

# Model output from Finite Volume Coastal Ocean Model, Gulf of Maine/Georges Bank (FVCOM-GoM/GB) from SMAST/UMassDartmouth in 1999 (Phytoplankton Blooms project)

**Website:** <https://www.bco-dmo.org/dataset/473148>

**Data Type:** model results

**Version:** 18 Dec 2013

**Version Date:** 2013-12-18

## Project

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

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## Dataset Description

Output from the Finite Volume Coastal Ocean Model, Gulf of Maine/Georges Bank (FVCOM-GoM/GB). More information about the modeling system:

[http://fvcom.smastr.umassd.edu/research\\_projects/GB/modeling\\_system.html](http://fvcom.smastr.umassd.edu/research_projects/GB/modeling_system.html)

Note: The "Get Data" button, above, goes to an external site where the data files are hosted:

[http://www.smastr.umassd.edu:8080/thredds/catalog/models/fvcom/NECOFS/Archive/Seaplan\\_33\\_Hindcast/catalog.html](http://www.smastr.umassd.edu:8080/thredds/catalog/models/fvcom/NECOFS/Archive/Seaplan_33_Hindcast/catalog.html)

## Methods & Sampling

### See the following for more information:

The [3-D Model Framework](#) (a description of the 3-D model on the project website)

The [FVCOM model](#) (description)

The [nc header file](#) (.txt file, including description of variables)

### Also see the following publication for methodology:

Ji, R., Davis, C., Changsheng, C., and Beardsley, R. 2008. Influence of local and external processes on the annual nitrogen cycle and primary productivity on Georges Bank: A 3-D biological-physical modeling study. Journal of Marine Systems, 73: 31-47. DOI: [10.1016/j.jmarsys.2007.08.002](https://doi.org/10.1016/j.jmarsys.2007.08.002)

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## Parameters

Parameter	Description	Units
Other	Refer to data files and <a href="#">nc header file</a> (.txt) for information about parameters.	n/a

## Deployments

### lab\_SMAST-model

Website	<a href="https://www.bco-dmo.org/deployment/58054">https://www.bco-dmo.org/deployment/58054</a>
Platform	SMAST/UMassD
Start Date	1999-01-01
Description	model results

## 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.

## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0727033</a>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0726851</a>

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