Dec 7th, 2:30 PM - 2:45 PM

Session 3 Discussion Notes

Ocean Waves Workshop 2017

Session 3 Discussion Notes

Session
Session 3 - Advances and issues in wave buoy technologies

Start Date
7-12-2017 2:15 PM
End Date
7-12-2015 3:00 PM
Comments
These rapporteur notes do not necessarily reflect the view of all participants and speakers participating in the discussion session.

Session 3 Notes
Advances and Issues in Wave Buoy Technologies

These notes are intended as a supplement to the Session 3 presentation. The following discussion points were captured by workshop rapporteurs:

- Fixed weather buoys are an incredibly valuable part of NWS basic sea state forecasting and the hurricane warning system. Both require input data from a static location to support and improve existing models.

- Even given the significant amount of data generated and maintained by NDBC, modelers indicated that wave prediction capabilities are severely constrained by a lack of observations. The community needs validation requirements in order to enhance the network of wave buoys that could be incorporated into NDBC. Public organizations are critical to developing and maintaining requirements. These include National Weather Service Forecast Offices (NWSFO) and US IOOS Regional Associations.

- Implementation of SCOOP (Self-Contained Ocean Observations Payload) on buoys such as the 3-m discus buoys has enabled NDBC to reduce the size of wave buoys and save on operations and maintenance costs. SCOOP has also been employed in some 2.3-meter foam discus buoys. Overall, technology advancements and cost savings such as SCOOP should be continued to ensure that the observational networks could be extended.

- NDBC expressed interest in using the Small Business Innovation Research (SBIR) Program and the Small Business Technology Transfer (STTR) programs to provide opportunities for small businesses to participate in NDBC-sponsored research and development of technology.

- Buoy configuration (e.g., size, shape, and mooring) are important considerations since the buoy should follow the motion of the water particles at the surface in all directions. The buoy will not be able to follow waves that are smaller than the buoy's approximate diameter. Thus, the shortest wavelength that a buoy can follow is generally determined by the size of the

buoy, while the shape of the buoy determines its responsiveness to vertical wave motion. Individual corrections are made for a particular buoy.

- Buoy specific corrections need to be calibrated and validated with known wave observations. An important aspect in long-term data analysis requires an appreciation for the differences in buoy platforms and sensor payloads over the years.

- Wave measurement instrumentation needs to be carefully chosen, configured, and validated for the specific environment. For example, the wave glider can measure waves, but measurement capabilities have only been validated for operational use in specific Gulf of Mexico situations. While the technology is mature and robust, further validation will continue to improve confidence in the measurements.

- Some expendable mini-drifting buoys used by the Navy are not providing accurate enough wave information to use in modeling applications. Prior to deployments, individual sensors must be operationally validated and calibrated where necessary.

- Long term records from wave buoys form the basis to objectively assess climate change and the impact of sea level rise. Wave models provide greater utility with observations, which was discussed in detail during Sessions 2 and 4.

- Continued assessment the overall realism of models in response to actual hurricanes within the limits of available observations will help determine where data and modeling gaps exist. An understanding of the existing data gaps will help assess the need for future wave measurement buoys.

- Data sources (e.g., gliders, floats, profilers, UUVs) that are presently in Navy warehouses to enhance observation programs at military bases, home ports, and ranges could be linked to U.S. IOOS. The increased database would greatly support wave assessment activities such as hurricane preparedness, beach nourishment projects, disaster response, homeland security, training, offshore operations, etc.