

## **NOGAPS/NAVGEM Platform Support**

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### **LONG-TERM GOALS**

The long-term goal of this ONR project is to prepare the technical framework for the associated ONR DRI on “Unified physical parameterization for seasonal prediction” which aims to develop generalized physical parameterizations that will enable a global prediction system useful for forecasts out to seasonal time scales. Targeted specifically at improving/extending the forecast capability of the Navy Operational Global Atmospheric Prediction System (NOGAPS) and the Navy Global Environmental Model (NAVGEM; a successor to NOGAPS with new dynamical core and advanced physics) from weather prediction to seasonal prediction, potential PIs of the DRI will be able to work collaboratively and efficiently on model physics development using the technical framework developed by this project.

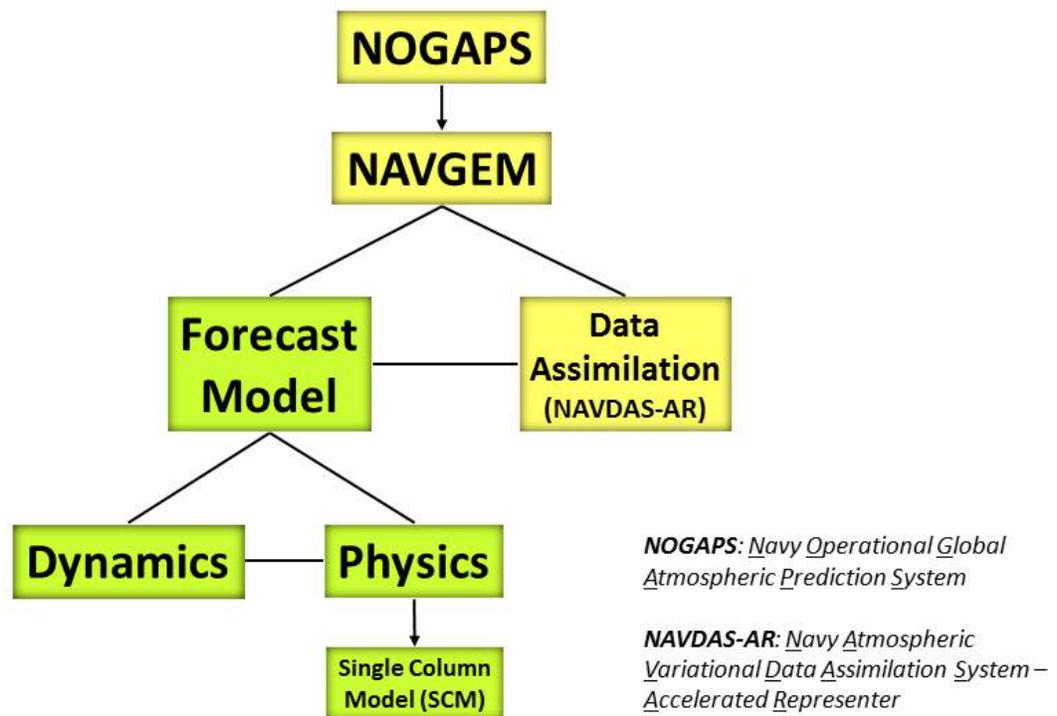
### **OBJECTIVES**

The objective of this project is to offer support (e.g., consultation, code updates and version control, data transfer, user feedback collection and implementation, etc.) for users of NOGAPS/NAVGEM who obtain the system through the release of the code as determined by release guidelines. One of the primary objectives of this proposal is to establish a more comprehensive technical support capability for the NOGAPS/NAVGEM users, particularly those who have projects supported by ONR. The distribution of NOGAPS/NAVGEM to the scientific community will be accomplished by Naval Research Laboratory (NRL)-Monterey whose functions include, but are not limited to, making incremental improvements to the website, updating versions of the code as necessary, updating the NOGAPS/NAVGEM documentation, providing user feedback to NOGAPS/NAVGEM developers, and providing atmospheric and surface initial and boundary condition data for forecast model simulations.

### **APPROACH**

The Navy global forecast system is continuously upgraded and a recent significant milestone is the operation of the 4D-Var data assimilation system (NAVDAS-AR). The focus of the ONR DRI is on the development of the physical parameterizations to improve the weather prediction skill of NOGAPS/NAVGEM and to extend its capability to seasonal prediction. Further improvement can be

achieved by efforts from broader community dedicated to work on Navy’s modeling framework. We are building a centralized and automated code access system to distribute the software efficiently and effectively. This web-based system will have a two-tier infrastructure (Figure 1). NRL researchers have access for the Tier 1 system containing the operation version of NOGAPS/NAVGEN and the NAVDAS-AR data assimilation system (Figure 1, whole diagram). Outside collaborators and PIs of the DRI will have access to the Tier 2 access to the NOGAPS/NAVGEN software only (Figure 1, green blocks) and sets of initial and boundary forcing fields, as well as the validation data set. As the first step, a single-column version (SCM) of the model physics will be distributed for evaluating the physical parameterizations and upon completion of the evaluation of the SCM the distribution of the whole forecast model will follow. The key personnel is Dr. Young-Joon Kim (PI) and Mr. Tim Whitcomb, and Dr. Jim Ridout, who is the PI of the ONR DRI project on “Unified physical parameterization for seasonal prediction”, will play an advisory role.



