6.2 OCEANNOMADS – AN UPDATE: REAL-TIME AND RETROSPECTIVE ACCESS TO OPERATIONAL U.S. OCEAN PREDICTION PRODUCTS

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1. INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Oceanographic Data Center (NODC), the NOAA National Centers for Environmental Prediction (NCEP), the Naval Oceanographic Office (NAVOCEANO) and the NOAA Northern Gulf Institute (NGI) have developed a capability to allow real-time and retrospective access to 3-dimensional, operational ocean prediction model data. This capability serves as an extension to NOAA's National Operational Model Archive and Distribution System (NOMADS) that provides both real-time and archived atmospheric model output.

2. DESCRIPTION

This new capability, called OceanNOMADS, leverages the complementary strengths and missions of the partner agencies to provide a complete suite of data services: Navy and NOAA/NCEP operate the real-time ocean prediction systems; NCEP provides real-time access to its operational users; NODC provides long-term storage and retrospective access; and NGI provides a developmental environment to facilitate the development and transition to operations of new model products and tools (Figure 1).

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Real-time access to NOAA and Navy models is provided through operational NOMADS servers at NCEP (http://nomads.ncep.noaa.gov). This service is maintained on a high-availability basis to meet the needs of NCEP's operational customers. The National Coastal Data Development Center (NCDDC, a division of NODC) provides the retrospective access to ocean prediction fields through the OceanNOMADS production server (http://www.ncddc.noaa.gov/ocean-nomads/). Established in summer 2011, this production version evolved from a developmental OceanNOMADS (http://www.northerngulfinstitute.org/edac/ocean_nomads.php), a joint project of NCDDC and the multi-university NOAA Cooperative Institute, NGI. Complementary funding from the U.S. Integrated Ocean Observing System (IOOS) via the Southeastern University Research Association (SURA) Coastal Modeling Testbed supported this transition.

This development to production pathway allows access tool development as well as web service visualization and storage of initial archival data sets on the NGI developmental server. Transition to the NODC/NCCDC production server occurs as server space and distribution capabilities grow.

3. MODEL DATA AVAILABLE

The data catalog on the operational NOMADS server at NCEP includes regional subsets from Navy's Global NCOM, as well as high-resolution regional NCOM data from four domains: (1) U.S. East Coast, (2) Southern California, (3) Gulf of Mexico/Caribbean, and

(4) Hawaii. The NCDDC OceanNOMADS production server catalog currently includes (1) regional subsets from Global NCOM, (2) NOAA's Real-Time Ocean Forecasting System (RTOFS) for the Atlantic and Gulf of Mexico, and (3) the ocean component of NOAA's Climate Forecast System Reanalysis. The NGI/NCDDC developmental server currently includes the Naval Research Laboratory Inter-America Seas nowcast/forecast System for the Gulf of Mexico from 2004-March 2011. It also contains the operational NAVOCEANO regional nowcast/forecast domains for the U.S. east coast from early 2011 to present, the Gulf of Mexico/Caribbean from 25 June 2010 to present, and Southern California from August 2011 to present.

Figures 2 and 3 present examples of OceanNOMADS web service visualization capabilities available at both the NGI and NCDDC sites. Figure 2 identifies ocean heat reservoirs in the NAVOCEANO Gulf of Mexico/Caribbean regional domain during the passage of Hurricane Sandy in late October 2012. Figure 3 illustrates the cooling of the surface waters as Sandy progressed from a tropical depression to category 2 hurricane from 22 to 25 October 2012. Note that the atmospheric surface heat and momentum fluxes used to drive these regional forecasts are also available in the data files.

4. FUTURE PLANS

Future OceanNOMADS plans include expanding the catalog of available datasets, transitioning retrospective fields from the developmental to production server, and developing enhanced data services targeted for specific user groups. In October 2011, NCEP implemented the first operational Global Real Time Ocean Forecast System (G-RTOFS) based on the Navy implementation of the Global HYCOM model. Real-time operational G-RTOFS output is currently available through NCEP with planned future inclusion of the retrospective global fields on the NCDDC servers.

