MBARI's Spatial Temporal Oceanographic Query System (STOQS) [1]

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Abstract:
Advances in technology enable us to collect massive amounts of diverse data. With the ability to collect more data, the problem of comparative analysis becomes increasing difficult. The Monterey Bay Aquarium Research Institute (MBARI) designed the Spatial Temporal Oceanographic Query System (STOQS) to create new capabilities for scientists to gain insight from data collected by oceanographic platforms. STOQS uses a geospatial database and a web-based user interface (UI) to allow scientists to explore large collections of data. The UI is optimized to provide a quick overview of data in spatial and temporal dimensions, as well as in parameter and platform space. A user may zoom into a feature of interest and select it, initiating a filter operation updating the UI with an overview of all the data in the new filtered selection. When details are desired, radio buttons and check boxes can be selected to generate a number of different types of visualizations. These include color-filled temporal section plots, parameter-parameter plots, and both 2D and 3D spatial visualizations. The Extensible 3D (X3D) standard and X3DOM JavaScript library provides the technology for presenting 3D data in a web browser. STOQS has been in use at MBARI for four years and is helping us manage and visualize data from month-long multi-platform observational campaigns. These campaigns produce tens of millions of diverse measurements. These volumes are too great to really understand – even with an effective data exploration UI.

Effective management of these diverse data in STOQS is achieved through a two-step harmonization process: 1) conversion of all data to OGC CF-NetCDF Discrete Sampling Geometry feature types and 2) loading all data into the STOQS data model. Having all of the data easily accessible via this data model made development of the UI possible. This same method of access is also being used for development of visualization and analysis programs for tasks that cannot be executed within the UI. Examples include 1) generating a movie of chlorophyll-backscatter plots from data collected by multiple platforms over weeks and 2) classification of measurements via machine learning methods. This demonstration will show how STOQS is being used to help scientists understand recently collected data from Monterey Bay.

Collaboration Area: Visualization [3]

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Keywords: Oceanographic 3D in situ data Web-based user interface [5]

Links
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