Collection of nutrient and hydrographic data from the greater Gulf of Maine region for use in driving the associated models (Phytoplankton Blooms project)

Website: https://www.bco-dmo.org/dataset/473191
Data Type: model results
Version: 18 Dec 2013
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Project
» Interannual Variability of Coastal Phytoplankton Blooms in the Gulf of Maine and Their Relationships to Local and Remote Forcings (Phytoplankton Blooms)

Contributors	Affiliation	Role
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Dataset Description

This is a database/archive of nutrient and hydrographic data collected in the greater Gulf of Maine region. It is intended to be a 'nutrient' database, however temperature, salinity, and nitrate (reported as either NO_3 or NO_3+NO_2) are included as variables, which may or may not include corresponding silicate or phosphate. Read more about these data from Rebuck et al. (2009).

Data include: month; day; year; decimal longitude; decimal latitude; bottom depth; sample depth; temperature; salinity; NO_3+NO_2; $Si(OH)_4$; PO_4; extracted chlorophyll; and quality flags.

Note: The "Get Data" button, above, goes to an external site where the data are hosted: http://grampus.umeoce.maine.edu/nutrients/#Data (From there, click on "RebuckGoMaineNutrients.txt" to get to the data.)

Methods & Sampling

The nutrient data mining effort was led by D. Townsend (UMaine). After a careful calibration, those nutrient data were compiled into a database. The database includes more than 100,000 samples. The majority of data comes from two public sources: the World Ocean Database maintained at the National Oceanographic Data Center, and data assembled at the Marine Environmental Science Division at the Bedford Institute of Oceanography and the Marine Environmental Data Service in Ottawa, both a part of the Department of Fisheries and Oceans Canada. The two public sources were supplemented with additional data that have remained in provisional or unreleased status. More information is available on the project website and from Rebuck et al. (2009).

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Parameters

Parameter	Description	Units
Other	Refer to http://grampus.umeoce.maine.edu/nutrients/#Data for information about parameters.	n/a

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Project Information

Interannual Variability of Coastal Phytoplankton Blooms in the Gulf of Maine and Their Relationships to Local and Remote Forcings (Phytoplankton Blooms)

Website: http://www.whoi.edu/sbl/liteSite.do?litesiteid=22693&articleId=34467

Coverage: Northwest Atlantic, Gulf of Maine

Description from NSF Award Abstract:
The aim of this project is to explore the interaction of remote climate based forcing with local forcing to impact phytoplankton blooms in coastal and shelf regions with a coupled biological-physical model. Phytoplankton bloom dynamics are a classic example of biological-physical interactions in the ocean (Gran and Braarud, 1935; Sverdrup, 1953). Yet it is still a challenge to identify the dominant processes controlling the interannual variability of phytoplankton blooms in coastal and shelf seas where multiple-scale biological and physical processes interact. The unstructured-grid, finite-volume, coastal ocean model (FVCOM, built within the GLOBEC Georges Bank Program) bridges the multi-scale physical processes of the Gulf of Maine and includes both local and remote forcing. Twelve years of prognostic simulation and assimilation experiment products, with careful comparison/validation with field measurements, provide a unique background and tools with which to explore the interannual variability of ecosystem dynamics in the Gulf of Maine. **This project will examine relationships between the dynamics of spring and fall phytoplankton blooms in the Gulf and local and remote forcing. A specific focus is the variability Scotian Shelf Water and Slope Water inflows.** A series of numerical experiments will be conducted to test long-standing and recently-proposed hypotheses, including the impact of the North Atlantic Oscillation as it influences Warm Slope Water versus Labrador Slope Water dynamics, which in turn affect nutrient fluxes to the Gulf of Maine and vertical fluxes between surface and deep waters. The influence of surface water freshening (related to Scotian Shelf Water inflow, in turn believed to be affected by global warming) on the vertical density structure of the water column, winter convection, and consequently, the timing/magnitude of blooms, will also be addressed. The process-oriented coupled biological and physical model experiments will focus on the date-rich period 1998-2001 when pronounced large-scale forcing conditions occurred.

Providing new insights into the influence of large-scale forcing on the dynamics and productivity of coastal ocean ecosystems will be a significant advance in our understanding of phytoplankton blooms dynamics, which has been traditionally focused on local forcing and seasonal changes. The project will provide a web-based open archive of the 1995-2006 coupled model hourly physical and biological output, and produce a tested coupled biological-physical model system available for other ongoing (e.g. ECOHAB) and future ecosystem studies in the Gulf of Maine and other coastal oceans. The web-based ocean forecast model system being developed by UMASSD-WHOI will benefit directly from this project by helping to optimize the design of ocean observatories and help shape the future of interdependent model-observing systems.

Note: This project is an NSF Collaborative Research project.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0726577

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