**Figure 1. NOGAPS/NAVGEN 2-Tier Access System.** Tier 2 system (denoted by green), which consists of the model physics component (together with the dynamics component needed to integrate the model in time) and its single column model (SCM) version will be available for external collaborators, whereas the Tier 1 system, which also include the rest of the model components (denoted by yellow and green, i.e., the whole system), will be available for internal developers only.

## WORK COMPLETED

- Designed and constructed web pages using TRAC software to provide means to communicate with external collaborators to improve NOGAPS/NAVGEN physics.

- Described the functions of the web pages to the participants of the ONR Workshop on Unified Parameterization for Extended Range Prediction.
- Constructed a branch within the NOGAPS/NAVGE M version control system to host a version of NOGAPS/NAVGE M physics code appropriate for external distribution.

## RESULTS

The TRAC-based webpages and version control system provide both external and internal users with convenient and reliable means to access NAVGE M model physics code, be informed of the news (Figure 2), ask questions and share ideas and results (Figure 3).

The screenshot shows the TRAC web interface. At the top left is the TRAC logo with the text "Integrated SCM & Project Management". To the right is a search box and the text "logged in as yjkim" with links for "Logout", "Settings", "Help/Guide", and "About Trac". Below this is a navigation bar with tabs for "Wiki", "Timeline", "Roadmap", "Browse Source", "View Tickets", "New Ticket", "Search", and "Admin". At the bottom of the navigation bar are links for "Start Page", "Index by Title", "Index by Date", and "Last Change".

**Introduction**

1. The NAVGE M\_FM workflow uses the Trac issue tracking system integrated with Subversion version control.
2. Users are encouraged to share information, ask/answer questions, and/or discuss results by using the ticket system.

Note: Click "View Tickets" to view old tickets and "New Ticket" to create a new ticket.

**NAVGE M Forecast Model (FM) Code Distribution and Support**

1. According to the scope of the project, external collaborators will have access to the forecast model only, excluding the data assimilation part.
2. The model code to be distributed will include a development version as well as the operational version.
3. The development version includes features that may be more suitable for extended-range forecast.
4. The code and data can be accessed via an ftp server (to be announced).
5. The support will be limited to the model code installed on the hardware platforms that NRLMRY supports.

**NAVGE M Single-Column Model (SCM)**

1. Initially, the Single-Column Model (SCM) version of NAVGE M and the necessary input data, designed to test physical parameterizations, will be distributed.
2. To evaluate and compare physical parameterizations at individual grid points for given environmental conditions for a few time steps.

**NAVGE M Full Forecast Model (FM)**

1. Then, the full forecast model of NAVGE M and the necessary input data will be distributed. Sample data and default model settings will be distributed for reproducing selected sample cases.
2. To evaluate and compare physical parameterizations developed and/or calibrated by the SCM experiments for the global domain for extended periods.

**NAVGE M User Support and Communication**

1. Web-based forum will be set up to distribute news, ask questions and share research results among the internal developers and outside collaborators.
2. => [https://inversion.nrlmry.navy.mil/TRAC/NAVGE M\\_FM](https://inversion.nrlmry.navy.mil/TRAC/NAVGE M_FM)

**Attachments**

- [NAVGE M\\_FM\\_Chart.jpg](#) (57.5 kB) -"Project Mission Chart", added by yjkim on 05/18/11 12:36:26.

**Figure 2. A snapshot of one of the webpages constructed using TRAC software. Upon approval, external as well as internal users of NOGAPS/NAVGE M can access the pages to obtain basic information about the project, etc. The secure web address is ([https://inversion.nrlmry.navy.mil/TRAC/NAVGE M\\_FM](https://inversion.nrlmry.navy.mil/TRAC/NAVGE M_FM)).**

## **IMPACT/APPLICATIONS**

Provide convenient access to the NOGAPS/NAVGEN model code and data for external users, and promote scientific discussions of the results obtained from their research, leading to the synergic development of the model physics.

## **RELATED PROJECTS**

“Unified physical parameterization for seasonal prediction” (ONR DRI)

## **PUBLICATIONS**

- Kim, Y. –J., and M. Liu, 2011: Reducing forecast bias with unified orographic drag parameterization and radiation parameterization. 1st Scientific Workshop on ONR DRI: Unified Parameterization for Extended Range Prediction, 24–26 May 2011, Monterey, California, USA.
- Kim, Y. –J., and T. Whitcomb, 2011: Navy global forecast system, NAVGEN: Distribution and user support. 1st Scientific Workshop on ONR DRI: Unified Parameterization for Extended Range Prediction, 24–26 May 2011, Monterey, California, USA.

## Create New Ticket

Short summary:

Type:

Full description (you use [WikiFormatting](#) here):

**B** **I**

### Ticket Properties

Priority: <input type="text" value="Critical"/>	Component: <input type="text" value="Original Forecast Model"/>
Version: <input type="text"/>	Keywords: <input type="text"/>
Assign to: <input type="text"/>	Cc: <input type="text"/>

I have files to attach to this ticket

Note: See [TracTickets](#) for help on using tickets.

**Figure 3.** A snapshot of one of the webpages constructed using TRAC software. Approved users of NOGAPS/NAVGEN can read announcements, report and/or suggest model bugs and enhancements, ask questions and discuss results with collaborators. The secure web address is ([https://inversion.nrlmry.navy.mil/TRAC/NAVGEN\\_FM](https://inversion.nrlmry.navy.mil/TRAC/NAVGEN_FM)).