

“Conference on Coastal Surface Current Mapping”

Hosted by Ocean.US

At the Consortium for Ocean Research and Education, Washington, DC

On October 21, 2004

Coordinated by Jack Harlan (NOAA) and Larry Atkinson (Ocean.US)

Purpose

The purpose of the Conference on Coastal Surface Current Mapping was to inform appropriate federal agency representatives about the state of surface current mapping technology in nearshore ocean waters so they can determine if such observations and information might help them better meet their agency goals and missions. Another expected outcome was the description of the specific types of surface current products needed by each agency.

The conference focused on high frequency (HF) radar surface current mapping technology. This technology provides surface current maps in an area within 200 km of the shore. Hourly maps can be provided with resolutions of 100's of m to 10's of km depending on the particular system. Other methodologies were also discussed such as feature tracking and satellite altimetry. These methods are more effective farther offshore and would complement the information provided by HF radar.

Participants

The meeting was attended by 33 people from twelve federal offices and from several academic institutions. Participants included potential HF radar data products users from Federal agencies, as well as several members of the ocean remote sensing research community who presented HF radar background information, current research interests and examples of possible products.

Interactive Session

Preliminary conclusions of the conference are as follows:

- All attendees had a need for HFR-derived surface current information
- Most of the users' needs can be met by HFR i.e. spatial, temporal resolution. There are some requirements for higher spatial resolution and very near shore observations.
- A demonstration pilot project was considered high priority. A process might be to identify the core user groups and create a regional-scale, end-to-end pilot study that demonstrates existing user products while providing a research test-bed for developing products and improvements. Integration of data into models should be part of the demonstration pilot program.
- Current NOAA/NOS plans include appropriate DMAC compliance including quantifying errors in the measurements and QA/QC.

- Some of the spatial resolution requirements were sub-km scale
- Coverage in very nearshore (rip currents for example) desired by some would require additional R&D
- Wave information from HF radar was a common requirement. This would require additional research and development.

Since the goal of the meeting was to inform the participants several presentations were given:

- Introduction and Overview – Larry Atkinson
- Review of the technology and existing systems – Jeff Paduan
- Coast Guard use of Surface Current Mapping: Search and Rescue - Jim O'Donnell, U. Conn.
- NOAA Applications of Surface Current Mapping – Jack Harlan
- Surface Current Mapping for USCG - An Information User's Perspective – Lew Lewandowski
- Wave measurements – Jack Harlan
- Surface Current Mapping Education Project – Sara Tweedie

During the last hour of the meeting participants were asked to mention any requirements for this technology or any other thoughts that came to mind during the meeting.

Applications Needed

The applications of HFR-derived current velocities ranged over a wide spectrum of coastal priorities. A summary of those applications, broadly categorized, mentioned by participants:

Resource Management

Coral reef management
Coastal zone management

Modeling

Assimilation of data into models of coastal regions
Plume trajectories model input
Circulation model validation

Ocean Monitoring

Non-point source pollution
Bacterial forecasts
Water conditions

Coastal Monitoring

Sediment transport
Barrier island migration
Dredging material transport

Spatio-Temporal Resolutions of Interest

Typically, HFR-derived data has spatial resolutions in the range ~1 to 10 km, depending on the particular radar frequency and other radar operating parameters. The azimuthal resolution varies with distance from the radar and has values of less than 1 to approximately 10 km.

Several participants expressed the desire for sub-km scale resolution, although 1 km resolution would greatly enhance their existing available surface velocity data.

Temporal resolution normally available from HFR data is usually limited to about 15 to 20 minutes, with hourly data being more typical. This resolution was sufficient for all the participants' needs. In fact, for some of the ecologically-oriented applications, longer time averaging, e.g. weeks to months, was also needed.

Other Needs

Data formatting was also mentioned as a concern by a few participants who had specific requests for NetCDF and GIS-compatible formats.

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