



TEXAS A&M RESEARCH FOUNDATION

979-845-8600 979-862-3250 FAX
<http://rf-web.tamu.edu>

November 21, 2005

Dr. Paul Scholz
NOAA Coastal Services Center
2234 South Hobson Avenue
Charleston, SC 29405-2413

Reference: Grant No. NA03NOS4730245 "Development of the Regional Association for the Gulf of Mexico Coastal Ocean Observing System" (461811)

Dear Dr. Scholz:

The Semi-Annual Technical Report for the referenced grant is enclosed. The report covers the period 1 April 2005 through 30 September 2005.

If additional technical information is required, please contact Dr. Worth D. Nowlin, Jr., at 979/845-3900 or email wnowlin@tamu.edu. If administrative information is required, please contact me at 979/458-2739 or email pbonifazi@rf-mail.tamu.edu.

Sincerely,

Phyllis Bonifazi
Senior Research Administrator
Contracts & Grants

Enclosure

cc: W. Nowlin

Coastal Observation Technology System Project

Development of the Regional Association for the Gulf of Mexico Coastal Ocean Observing System

Progress Report April 1, 2005 - September 30, 2005

1.0 Progress on Regional Association Development

1.1 Activities during the report period

- A meeting, arranged by Alfredo Prelat, formerly with the Boeing Company and now with PAR, between officers of Pemex, Prelat, and Nowlin took place on March 31, 2005, in Mexico City. This was to brief Pemex on IOOS and GCOOS and to invite them to participate. Contacts have continued since that meeting.
- GCOOS has an informative web site (<http://www.gcoos.org>) which is revised on an ongoing basis. It is the major source of information regarding the GCOOS system of systems and development of a certified Regional Association (GCOOS-RA). This web site was completely revised during this report period.
- The GCOOS Office has continued to refine its list serve of 278 stakeholders. They receive pertinent information regarding system developments via email. This list serve also is used to solicit opinion and inputs.
- Voting Parties to the Memorandum of Agreement (MoA) establishing the GCOOS-Regional Association elected the initial Board of Directors for the Association. The Board had its first meeting in Houston, TX, on August 25-26, 2005. They elected an Executive Committee that met on August 26. The report of the Board meeting is on the GCOOS web site.
- The Memorandum of Agreement for the GCOOS-Regional Association was reviewed by the GCOOS Board of Directors and modifications suggested. The modifications correct some initial inconsistencies and editorial problems, improve definitions, clarify dispute resolution and liability clauses, and modify the qualifications for membership to allow for non-U.S. members as non-voting Associates. The revised MoA has been accepted by a majority of the voting Parties and now is in effect. The current MoA is on the GCOOS web site.
- The Board of Directors selected the Texas A&M Research Foundation, an independent 501c(3) corporation, as the fiscal sponsor for the GCOOS-Regional Association.

- Raymond Toll, SAIC, and Robert (Buzz) Martin, TX General Land Office, were confirmed by the GCOOS Board as our regional representatives to the National Federation of Regional Associations.
- Dr. Ann E. Jochens, Texas A&M University, was selected by the GCOOS Board as the GCOOS Regional Coordinator.
- Susan R. Martin is working part time in the GCOOS Office as an administrative assistant responsible for the web site and meeting logistics.
- Dr. Matthew K. Howard, Texas A&M University, was selected by the GCOOS Board as the regional DMAC Coordinator. He also serves as the representative of the National Federation of Regional Associations to the IOOS DMAC Steering Team.
- The National Data Buoy Center of NOAA offers extant observing system elements making observations of physical parameters the opportunity to submit those data in real time via the NDBC Modem Kit. The data are quality controlled, distributed national and internationally, and are available for future use via an OPeNDAP-enabled server. Most of the major data collectors in the Gulf of Mexico are either availing themselves of this opportunity or are working with the NDBC to do so in future. This one major step has vastly enhanced the availability of data to modelers and producers of data-products at minimal added costs. NDBC intends to add additional types of real-time data to its streams. During the report period, the Minerals Management Service, major oil and gas producers from the Gulf, and NDBC agreed that currents measured through the water column at some 40-50 platforms in the north central Gulf will be transmitted in near-real time to NDBC, where they are quality controlled and publicly released as GCOOS data. Some 40 platforms were reporting prior to Hurricane Rita; the current number reporting has again increased to about 30.
- Plans were completed for an Industry-GCOOS workshop focused on oil, gas, and related private sectors. That workshop will be held November 2-4, 2005 at Chevron in Houston, TX. It will be sponsored by Boeing and organized by the Gulf Partner of the Alliance for Coastal Technology at University of South Florida.

1.2 Results of the activities

- There are now 60 signatories to the Resolution to develop the Gulf of Mexico Coastal Ocean Observing System.
- The MoA for the GCOOS-RA has been signed by 43 Parties to the Association. It is open for signature by other qualified parties.
- The Association now has the ability to propose for, receive, and distribute funds using fully approved management practices.

