SCOOP Data Management: A Standards-based Distributed System for Coastal Data and Modeling

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http://scoop.sura.org
Integrated Ocean Observing: A Key Component of IEOS

- National Oceanographic Partnership Program (NOPP) 15 federal agencies providing leadership and coordination of national research and education programs [http://www.nopp.org/](http://www.nopp.org/)


- National Federation of Regional Associations provide a framework for orchestrating regional collaborations [http://www.usnfra.org/](http://www.usnfra.org/)

- NSF Ocean Research Interactive Observatory Networks (ORION) an emerging network of complimentary research infrastructure that provides a research foundation for IOOS applications [http://www.orionprogram.org/default.html](http://www.orionprogram.org/default.html)

- Interoperability so that national and regional activities can integrate into a seamless tapestry of observations and predictions, e.g., OpenIOOS [http://www.openioos.org/](http://www.openioos.org/)
Key Standards-based Interoperability Efforts

- **Ocean.US Data Management and Communications (DMAC) Plan** provides the framework for interoperability
  
  [http://dmac.ocean.us/dacsc/imp_plan.jsp](http://dmac.ocean.us/dacsc/imp_plan.jsp)

- **Open Geographic Information Systems (GIS) Consortium (OGC)** is an open consortium of industry, government, and academia developing interface specifications to support interoperability
  
  [http://www.opengis.org](http://www.opengis.org)

- **Marine Metadata Interoperability** is a community effort to make marine metadata easier to find, access and use
  
What is SCOOP?

- Southeastern Universities Research Association (SURA) program to create an infrastructure for a distributed Integrated Ocean Observing System (IOOS) in the southeastern region
  - Provides a shared means for the acquisition of observational data
  - Enables modeling, analysis and delivery of information in real-time

- The SCOOP program is a SURA Coastal Research initiative that is deploying cutting edge IT to advance the science of environmental prediction and hazard planning for our nation’s coasts.

- SCOOP will serve as a model for the national effort in integrating ocean observing systems

http://scoop.sura.org/
A Distributed Laboratory

- Community-based prototype of a distributed national laboratory for coastal research and applications
- Open-access, distributed facility supported by university researchers in partnership with government agencies and the private sector.
- Combining coastal science & IT to enable revolutionary science in environmental prediction & hazard planning.
- Implementing partners:
  - GoMOOS - OpenI0OS (user interface), WW3 & SWAN (wave models)
  - UAH - Catalog & Related Services (Data Portal) & SCOOP web site
  - UF - Regional Inundation Models (CH3D), Virtualization, & Wind Ensemble
  - LSU - Distributed Archive Design & Compute Resource Utilization
  - U Miami - Hurricane Forcing & Product-Info Development
  - UNC - Regional Inundation (ADCIRC) & USACE & Grid Computing
  - TAMU - Archive and Visualization Services (Smorgasbord Portal)
  - VIMS - Regional Inundation Models (ELCIRC) & OOSTech Follow-on
Standards and conventions are used across the program to enable interoperability among SCOOP partners:

- **SCOOP file names** encode selected metadata, in order to facilitate data file identification and usability across the distributed system:
  - Basic categorizations of data: (1) in-situ and remotely observed data, (2) Wind model output, and (3) Wave/Surge model output
  - Observation instrument or model name
  - Source institution
  - Time of observation or model initialization, and forecast period
  - Various ancillary information

- **netCDF file format** used for all data generated by coastal models in SCOOP

- **COARDS/CF vocabulary** used for variable names within SCOOP data files and in the metadata Catalog
The SCOOP metadata Catalog is a central metadata repository facilitating data discovery and access.

The Catalog is accessed through a suite of web services:

- Support *SOAP*, *WSDL*, and *XML* standards of the *World Wide Web Consortium*
- Conform to the *Basic Profile* specifications of the *Web Services Interoperability Organization*
- Written in Java or Perl
- Tested locally with both Java and Perl clients to assure cross-platform interoperability
Interactive visualizations of near-real-time coastal observations with water level, wave and surge forecasts

**Web Map Service** and **Web Feature Service** protocols defined by *Open Geospatial Consortium*

Standard, efficient visualization interface for both SCOOP archives

- No requirement to move large model output to another site
- Local data access allows fast image creation
- Graphical product smaller than model output
OpenIOOS Interoperability Testbed
...where standards enable innovation

http://www.openioos.org/
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The SCOOP Catalog is compliant with federal metadata standards

- Incorporates *Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata*
- Supports an FGDC Clearinghouse node for SCOOP

UAH represents SCOOP in several data and metadata standards efforts

- Metadata and Data Discovery Expert Team for *Data Management and Communications* within IOOS.
- *Marine Metadata Interoperability* project
Hurricane-based Data Search

http://scoop.sura.org/Storms/
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SURA Coastal Ocean Observing and Prediction (SCOOP) Program

"Enabling Integration of Coastal Observing Initiatives"

Vision
Providing community-wide information services and technologies that advance the sciences of prediction and hazard planning for our nation’s coastal populations.

Objective
The SURA Coastal Ocean Observing and Prediction (SCOOP) program is integrating diverse efforts and empowering a virtual community of scientists with the tools, resources, and ideas that lead to discovery. The purpose is to promote the effective and rapid fusion of observed oceanographic data with numerical models and to facilitate the rapid dissemination of information to operational, scientific, and public or private users.

Goals
Creating an open access, distributed laboratory for oceanographic scientific research and coastal operations by:

- Supporting the development and implementation of data standards that comprise the technical language of interoperability,
- Demonstrating the potential for integration and added value that occurs when disparate and diverse communities employ a common, standardized framework for information exchange; and
- Deploying the technical infrastructure to create an environmental prediction system that can be used as a research tool and handed off to the responsible entity that will use it to support the decision-making activities that benefit society.