### 7C.01 Techniques for Improving the Usability of Data Repository User Interfaces

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Usability, as discussed by Jakob Nielsen (2012), is the “quality attribute that assesses how easy user interfaces are to use” as well as refers to “methods for improving ease-of-use during the design process”. By applying usability principles to user interface (UI) designs and evaluating user experience (UX) through usability techniques, interfaces can be enhanced and improved in order to provide people with positive and productive interactions with the technologies that they use.

Usability is especially critical in web interface design. For data repositories, web interfaces are usually the primary, if not the only, method that is available to their users for searching, discovering, understanding, accessing, and using the data and related resources that the repositories hold. Given that sub-par UIs can reduce the ability of users to access and use data, it is important to consider how repositories’ web interfaces can be evaluated and improved in order to ensure useful and successful user interactions.

At the National Center for Atmospheric Research (NCAR), the Digital Asset Service Hub (DASH) is being designed and implemented as the system for deploying NCAR’s new data services. The usability of the DASH and its services has been a priority since the beginning, and usability evaluation techniques have been used throughout the design and implementation cycles in order to provide positive and productive results for DASH’s intended community. We will present lessons learned in having already applied four different usability techniques to four separate data service areas. The talk will demonstrate the ways in which data repositories can benefit from the UI/UX principles and optimize their overall usability by integrating usability evaluations into their workflows.

### 7C.02 Good metadata guidance can make CMECS resources more accessible in data catalogs

**Kathy Martinolich** (NESDIS NCEI/MSU NGI)

The Coastal and Marine Ecological Classification Standard (CMECS) provides a vocabulary to describe geological, physical, biological, and chemical components of coastal and ocean ecosystems. Consistent use of the CMECS standard produces data sets that can be more easily integrated by future projects that compare sites, evaluate changing conditions, or assemble regional assessments. Discovery of useful CMECS data is easier with data catalogs that are designed to automatically filter data by keywords, assuming the data are represented by metadata records with identified CMECS terms in keyword fields. Our presentation will show how NOAA discovery catalogs use this capability, as well as the small set of metadata requirements that make it possible. By starting to use CMECS terms consistently, when appropriate, in our metadata, scientists can more easily locate and utilize coastal and marine ecological data.

### 7C.03 Tailored data delivery from multiple surface and subsurface ocean observing systems using the Optimized Ocean Data Portal at the National Centers for Environmental Information (NCEI)

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NCEI stewards data from many different ocean observing systems. The data from these systems must be synthesised to understand the entire ocean environment and the ways that it is changing. However, the data are archived separately and in different formats, and it can be difficult for a user without expertise with each observing system’s data to fully take advantage of all the information. In addition, a user would need expertise in several different ocean observing systems and databases to ensure they have the best copy of each observation.

The goal of the Optimized Ocean Portal project is to provide a single access point for users to select and download the highest-quality ocean data and metadata that will advance their work while avoiding duplication and unsuitable data. The Portal will provide tailored access to quality-controlled marine meteorology and sea surface variables such as sea surface temperature, as well as subsurface measurements of ocean currents and physical, chemical, and biological variables from the surface to the ocean bottom. Users can filter the data by measured variables, dataset types, geospatial bounds, quality control flags, and other criteria. Data obtained in the search will be provided in a Climate Forecast (CF)-compliant netCDF format or OPeNDAP ASCII format that can easily be used in analytical tools. The Portal is currently in the late stages of development.

7C.04 Increasing access to coral reef data for improved resource management

Brian Beck (NESDIS NCEI/CRCP)

Coral reefs are one of the most valuable marine ecosystems on the planet and are under increasing threats from climate change, overfishing and land based pollutants. Resource managers have an increasing need for the most recent data to help them determine the status of their reefs. Historically, survey-based monitoring data (e.g. fish and coral surveys) have been difficult for managers to access in a timely fashion. In order to provide enhanced access to the latest monitoring data produced, NOAA’s Coral Reef Conservation Program (CRCP) is utilizing ERDDAP to provide quick access to fish and coral survey data. A workflow has been developed to publish a subset of these data via ERDDAP and current efforts are focused on refining the database and Web front end to make it more user friendly and as useful as possible for coral reef resource managers.

