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Towards a regional coastal ocean observing system: An initial design for the Southeast Coastal Ocean Observing Regional Association

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ABSTRACT

A conceptual design for a southeast United States regional coastal ocean observing system (RCOOS) is built upon a partnership between institutions of the region and among elements of the academic, government and private sectors. This design envisions support of a broad range of applications (e.g., marine operations, natural hazards, and ecosystem-based management) through the routine operation of predictive models that utilize the system observations to ensure their validity. A distributed information management system enables information flow, and a centralized information hub serves to aggregate information regionally and distribute it as needed. A variety of observing assets are needed to satisfy model requirements. An initial distribution of assets is proposed that recognizes the physical structure and forcing in the southeast U.S. coastal ocean. *In-situ* data collection includes moorings, profilers and gliders to provide 3D, time-dependent sampling, HF radar and surface drifters for synoptic sampling of surface currents, and satellite remote sensing of surface ocean properties. Nested model systems are required to properly represent ocean conditions from the outer edge of the EEZ to the watersheds. An effective RCOOS will depend upon a vital "National Backbone" (federally supported) system of *in situ* and satellite observations, model products, and data management. This dependence highlights the needs for a clear definition of the National Backbone components and a Concept of Operations (CONOPS) that defines the roles, functions and interactions of regional and federal components of the integrated system. A preliminary CONOPS is offered for the Southeast (SE) RCOOS. Thorough system testing is advocated using a combination of application-specific and process-oriented experiments. Estimates of costs and personnel required as initial components of the SE RCOOS are included. Initial thoughts on the Research and Development program required to support the RCOOS are also outlined.

1. Introduction

The definition of the structure of the U.S. Integrated Ocean Observing System (IOOS) has been developed in large part through the actions of Ocean.US, an interagency planning office established in 2000 to advance the development of IOOS. The U.S. coastal ocean component of the IOOS is envisioned to consist of a federal network (the "National Backbone") which will provide sustained support for *in situ* and satellite remote sensing observations, predictive models, and data management elements on the national scale, augmented by regional coastal ocean observing systems (RCOOSs) (Ocean.US, 2002). Each RCOOS will be an integral component of its respective regional association (RA) of stakeholders (*viz.*, data providers and users), which in turn is

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a member of the National Federation of Regional Associations (NFRA) (Ocean.US, 2004). Through the RA, the RCOOS will be responsive to regional and local needs and augment the National Backbone accordingly. As a pioneering activity associated with the regional development of a coastal ocean observing system (COOS), the Southeast Atlantic Coastal Ocean Observing System (SEACOOS; Seim et al., 2003) has considered the scientific and technical design criteria of the operational RCOOS that will be a central element of the Southeast Coastal Ocean Observing Regional Association (SECOORA). SECOORA and its RCOOS are required to be fully interactive and interoperable with other regional associations, especially with the neighboring GCOOS for the Gulf of Mexico and MACOORA for the mid-Atlantic, as well as with the National Backbone provided by the federal agencies (Fig. 1). Discussed here are preliminary thoughts on the design of a RCOOS for SECOORA, some aspects of how this RCOOS may interact with the National Backbone, and how elements of the RCOOS will transition to certified components of IOOS.

The SEACOOS program began in 2002 and was a prototype RCOOS for the region. To establish support for IOOS the program engaged representatives from public (state and federal), academic and private sectors through a series of public workshops and through directed outreach activities (see www.seacoos.org). These outreach activities were the basis for subsequent definition of regional priorities established by SECOORA. SEACOOS conducted an initial inventory of observing activities and significantly augmented the existing observing infrastructure; established a regional data management and developed a quality assurance/quality control protocol for regional data sharing; and supported several modeling teams. The subsystems functioned in a coordinated fashion to provide a demonstration information portal for the region. However, funding for SEACOOS was not permanent and the assets it supported cannot be maintained without a new funding source. The experience of the SEACOOS program does provide a valuable perspective on how a more operational RCOOS program should be structured and is largely the basis for the views expressed herein.