- The GCOOS Office is in operation. Members are undertaking activities decided on by the Board of Directors and Executive Committee at their initial meetings.
- A second draft GCOOS Business Plan is in revision.
- Initial members for the Councils and Committees of the GCOOS-RA have been selected by the Board and contacted as to their willingness to serve. **It should be noted** that the damage visited on the Gulf coast by hurricanes this year greatly slowed planned GCOOS Activities such as initial meeting of these councils and committees.

1.3 Plans for the next year

- During January 10-13, 2006, three major GCOOS meetings will be held sequentially in Alabama: the first annual meeting of our Stakeholder Council, the first annual meeting of Parties to the MoA, and the second semi-annual meeting of the Board of Directors.
- Elections for Board of Directors positions that are rotating open will be arranged by the Membership Committee for the voting Parties. Results are expected to be announced at the meeting of the Parties.
- The initial meeting of the GCOOS Education and Outreach Council tentatively will be held during March or April of 2006. Based on the education and outreach formation meeting held during October 2005, the Board of Directors has prepared instructions for activities of that council which should get them off to a fast start.
- Initial meetings of the DMAC, Products and Services, and Observing Systems Committees will be held during early summer of 2006.
- The third meeting of the Board of Directors and Executive Committee will be held in August 2006.
- The Board of Directors, with inputs from the GCOOS Committees and Councils, will identify priority pilot projects for the GCOOS.
- A series of workshops that reach out to specific stakeholder sectors will be held. These may include a general introductory workshop for fisheries, followed by workshops targeted to each of the recreational, commercial, and regulatory fisheries sectors. Other possible workshops would include storm surge and flooding and energy management; maritime transportation, including shipping agents, port authorities, shipping lines, pilots; recreational boating, including marinas, power squadrons, yacht clubs; and water quality, which is a priority issue for the Gulf of Mexico Alliance.
- Planning for an operations center will be completed and implementation begun.
- The first GCOOS business plan will be completed and approved by the Board of Directors.

2.0 Priorities for Observations from Regional Perspective

2.1 Identification of top five priorities for developing the National Backbone

Along with the entire GOOS endeavor, continuation and expansion of the satellite remote sensing programs is a high priority for GCOOS. This is particularly so of developments that will lead to both better processing algorithms and spatial/temporal sampling in the coastal regime.

Priorities specific to GCOOS follow.

1. Improve DMAC compliance in the Gulf region
 - NDBC is working with several Regional Observing Systems and providing a QA/QC and real-time data distribution service using a product called the "MODEM Kit". In the Gulf of Mexico NDBC is working with TABS, COMPS, TCOON, and LUMCON. This activity will be expanded to include other data providers so as to achieve complete integration of real-time measurements in the region.
 - NDBC also places these data sets on a DODS server once a month. They will expand this to real-time on an OPENDAP server, using a Live Access Server as a user interface to keep current with the DMAC guidance.
 - Transition the NDBC Real-Time OPENDAP server to operational status
2. Enhance NDBC buoy and C-MAN networks
 - Add wave directionality to wave height—useful for rip current forecasting and sediment transport estimation
 - Add visibility measurements—needed near the Mississippi River and other areas for biological productivity estimation and for river-ocean connection
 - Add acoustic Doppler current profilers—constraints for models and for HF radar network
 - Add ecosystem measurements, as feasible
 - Add water level measurements
 - Increase the number of stations in these networks by a factor of five, including additional meteorological stations in the near coastal zone for use in forecasting surface currents for HABSOS as well as improved regional models
3. Improve and enhance monitoring of water quality in watersheds, estuaries, and coastal to shelf waters, as well as fluxes between these entities. As recommended in the USCOP report, the Council on Environmental Quality is proposing a federal water quality initiative involving EPA, NOAA, and the USGS. A demonstration project in the Mississippi River watershed and the Gulf of Mexico would focus on nutrient enrichment issues, such as hypoxia. Along these lines, GCOOS would like to see:
 - Monitoring in additional streams
 - Monitoring to include nutrients and other ecosystem indicators, as well as flow rates—uses include monitoring coastal eutrophication
4. Establish long-range HF radar monitoring of surface currents as a part of the national surface current monitoring initiative being planned by Ocean.US.

5. Integrate and assess numerical circulation models for the region One or more numerical circulation models, utilizing data assimilation, for the Gulf of Mexico should be added to the national backbone. The benefits of having both high density model data (compared to measured data density), which dynamically interpolates the observations, and the capability to forecast the ocean state, will greatly increase the usefulness of GCOOS.

