

AT A GLANCE

What is it?

A system to import measured ocean surface wave data into the model WAVEWATCH III®, significantly improving wave forecasts for the deployed fleet.

How does it work?

Wave data are compared to model output to determine weighted errors. Then an adjoint-based assimilation system is used to correct model forcing and make better forecasts.

What will it accomplish?

The Navy uses WAVEWATCH III® every day to safely route Naval vessels deployed throughout the global ocean. This system will improve that guidance, making deployments both safer and more effective.

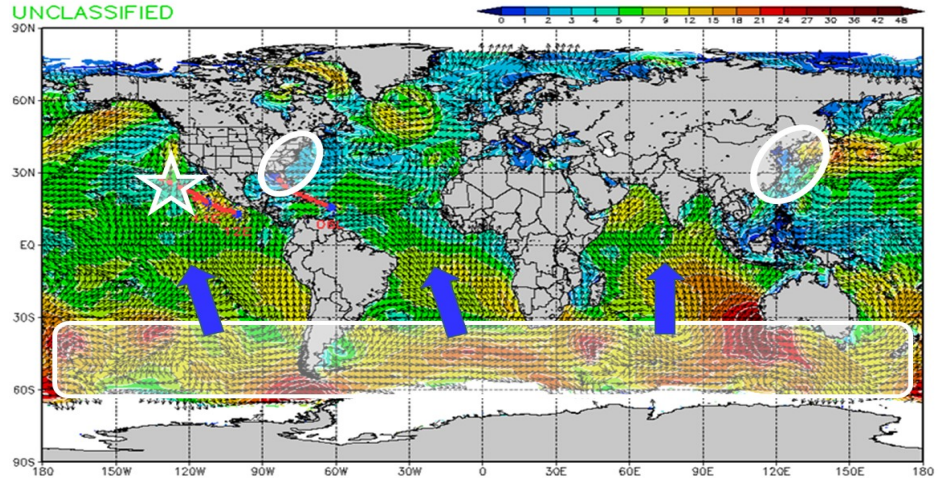
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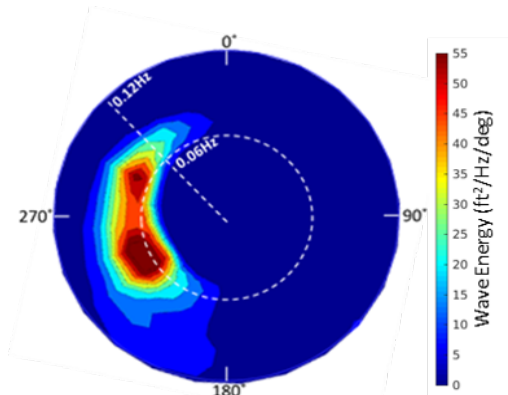
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Locations where spectral assimilation can improve wave forecasts

Forecasts of ocean surface waves by U.S. Navy oceanographers are used regularly to provide routing guidance to deployed ships, and they are usually pretty accurate. However, certain environmental conditions, such as the stronger currents found along some coastal boundaries or the highly variable winds of the Southern Ocean, can cause wave forecast accuracy to deteriorate. Assimilation of measured wave data can help to significantly improve model performance in such regions.

In a new (FY23-25) project at NRL-South, we are designing and building a comprehensive 4-D variational (4DVAR) assimilation system for the Navy's operational wave model, WAVEWATCH III®. The system will allow the model to read in entire wave spectra, which provide a complete description of wave energies and directions at every location where they are measured. Surface wave spectra are now available in near real-time from over a thousand locations around world's oceans. These data will be compared to WAVEWATCH III® output and used to reduce errors in model forcing.



Sample Surface Wave Spectrum

Post-Doc Opportunity

We are currently seeking a post-doctoral student to join us on this project. If you are a U.S. citizen and have experience with variational data assimilation, you may be eligible to apply for a 2-year fully funded post-doc position at NRL South. For further information, visit our website (<https://www7320.nrlssc.navy.mil/jobs.php>) and/or contact Drs Orzech and Ngodock using the information at left.