and thermometer.
 - [Water Temperature](#) - Students will measure the temperature of the water.
 - [Water Transparency](#) - Students will first measure water transparency at their undisturbed study site using a transparency tube or Secchi disk.
- Pedosphere (Geosphere)

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- [Soil pH](#) - Students will prepare a one-to-one mixture of dry soil and distilled water and then measure the pH of the liquid left after most of the soil has settled to the bottom of the mixture.