Continued Development of the Gulf of Mexico Coastal Ocean Observing System

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December Semi-Annual Supplement to Program Performance Report

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This is the December 2014 Semi-Annual Supplement for the project, Continued Development of the Gulf of Mexico Coastal Ocean Observing System, under NOAA Cooperative Agreement NA11NOS0120024.

1.0 Products and Services

1. New or improved regional Products and Services:

1. The Data Portal has been enhanced to include a new data provider (Everglades National Parks) and new stations from Sanibel-Captiva Conservation Foundation (Figure 1), improved presentation of the statistics of GCOOS assets (Figure 2), additional monitoring modules available as a series tools available to the public (Figure 3), and new coding available as open source. The Data Portal is at http://data.gcoos.org.

2. The 52°N SOS is fully operational and supports GetCapabilities, DescribeSensor and GetObservation calls. It accepts version 1.0.0 and version 2.0.0 standards, and as well as JSON response format for GetObservation calls (http://data.gcoos.org:8080/52nSOS/).

3. The Products Portal web page was enhanced to show new web map capabilities and products, new or improved outreach products (e.g., lionfish observations, hurricane tracker page), profile and wave glider deployments, and oil and gas platforms. Products Portal is at http://gcoos.org/products/ (see Figure 3).

4. The lionfish observation map is continually improved, most recently with a newly available 2014 data set (http://gcoos.org/products/maps/lionfish/)

5. The drift card page of the Gulf Integrated Spill Response Consortium, developed by GCOOS, is introduced in the Oil and Gas section and continually improved (http://gcoos.org/products/maps/gisr/driftcard/)

6. The mobile section is introduced with a help page. (http://gcoos.org/products/index.php/mobile)


8. The glider products are continually improved and include the addition of new deployments. The Gulf gliders page includes 6 new profiling gliders. (http://gcoos.org/products/maps/gulf_gliders/); a new wave glider page was launched with 3 deployments in 2014. (http://gcoos.org/products/maps/waveglider/msstate/)

2. New or improved national products and services: No new national products were introduced this period. We continue to improve our glider data processing capabilities and compliance with changes in National Glider DAC standards. We were deeply involved in the testing of the 52°N SOS and the development of the SOS injector; see https://github.com/ioos/sos-injector-db.
2.0 Data Management

1. Progress towards a standards-based foundation for DMAC capabilities: GCOOS continues to maintain and enhance the established data management system in response to changes in system hosting, network security, the IOOS ocean informatics community and IOOS Program Office DMAC initiatives. GCOOS staff participate at all levels of the interoperability enterprise from testing software code to developing national policy.

2. Demonstrated progress:

   1. **52° North SOS:** Fully operational and supports GetCapabilities, DescribeSensor and GetObservation calls. It accepts version 1.0.0 and version 2.0.0 standards, and as well as JSON response format for GetObservation calls (http://data.gcoos.org:8080/52nSOS/). Also, assisted Axiom Consulting to demonstrate an example on how to correctly create a SOS injector (https://github.com/ioos/sos-injector-db).

   2. **IOOS Biological Observations Data Project (BDP):** The CAGES data set developed in the previous year has been migrated from the development server to its permanent home at http://gcoos1.tamu.edu:8080/erddap/info/index.html. The data are registered with the IOOS Catalog at http://catalog.ioos.us/datasets/542369c846a46b0eebd13679

3. **Gliderpaloosa 2014:** In summer and fall of 2014, a number of gliders were deployed by Texas A&M University, University of Southern Mississippi, University of South Florida, Mote Marine Laboratory and Mississippi State University. The Gliderpaloosa group, primarily a northeastern U.S. activity, was kept informed of Gulf deployments and we participated in their conference calls. Some, but not all, Gulf data made it to the National Glider DAC. Data of questionable validity were not released to the Glider DAC. A number of our glider operators are new and still working the bugs out of file configuration and operation. Glider tracks and data plots are on the GCOOS web sites http://abcmgr.tamu.edu/glider/ and http://gcoos.org/products/index.php/gliders/

4. **Marine Biodiversity Observing Network (MBON):** NOAA and BOEM funded Dr. Frank-Muller Karger (USF) to conduct a 5-year demonstration project involving Gulf of Mexico and West coast Marine Sanctuaries. GCOOS has a subcontract with USF to develop IOOS-compliant data management for the Gulf coast data sets in collaboration with CENCOOS and AXIOM. The project has a 1-August-2014 start date but funding delays pushed the effective start to October-November 2014. A number of conference calls have been held to date. An all-hands kick-off meeting is scheduled for February 2015 in Miami, FL.