- Create a portal to outputs from all accessible full Gulf models
- Assemble and assess the skill of these models
- Provide boundary conditions for smaller-scale coastal and estuarine models

6. Integrate the water level network for the Gulf of Mexico.

- Adjust all water level measurements to a common set of datums
- Analyze all extant water level records for regional trends and assess new requirements
- Expand NWLON (NOS National Water Level Network) as needed based on foregoing activities

7. Develop a deep-ocean, advanced capability sentinel station. Envisioned is a station with a measurement suite capable of characterizing the environment from the sea floor to the troposphere (-3000 m to +3000 m). It would serve both as a sentinel station in the U.S. EEZ but also as a test bed for advanced technology.

2.2 Identification of top five Regional Ocean Observing System priorities

These priorities are predicated on the assumption that the priority enhancements to the national backbone will be forthcoming. A high priority is a set aside of regional funds for education and outreach. High priority outreach areas are the identification of system users and capacity building between Gulf states (U.S. and Mexican) for harmful algal bloom measurements.

1. Enhance and expand the real-time networks of COMPS, LUMCON, TABS, TCOON, WAVCIS, and other extant observing system elements. [COMPS costs will be budgeted via SERA-COOS.] This will include:

- Expand LUMCON observing system by one offshore station per year beginning in 2007.
- Strengthen TCOON platforms against hurricanes.
- Upgrade TCOON with improved data communication capability to reduce data delay.
- Place new sensors on COMPS, TABS, LUMCON, and other elements serving data in real-time via MODEM Kit to OPENDAP server.
- Expand COMPS buoy and HF radar sites, expand types of measurements, and provide adequate auxiliary supplies.
- Enhance and expand TABS to improve near shore coverage in southwest region and include meteorological packages on all platforms.
- Expand CenGOOS to improve coverage in the region off eastern Louisiana, Mississippi and Alabama.

2. Develop technology for ecological monitoring, particularly for use in HABSOS, and hypoxia study.

Moored sites will be used to test and evaluate new technology, and proven instrumentation will be added. This will be carried out at sites of TABS, COMPS (budgeted as part of SERA-COOS) and perhaps other elements.

3. Undertake a project to develop and improve products and services
This must be joint public-private venture from the beginning. Some new products may be envisioned as being produced and sold by the private sector. Other new products may be envisioned to be produced for the common good, and those might be handed off to NOAA's Coastal Services Center for routine production and distribution.
4. Provide ground support for non-real-time activities, including:
 - Evaluation of developing technology
 - Calibration/validation of satellite remotely sensed measures
5. Expand surface current measurement network near coasts and in estuaries using short-range HF radar systems.
6. Develop and conduct a pilot project demonstrating the use of fiber optic cable for data retrieval and instrument control in the IOOS.
7. Develop and conduct a pilot project to retrieve deep current data being collected by oil industry and MMS and to begin selected use of these data
 - Systematic monitoring of deep currents
 - Model improvements
8. Monitor the effects of river input (e.g., the Mississippi River) on the region.
This is of very high priority, but design will require time and effort. Sought is the ability to track outflow, spreading, stratification, and effects of river water and constituents. This likely will include:
 - Major densification of present levels of measurements, both spatially and temporally.
 - A concerted modeling effort
 - Coordinated data integration
 - Development of products and reporting
9. Develop and conduct hydrographic science projects to support the IOOS goals. This includes GPS buoys for offshore water level monitoring, surveys to provide high resolution bathymetry and topography across the land-sea interface between 30 m above and 30 m below the mean low water level, and sediment and bottom habitat characterizations.

3.0 Issues, Challenges and Opportunities

- Clear guidelines are need as to what "certification" of a Regional Association means and how certification is achieved.

- Activities to advance the IOOS DMAC Plan should receive high priority. A website of open bulletin board describing ongoing DMAC related activities, contacts, and results should be established and maintained. *This also was suggested last year with no consequent action.*
- New funds should be openly competed for pilot programs deemed necessary for Regional Associations, without specific constraints from the funding agency.
- A national IOOS Education and Outreach Committee should be established. *This also was suggested last year.*
- Necessary workshops and meetings should be scheduled well in advance and with consideration for other meetings and for holidays. *This also was suggested last year.*
- Clear guidelines are needed for coordination between units of federal agencies within the purview of a Regional Association and the Regional Association.

4.0 Recommendations for Conferences and Workshops

Recommended are:

- A series of Gulf of Mexico fisheries workshops held by the GCOOS-RA and SECOORA to introduce IOOS and the two RAs to the fisheries stakeholders and to develop ocean observing system priorities for the three fisheries sectors, recreational, commercial, and regulatory.
- A conference or workshop to assess emergency management priorities in light of the lessons learned from the series of Gulf Coast hurricanes in 2005.
- Participate in conferences of Gulf of Mexico Alliance and obtain priority requirements of that group for ocean observing system data and products.

5.0 Recommendations of Additional Resource Needs

Additional resources are needed for the following priorities:

- To advance the DMAC Plan,
- To complete formulation of the NFRA,
- To initiate a national IOOS Education and Outreach effort,
- For selected pilot projects, and
- To hire an Education and Outreach Coordinator for the GCOOS-RA.