

Predicted Wave Climate for the UK: towards an Integrated Model of Coastal Impacts of Climate Change

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Abstract

The effect of global climate change on the wave climate of the coastal regions of the UK is investigated. A state of the art third generation wave model is used to predict changes in wave climate in the North East Atlantic and UK coastal waters. The driving meteorological data is provided by global and regional climate models, driven by different future greenhouse gas emissions scenarios. Present day wave climates are validated against a previous hindcast, which has been calibrated with wave observations, and good agreement is found in regions of interest. These studies downscale the affect of global climate changes on wave climate to a previously unresolved scale. Ouput of these wave climate predictions are to be used in a regional *Coastal Simulator* manged by the Tyndall Centre for Climate Change Research. The Coastal Simulator is a framework of integrated hydrodynamic, morphological and socio-economic models that provides predictions of the increased risks of coastal flooding and cliff erosion on the East Anglia coastline. The drivers of increased risks are sea-level rise and increased storm surges and waves in possible future climate scenarios. On a large scale, for the range of future climate scenarios, strong positive changes in significant wave height are predicted in the North East Atlantic and South West of the UK. On the regional scale of the Southern North Sea the spatial pattern of changes in wave height varies considerably with possible future scenario, but positive changes in the mean and high percentiles of wave height are predicted off-shore from the particular region of interest on the East Anglia coastline.