Time aggregations of the NAVOCEANO high-resolution coastal model coverage around the continental United States, already available through the developmental server as noted earlier, will also be added to NCDDC's production servers. Finally, we are developing software tools that enable the reuse of these model fields as input for ecosystem models applicable to larval transport, biogeochemical, food web, and other studies.

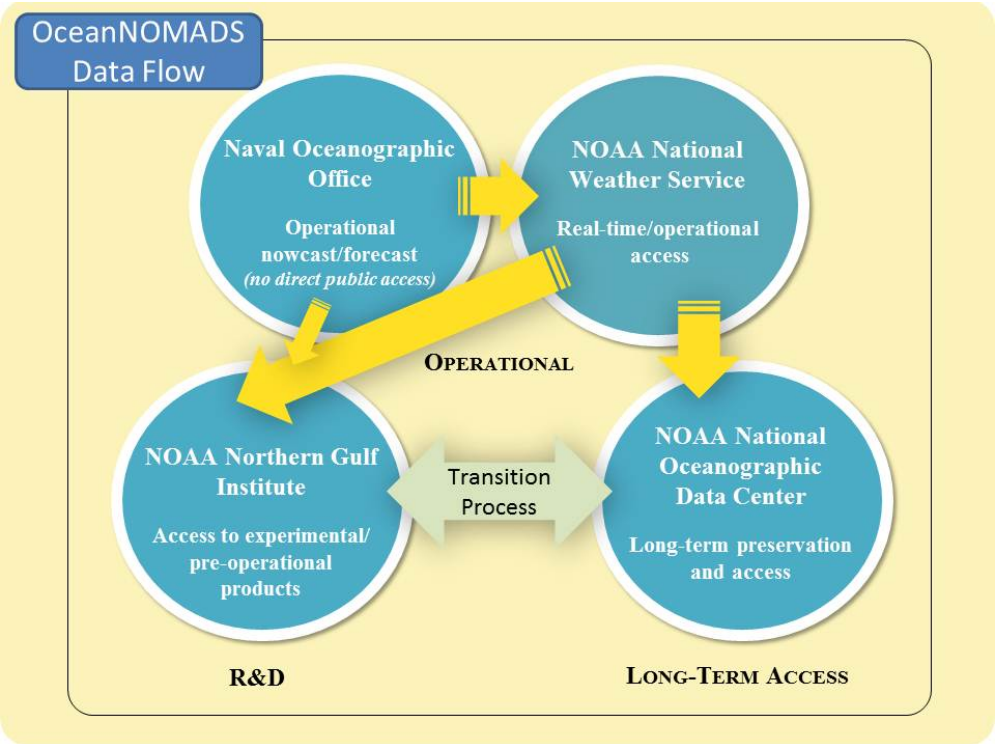

Figure 1. OceanNOMADS data pathways and organizational partnerships

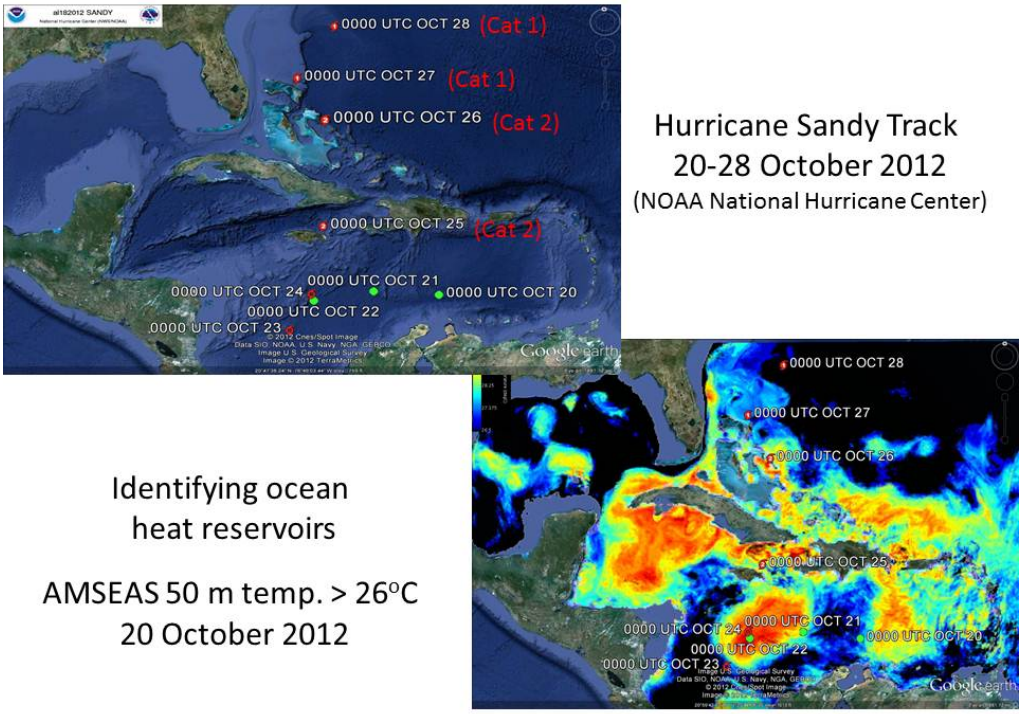

