Case Study: Ocean Condition Forecasting

Contact:

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Topic:

Can coastal ocean forecasting and visualization be improved through collaboration in discovery, learning, and practice?

Background:

This research relates to the intersection of fisheries, climate, and resilience by focusing on the process by which ocean forecasting systems can be developed, used, evaluated and improved through collaboration between three key entities: (1) marine scientists (the people who produce computer models/data of the ocean's near-term future surface and subsurface conditions); (2) information technologists (the people who produce visualization “tools” that can display the predicted ocean conditions); and (3) ocean users (the people who can practically use this information; initially commercial fishermen in Newport but will expand to include other ocean users such as charter fishermen and search and rescue, etc.).

NOAA is moving forward in their efforts to create West Coast Ocean forecast models. They are, however, less clear and experienced in crafting relationships with end users to (1) improve the data in the models and (2) in the process of collaboratively designing and implementing visualization systems. As climate change and other stressors continue to face ocean users, a timely opportunity exists to move towards making “ocean forecasting” as user friendly as “weather forecasting” is on land.

Our hypothesis is that establishing and strengthening collaboration / relationships between these three key entities improves the accuracy and usability of the ocean forecast data and visualization systems (current tool is called Seacast.org) because feedback from those directly benefiting from the use of the forecast tool is shared and considered by those producing the models and subsequent forecasts. Thus, these relationships are the “core” of the system and the “process” by which accurate and practical advances can be made. These relationships need to be strong enough to generate continued support for the development of ocean forecast systems within NOAA or to encourage commercial development. The goal of our research is to determine and document how such relationships can be established, strengthened, and flourish, and how ocean forecasting visualization systems can be improved to support fishing and coastal community resilience.

Existing Data:

Current computer models of the ocean's circulation have been developed:

1) ROMS (the Regional Ocean Modeling System) is a regional coastal ocean circulation model that forecasts:

* Sea surface temperature
* Sea surface currents

2) NAMS (North American Mesoscale???) is a \_\_\_\_\_\_ model that forecasts:

* Wind speed
* Wind direction

3) Wave Watch III is a model that forecasts:

* Surface wave direction
* Surface wave height

Current website is in operation but in continual improvement:

* Seacast.org

One masters thesis complete regarding the history of this effort:

* Colin Duncan’s Thesis ([http://ir.library.oregonstate.edu/xmlui/handle/1957/52811](http://ir.library.oregonstate.edu/xmlui/handle/1957/52811#http://ir.library.oregonstate.edu/xmlui/handle/1957/52811))

Data Needs:

Our goal is to make predictive model fields (from the scientific community; OSU, NOAA and others) available and understandable through a visualization system (created and improved by OSU CS students considering the needs and feedback of ocean users), and to study and document the factors that build/strengthen the relationships between the three communities in order to improve the accuracy and usability of the science to ultimately help to build the resilience of coastal communities of interest and place.

Desired Area(s) of Expertise for Students:

Human dimension analytical skills

Physical dimension analytical skills

Computer visualization analytical skills