The next step for this research is to work with coral reef resource managers to develop a user friendly front end to access the data. The objective is to decrease the amount of time that the resource managers will have to spend obtaining, formatting and summarizing the data, leaving more time for application of the data to better manage coral reefs. Once this process has been completed for the subset of fish and coral survey data, it will be expanded to include all surveys for the areas that the CRCP monitors. Development beyond that will be the roll out of various climate based data sets collected for coral reef monitoring.

7C.05 NOAA CoastWatch/OceanWatch: Disks, Data, and Discovery

Michael Soracco (NESDIS NOAA CoastWatch/OceanWatch and Digital MindTrust)

Heng Gu (NOAA CoastWatch/OceanWatch and Digital MindTrust), Veronica P. Lance (NOAA CoastWatch/OceanWatch and Global Science and Technology, Inc.), Paul DiGiacomo (NOAA CoastWatch/OceanWatch)
The NOAA CoastWatch/OceanWatch Program (hereafter CW) has a long history of serving sea surface temperature (SST) and ocean color (OC) near real time satellite data products for coastal regions in the continental United States (CONUS) to a broad user community both NOAA and outside of NOAA. In this new era of JPSS and other NOAA, US and international satellite missions coupled with emerging and evolving user requirements, CW has expanded its scope in:

- Environmental parameters: CW serves at least 7 ocean parameters, representing all of the NESDIS/STAR Satellite Oceanography and Climatology Division (SOCD) science teams including: SST, OC, sea surface height from altimetry, surface roughness from SAR, ocean surface vector winds, sea ice, and sea surface salinity.
- Processing levels: CW serves swath data as well as higher level gridded data products and model outputs, processed both at STAR and by others.
- Temporal ranges and data quality: both near real time (fast) and long term, consistent, time series (e.g., science quality reprocessed datasets)
- Geographical coverage: CONUS explicit, global and sectorized global data.

CW also functions as a hub for NESDIS/STAR Satellite Oceanography and Climatology Division (SOCD) data management and as a pathway to operations for experimental research products by 1) providing product development and technical guidance (e.g., such as passing user requests to algorithm developers and suggesting metadata formatting to make product files compatible with CW data search and access tools); 2) providing a routine processing and distribution platform for experimental and “value-added” information products; 3) serving as a “moderate assurance” data provider for multiple levels of data products; 4) serving as interim data repository; 5) providing product information and training for users through various methods including website, videos and training classes; and 5) serving as the provider to transition products to OSPO and/or to NCEI when mature and funded.

In this presentation, we will show advances in our data portal and data discovery tools as well discuss technical strategies being considered for meeting the rapidly growing data management needs of CW and we will invite suggestions and feedback from the EDMW community.

7C.06 DIVER Application: Accessing Project and Environmental Data and Developing Data Services

Benjamin Shorr (NOS Office of Response & Restoration) Nicholas Eckhardt (NOAA), George Graettinger (NOAA)
The DIVER application is a data warehouse containing detailed environmental and project data including the majority of Natural Resource Damage Assessment (NRDA) data from the Deepwater Horizon Oil Spill which spans the Gulf of Mexico.

The DIVER Explorer query tool was developed to support querying high level information describing organizing of environmental data (e.g. Workplan, Dates, Location) and also detailed information including analytical chemistry results, field measurements, and related information including field sampling forms and photographs.

The DIVER Explorer query tool has two main ways for users to query data: Guided Queries and a Keyword Search. The Guided Queries provide users with queries that are developed for specific data types, with the detailed choices required to output results that can be used for further analysis and modeling. Keyword Search is newly developed functionality that supports users entering a fragment of text or whole word, with a result showing the texts occurrence within the 20+ million environmental data records. A user can further refine the result of a Keyword Search by a useful field (e.g. Collection Form or Matrix), and then choose to run a query which results in an output table.

All query results in DIVER Explorer create a map with spatial data, a table with results that can be filtered and downloaded, charts showing facets of the data, and ISO-compliant metadata. Some data types include detailed study notes, photos, and the ability to link to unstructured information such as scanned forms or notes.

An additional new way to access data is through data services built upon the ERDDAP data server, developed by NOAA. The ERDDAP data server implemented within DIVER provides direct, machine readable access to the data warehouse through a URL. DIVER also generates Web Mapping Services (WMS), which are map layers that can be consumed by mapping applications including NOAA's Environmental Response Management Application (ERMA).