Figure 2. Example of OceanNOMADS web service visualization capabilities to identify ocean heat reservoirs in the NAVOCEANO Gulf of Mexico/Caribbean regional domain available during the development of Hurricane Sandy.

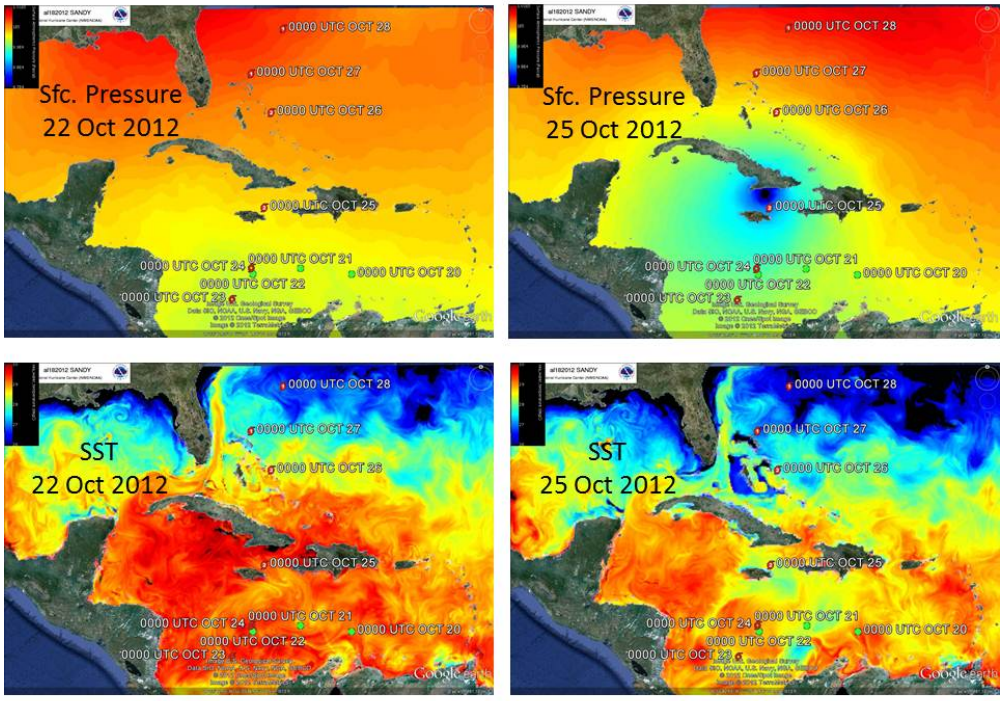

Figure 3. Example of OceanNOMADS web service capabilities used to illustrate cooling of sea surface temperature in the NAVOCEANO Gulf of Mexico/Caribbean regional domain as Hurricane Sandy strengthens from a tropical depression to category 2 hurricane from 22 to 25 October 2012.