



Sensitivity to feedbacks in a three way coupled atmosphere-ocean-wave modelling system at regional scales

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The Met Office is currently developing three way coupling capability of the atmosphere-ocean-wave models. A high resolution (1.5 km) regional configuration for the Atlantic Margin domain over north-west Europe have been implemented as part of the UK Environmental Prediction project. It is a unique modelling system comprised of ocean (NEMO), wave (WAVEWATCH III), atmosphere (Met Office Unified Model) and land surface (JULES) model components. Research results will be presented showing the sensitivity of coastal ocean (e.g. SST) and wave (e.g. significant wave height) predictions to the choice of coupling approach and degree of complexity represented (e.g. one-way, two-way feedbacks, with and without atmospheric feedback, and sensitivity to choice of coupled physics represented).

A number of further sensitivities and recommendations will also be discussed. For example, by comparing results with a coarser-resolution (7km) system, the presentation will also highlight the sensitivity of results to model resolution. Different source terms are available for wave growth and decay within WAVEWATCH III. These have been found to produce significantly different values and distributions of the Charnock parameter, which is the primary coupling parameter between the wave model and the atmospheric model. Sensitivities to the choice of model coupling frequency will also be addressed.

The presentation will also discuss the potential for insight to be drawn from comparisons between results at high resolution regional seas with sensitivities to coupling found in global ocean and wave prediction systems.