A Collaborative Environment for the Northern Gulf Coastal Hazards Collaboratory

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http://www.itsc.uah.edu/ngchc/

Abstract

Sharing data and information across platforms and disciplines is essential to the research process and key scientific discovery and understanding. While the ability to use and share distributed data, computations, models, and instruments at unprecedented scales can enable transformative research, the complexity of scientific problems has increased as research has become more collaborative and interdisciplinary in nature. The effective use of modeling and simulation in observatories plays a critical role in modern scientific advances. There is a great need within the coastal community to share data and information for accelerating the research process. The Northern Gulf Coastal Hazards Collaboratory (NG-CHC), funded by the National Science Foundation (NSF) Experimental Program to Stimulate Competitive Research (EPSCoR), is filling that need by building cyberinfrastructure to catalyze collaborative research and education to reduce risks to coastal vulnerabilities. Researchers in Louisiana, Mississippi, and Alabama are working to advance the science and engineering of coastal hazards across the region and address problems of major national importance, including engineering design, coastal system response, and risk management of coastal hazards. The research team will pioneer the development of an integrated large-scale 'catchment to the coast' collaborative modeling system using cyberinfrastructure to integrate data from observation and sensor systems with computer models across the Northern Gulf Coast. Within this effort, the Information Technology and Systems Center (ITSC) at the University of Alabama in Huntsville (UAHuntsville) is leading the development of a collaborative environment for the coastal hazards research community to provide needed capabilities for simulating coastal hazards in a multidisciplinary environment.

Content Management Framework based Environment

The NG-CHC collaborative environment enables the close interaction among coastal scientists, coastal engineers, social scientist and computer scientists, freeing the researcher to concentrate on science and enables knowledge discovery. Based on a freely available Content Management Framework (CMF), the environment includes modules specifically developed to support science research, analysis, and visualization. The environment supports permission-based access to both public and private content, as well as the categorization and aggregation of content by type and group audience. A Public education and outreach area is provided to increase public knowledge and understanding, including project information, educational tools, and learning modules.

Tools

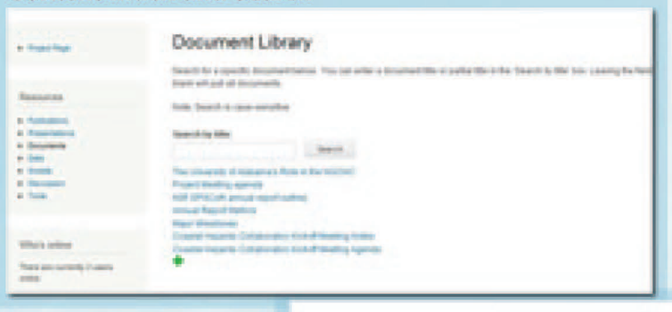
Information and access to a variety of tools for working with data and models is provided; including tools for data processing and analysis, assimilation, mining, and visualization.

Sulis, developed by Mississippi State University and the Northern Gulf Institute (NGI), is a computer-based water resource decision support toolkit. Sulis will provide ready access to environmental and natural resources information in a useful form to better understand aquascapes and their processes, to evaluate the probable consequences of management decisions and natural change, and to make informed decisions with a holistic perspective
http://www.gri.msstate.edu/research/sulis/

NG-CHC Cyberinfrastructure

The NG-CHC cyberinfrastructure design builds upon the shaded portion of the layered diagram presented in the January 2003 Report of the National Science Foundation Blue-Ribbon Advisory Panel on Cyberinfrastructure. Simulation experiments, each focusing on different aspects of coastal hazards, will demonstrate new capabilities and provide communities of users with needed tools and services. Detailed requirements for cyberinfrastructure are being refined through the development, implementation, and testing of collaborative simulation experiments.

Content Index and Search

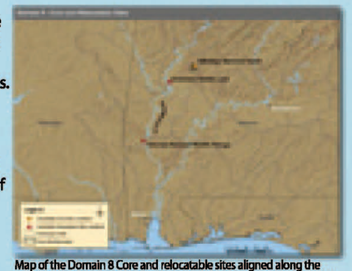


Private Group Dashboards

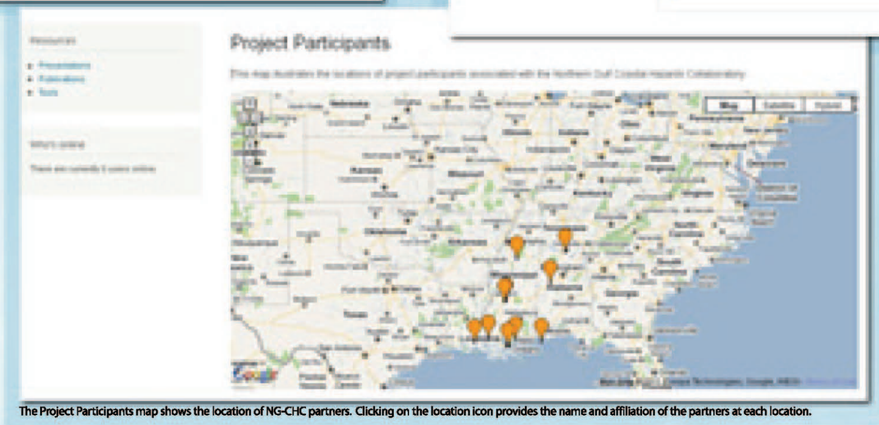
In addition to serving as a portal, the collaborative environment allows researchers to organize, discover and share information about data, models, tools and other resources; discuss project activities and results; view publications, presentations and other documents; and track the history of project activities. Researchers can associate data, data sources, parameters, models, tools and other information with specific research experiments. The researcher can then easily find and reuse this information, easing the process to capture and produce experiment results. Project management is supported in the environment, including the ability to produce project reports and a calendar allowing users to schedule meetings, telecoms, and other events, with easy access to associated content such as meeting logistics, agendas and notes. The discussion forum provides the capability for researchers to view and post messages, respond to posts from others, and search for topics of interest. Users can be notified of new posts via an RSS feed.

Data

The integrated cyberinfrastructure will enable and promote seamless access to data from diverse environmental monitoring systems. Researchers at the University of Alabama are populating the collaborative environment with ideas, data, and methods relevant to their investigations of the role of water quality, stream dynamics, landscape connections, and evapotranspiration to support modeling rivers and ecosystem recovery during extreme events as well as immediate and long-term ecosystem recovery. The research effort includes data inventory and collection, processing, gap identification, format exchange method development, and visualization for models supporting experiments in Ecosystem Restoration and Flood Risks Reduction for the Mobile Basin and in smaller watersheds connected to the newly established National



Map of the Domain 8 Core and relocatable sites aligned along the hydrological flowpaths down the Tombigbee waterway in the Mobile River Basin.



The Project Participants map shows the location of NG-CHC partners. Clicking on the location icon provides the name and affiliation of the partners at each location.

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