OceanNOMADS – An Update: Real-time and Retrospective Access to Operational U.S. Ocean Prediction Products

Presentation to:
11\textsuperscript{th} Symposium on the Coastal Environment
93\textsuperscript{rd} AMS Annual Meeting

John Harding, Northern Gulf Institute
Scott Cross, NOAA National Coastal Data Development Center
Frank Bub, Naval Oceanographic Office
Ming Ji, NOAA National Centers for Environmental Prediction
Charles Carleton, NOAA National Coastal Data Development Center
Hendrik Tolman, NOAA National Centers for Environmental Prediction
A. Rost Parsons, NOAA National Coastal Data Development Center
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts

NOMADS: Inspiration for OceanNOMADS

NOMADS
National Operational Model Archive & Distribution System

- NCEP/NCDC partnership
- Real-time and retrospective access to NOAA operational atmospheric model output

http://nomads.ncdc.noaa.gov/data.php
http://nomads.ncep.noaa.gov/
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS

OceanNOMADS

• Navy/NCEP/NODC partnership

• Real-time and retrospective access to Navy and NOAA selected operational & pre-operational ocean model output

• Web service graphics for quick look at retrospective data

http://NorthernGulfInstitute.org
http://www.ncddc.noaa.gov/ocean-nomads/
www.opc.ncep.noaa.gov/newNCOM/NCOM_currents.shtml
**OceanNOMADS Data Flow**

- **Operational**
  - Naval Oceanographic Office
    - Operational nowcast/forecast *(no direct public access)*
  - NOAA National Weather Service
    - Real-time/operational access
  - NOAA Northern Gulf Institute
    - Access to experimental/ pre-operational products
  - NOAA National Oceanographic Data Center
    - Long-term preservation and access

- **R&D**
  - Transition Process

- **Long-Term Access**
  - www.ncddc.noaa.gov/ocean-nomads
  - www.northerngulfinstitute.org/edac/ocean_nomads.php

- **www.opc.ncep.noaa.gov/newNCOM/NCOM_currents.shtml**
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts
OceanNOMADS – NCDDC production Site

http://www.ncddc.noaa.gov/ocean-nomads
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS: U.S. West Coast Cutout from global model

Navy Coastal Ocean Model Global Domain (2008 - present)

The Global NCOM is an ocean prediction system run by the Naval Oceanographic Office (NAVOCEANO) as the Navy’s real-time operational global nowcast/forecast system. The Naval Research Laboratory developed NCOM based on the Princeton Ocean Model with time invariant hybrid (sigma over Z) vertical coordinates. See Navy’s NCOM Publications Web page for additional information. For distribution, NAVOCEANO interpolates the output onto a regular latitude-longitude grid in the horizontal and a series of standard depths in the vertical, and parses the global domain into 13 regions. This site provides access to regions around the U.S. and its territorial waters. Additionally, access is provided to global data for the surface only.

Users who require operational, real-time access to this data are directed to the high-availability servers at the National Centers for Environmental Prediction.

Please Note: You must enable JavaScript and disable pop-up blocking to access data and products available from this page. The pop-up window that supports the product and data access links provides window history support when left open and successive selections are made. With the pop-up window in focus, you may use the Alt-left or Alt-right arrow key combination to move backward or forward through the window history.

Available Services

Access to G-NCOM data is provided via Thredds Data Server. Supported services include bulk file download in the native netCDF format, OPENDAP subsetting, and timeseries aggregation. Visualization services are provided via ERDDAP.

