Sensitivity analysis of dissipation parameterizations in the WAVEWATCH III spectral wave model using the ST6 source term packages for Ireland Coast.

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The research we perform has important engineering applications since a lot of marine activities and offshore engineering activities are in shallow water areas where phenomena like bottom and white-capping dissipation and wind growth take place. The physical parametrization of such forcing/dissipation has become an important issue in the improvement of the performance of models in order to provide accurate sea-state information. In this regard, we perform a sensitivity analysis of dissipation parameterizations in the third-generation spectral wave model WAVEWATCH III using the ST6 source term packages, proposed by Zieger-Babanin 2015, to describe wind generation and dissipation due to white-capping and bottom friction.

A system of nested grids is used to model long distance swells generated in the North Atlantic Ocean and propagating all the way to the west coast of Ireland. We used a 30-minute coarse resolution for the North Atlantic grid, a 6-minute intermediate resolution for the North-East Atlantic, and a 3-minute fine resolution in coastal areas closer to Ireland.

The sensitivity analysis in the parameterization is based on the effect of the model performance by varying the adjustable parameters in the wind input source, swell dissipation in terms of the interaction of waves with oceanic turbulence and the drag coefficient to potentially eliminate a bias in the wind field. The results of the model for the coast of Ireland are discussed in terms of various parametrization schemes.