5. **U.S. IOOS Office QARTOD Project:** This project will document standard practices for Quality Assurance and Quality Control of IOOS data. Adherence to these practices will be part of the requirements for Regional certification. Howard is a member of the Board of Advisors for the U.S. IOOS QARTOD Project and has participated in conference calls and provided written reviews of interim documents. The team has completed five manuals including temperature and salinity, in situ currents, in situ waves, water level, and winds. The next manual will cover marine optics.
6. **IOOS Regional Data Integration (RDI) Team:** The RDI team is composed of Regional DMAC managers and related members of the IOOS Program Office. They hold an annual meeting to plan joint activities and to inform the IOOS Program Office's Planning for the next fiscal year. Howard is the GCOOS representative. No annual meeting was held in 2014. The next meeting is scheduled for sometime in March-May 2015. The RDI team holds conference calls and webinars approximately monthly. Howard last presented on NDBC data management operations during the November 2014 call.

7. **Open data sharing:** The GCOOS Data Portal aggregates data from local data nodes, also known as data providers (see http://data.gcoos.org), and makes these data available through standards-based web services. A Data Sharing/Use Policy has been written and revised. New providers are continually added to the system.

1. **Provision of data to WMO GTS:** Most GCOOS data providers submit their data to NDBC directly. Additionally, NDBC may harvest data from the Data Portal directly through the Portal’s SOS access point, which currently uses the same as SOS implementation as does NDBC. NDBC injects much of this data into the WMO/GTS stream.

2. **Implementation of a service-oriented architecture:** The GCOOS Data Portal was constructed to be a service-oriented architecture. The portal provides maps of assets, shows the status of asset operations, and includes a tool to download specific data according to the user needs.

3. **Use of common vocabularies and identifiers:** GCOOS implements the common vocabulary and identifiers in our Data Portal, which also includes information on the vocabulary (http://data.gcoos.org/vocabularies.php). GCOOS produced the IOOS Parameter Vocabulary Version 1.0 which was the foundation for Version 2.0 produced by Sara Haines. Howard was a co-author with Sara and others on the 2012 IOOS Summit white paper on vocabularies.

4. **Data storage and archiving:** Data providers store their data locally. GCOOS stores data aggregated from the local providers as part of the Data Portal development. NDBC stores copies provided to them. All of these copies may differ from one another in terms of temporal or numerical resolution or completeness. GCOOS is developing plans to achieve long-term archiving at national repositories for all of the region’s near real-time data. We anticipate this will be a requirement for certification.

3.0 **Observing Assets**

1. The Central Gulf of Mexico Ocean Observing System (CenGOOS) station CenGOOS-01 buoy is hosting air and water CO2 sensors and water pH sensors for NOAA PMEL’s Carbon Program. Data are sent directly to the Carbon Dioxide Information Analysis Center (CDIAC). Data and plots are available through the PMEL site after review (see http://www.pmel.noaa.gov/co2/story/Coastal+MS http://www.pmel.noaa.gov/co2/story/Coastal+MS). In 2014, measurements were made from February to August at which time a system failure occurred. The system is expected to be restored to service in December 2014. Current inventory of regional observing assets:
1. Figure 1 shows the locations of all assets being served by the GCOOS Data Portal as of 12/03/2014 (318 stations and 1,905 sensors are monitored and reported, this is 95 stations and 350 sensors in addition to last year’s inventory).

2. A listing of all operational assets together with summary statistics (Figure 2) can be downloaded from the GCOOS Data Portal using a tool under the Monitoring tab (http://data.gcoos.org/monitoring.php). Information can be downloaded in ASCII text format as all assets, as federal assets only, and as non-federal assets only. Information included consists of owner, platform name, location, data type, and vertical datum. Information on the status of specific, local data node assets is also available.

3. GCOOS does not own any of its own assets. All assets are owned and operated by GCOOS partners. Thus information on anticipated changes (e.g., additions, deletions, upgrades, etc.) is not readily available. Due to diminishing fiscal support for operational systems, stations have been removed from some systems (e.g., the only station of COAPS has been down since July 2014, and WAVCIS is down to 1 station out of 6) and others are struggling to maintain their systems with selected stations are under consideration for removal. Leveraging has been successful for several systems (e.g., DISL Mobile Bay Environmental Monitoring System expanded, SCCF-RECON added a few more stations), but as the leveraging funding sources end the associated observational systems must find new leveraging sources or be cut back. A few systems remain relatively robust for now (e.g., TABS, TCOON).

Figure 1. Initial page of the GCOOS Data Portal showing locations of existing stations available through the GCOOS Data Portal on 03 December 2014 (http://data.gcoos.org).
Figure 2. Summary statistics of GCOOS assets for 03 December 2014. Additional plots are provided showing sensor count per phenomenon observed and cumulative plot of data counts.
Figure 3. GCOOS tools and modules available for use by data providers and the general public.
Figure 4. Introductory page for the GCOOS Data Products Portal with the Web Map Applications set for Education and Outreach (http://gcoos.org/products/).