<table>
<thead>
<tr>
<th>Region 1</th>
<th>Metadata</th>
<th>Daily Data</th>
<th>Timeseries Aggregation</th>
<th>Visualize 2-D Fields</th>
<th>Visualize 3-D Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 2</td>
<td>Metadata</td>
<td>Daily Data</td>
<td>Timeseries Aggregation</td>
<td>Visualize 2-D Fields</td>
<td>Visualize 3-D Fields</td>
</tr>
<tr>
<td>Region 5</td>
<td>Metadata</td>
<td>Daily Data</td>
<td>Timeseries Aggregation</td>
<td>Visualize 2-D Fields</td>
<td>Visualize 3-D Fields</td>
</tr>
<tr>
<td>Region 6</td>
<td>Metadata</td>
<td>Daily Data</td>
<td>Timeseries Aggregation</td>
<td>Visualize 2-D Fields</td>
<td>Visualize 3-D Fields</td>
</tr>
<tr>
<td>Region 7</td>
<td>Metadata</td>
<td>Daily Data</td>
<td>Timeseries Aggregation</td>
<td>Visualize 2-D Fields</td>
<td>Visualize 3-D Fields</td>
</tr>
<tr>
<td>Global (sfc)</td>
<td>Metadata</td>
<td>Daily Data</td>
<td>Timeseries Aggregation</td>
<td>Visualize 2-D Fields</td>
<td>Visualize 3-D Fields</td>
</tr>
</tbody>
</table>

US Pacific Coast Sub-Region
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts
OceanNOMADS: Web Service Example–10 m Temperature

Multiple graphic output possibilities including .kml
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts
OceanNOMADS – NGI/NCDDC R&D Site

NCEP OPC for Near-Term Ocean Prediction Access
NGI/NCDDC for Retrospective Access & NCEP Backup
Global subsets available on NCDDC production server

http://www.northerngulfinstitute.org/edac/ocean_nomads.php
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS: AMSEAS Regional Model Access

NAVOCÉANO AMSEAS Prediction System

OpenDAP Data Access
NGI, NAVO, NCEP & NODC

Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS: AMSEAS Web Service Graphics Access

AmSeas Subsection
August 14, 2011
00:00:00

NCOM American Seas

The Naval Oceanographic Office (NAVOCEANO) operational ocean prediction system for the Gulf of Mexico and Caribbean is based on the NRL-developed Navy Coastal Ocean Model (NCOM). With resolution of 1/36 degree (~3km) horizontal and 40 levels in the vertical. This capability provides 4-day forecasts at 3-hour time steps, updated at 00Z daily. The NetCDF files contain ocean temperature, salinity, eastward and northward currents, and elevation, along with the atmospheric forcing fields provided over this domain by a 15 km application of the Navy's COAMPS model. The AMSEAS ocean prediction system assimilates all quality controlled observations in the region including satellite sea surface temperature and altimetry, as well as surface and profile temperature and salinity data using the NRL-developed Navy Coupled Ocean Data Assimilation (NCODA) system. Boundary conditions are supplied from the NAVOCEAN.
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS: AMSEAS Hurricane Sandy Example
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS: Sandy example - Where are the heat reservoirs?

Hurricane Sandy Track
20-28 October 2012
(NOAA National Hurricane Center)

AMSEAS 50 m temp. > 26°C on 20 October 2012
NGI, NAVO, NCEP & NODC

Improve Access to Ocean Nowcasts/Forecasts

OceanNOMADS: Sandy example - Where are the heat reservoirs?

USEast Regional Model: 50 m temp. > 26°C on 26 Oct. 2012
OceanNOMADS: AMSEAS
Sandy Example:
Sfc. Pressure & SST Evolution

22 October 2012

Note expected along track cooling and recovery in subsequent figures
OceanNOMADS: AMSEAS
Sandy Example:
Sfc. Pressure & SST Evolution

23 October 2012
OceanNOMADS: AMSEAS
Sandy Example:
Sfc. Pressure & SST Evolution
24 October 2012
OceanNOMADS: AMSEAS
Sandy Example:
Sfc. Pressure & SST Evolution
25 October 2012
OceanNOMADS: AMSEAS
Sandy Example:

Sfc. Pressure & SST Evolution

26 October 2012
OceanNOMADS: AMSEAS
Sandy Example:
Sfc. Pressure & SST Evolution
27 October 2012
OceanNOMADS: AMSEAS
Sandy Example:
Sfc. Pressure & SST Evolution
28 October 2012
NGI, NAVO, NCEP & NODC
Improve Access to Ocean Nowcasts/Forecasts
OceanNOMADS

Additional Information:

http://NorthernGulfInstitute.org

http://www.ncddc.noaa.gov/ocean-nomads/

www.opc.ncep.noaa.gov/newNCOM/NCOM_currents.shtml