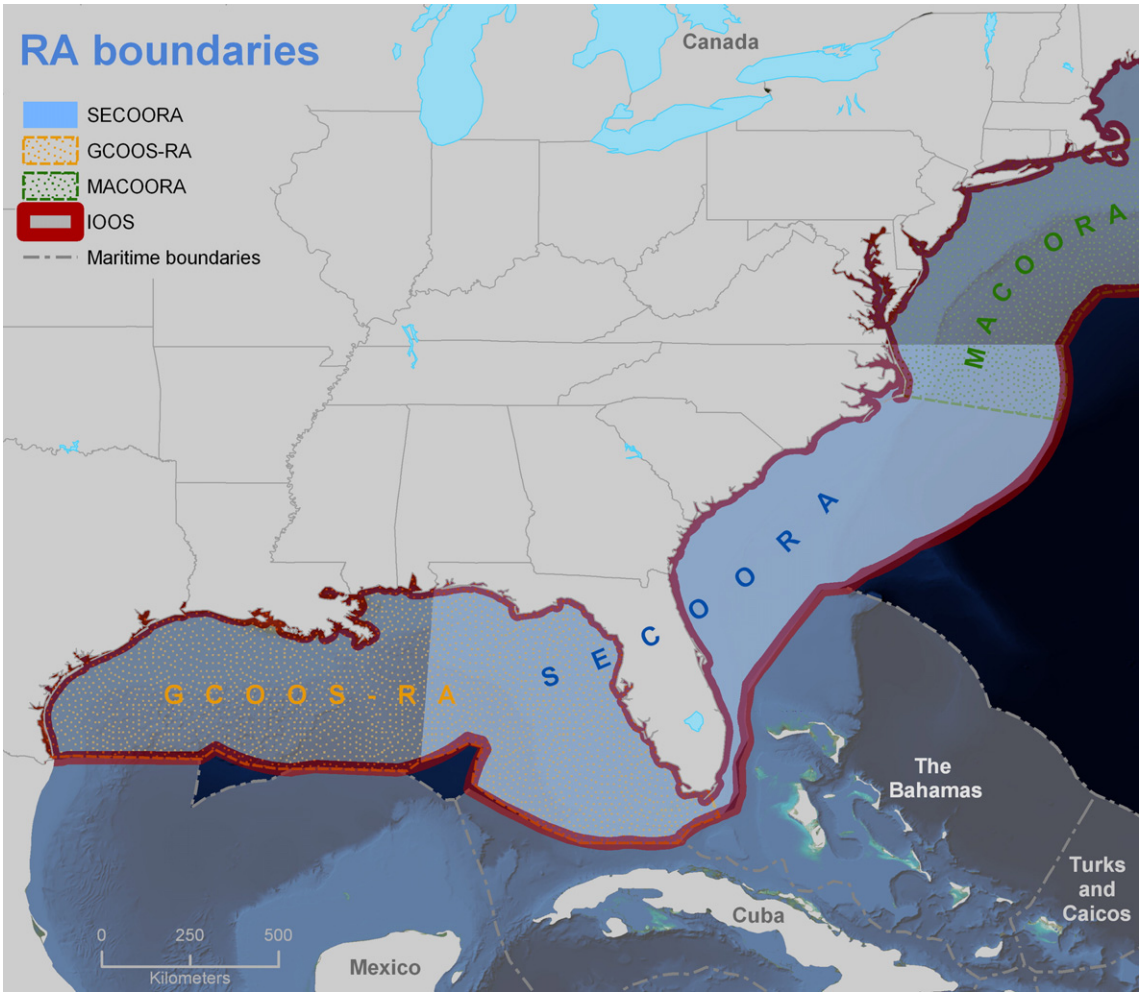

Fig. 1. Approximate boundaries of regional associations (RAs) and the coastal component of the U.S. Integrated Ocean Observing System (IOOS). CaRA does not overlap with SECOORA and is connected oceanographically through international waters.