Dec 7th, 4:45 PM - 5:00 PM

# Session 4 Discussion Notes

Ocean Waves Workshop 2017

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**Session**
Session 4 - Accessibility of wave information for scientists, engineers, and managers

**Start Date**
7-12-2017 4:15 PM
**End Date**
7-12-2015 5:00 PM
**Comments**
These rapporteur notes do not necessarily reflect the view of all participants and speakers participating in the discussion session.

## Session 4 Notes
## Accessibility of Wave Information for Scientists, Engineers, and Managers

These notes are intended as a supplement to the Session 4 presentation. The following discussion points were captured by workshop rapporteurs:

- Knowledge of environmental factors such as wave forces is key to planning and decision-making. As outlines in Session 1, the planning, operations, and maintenance of coastal and offshore infrastructure is dependent on detailed knowledge of the wave environment.

- Generally, wave models have a tendency to underestimate the largest wave heights, and in particular the peaks, especially during extreme storm conditions. The tendency presents a known problem to end users of model products resulting in an extra factor of safety in planning and operations.

- Coastal waves are significantly influenced by water depth variations, due to bathymetry, tides and surges. Static descriptions of the seafloor used in present day operational models must evolve to dynamic characterization to more accurately reflect significant wave variations over the course of a tide, storm, or other influential factors.

- Wave statistics are sensitive to trends in sea level rise. Increases in mean sea level may alter extreme wave heights and the occurrence of extreme wave conditions. Presently there is no standard way of evaluating these changes for coastal planning and hazards evaluation.

- There is an increasing need for scientists, engineers, and decision-makers to integrate the wealth of accumulated meteorological and oceanographic information to support decisions.

- Operators and managers want verified and analyzed data to back up and sometimes guide their decisions. For data to be of value, investigators must plan not only for collection of data, but also for its distribution and storage.

- There are some inherent differences between visually and instrumentally observed wave heights and wave forecasts; however, these differences are often not incorporated into quantitative vs. qualitative vs. real-world risk assessments.

- Data to include social media are necessary to develop a warning system for sneaker waves, an unanticipated coastal wave that is much greater in force and height than preceding waves.

- Wave spectra can be computed by different methods. The most commonly used algorithm is the Fast-Fourier transform (FFT). Directional wave spectra generally exhibit several peaks due to the coexistence of wind sea generated by local wind conditions and swells originating from distant weather systems. Software is being used by NDBC to partition spectra and discriminate between wind sea and swell waves.

- Wave model output and data from wave buoys can be used for the generation of new information displays and user interfaces that can quickly communicate information of relevance to the end user (e.g., the probability of sneaker sets, rip currents, etc.). Public and private entity outreach and education can help users to understand the value of the data provided by the wave spectral analysis from NDBC.

- Operators need to analyze data such as wave forecasts and explore the options to improve mission and operational performance. Better data analysis techniques result in improved safety and reduced operational costs and energy. Artificial intelligence and machine learning methods are emerging. Access to existing data collections, including databases and environmental modeling results should be explored using these new evolving techniques.

- Information technology should enable transmission of large, high-resolution gridded data products and the establishment of a software/model interoperability infrastructure. Collaboration with industry, academia, and government is needed to maintain the development of cutting edge techniques and technology.

- The public and private sector has access to NOAA Big Data - tens of terabytes of data a day from satellites, radars, ships, buoys, weather models, and other sources. These sectors now have the ability to independently implement advanced diagnostic analytics or predictive tools.

- The group suggested the writing of a White Paper on methods for appropriate model calibration, validation, and uncertainty estimation. The paper could provide a good communication of use, acceptance, and understanding of forecast model uncertainty on par with what the public sees from the NWS.