School of
Civil Engineering and the Environment

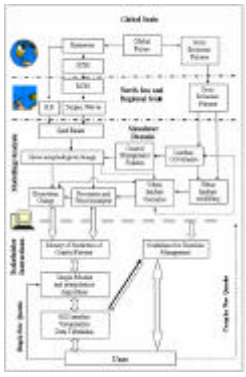
Managing Sea Level Rise: A Regional Coastal Simulator to Support Decision Making

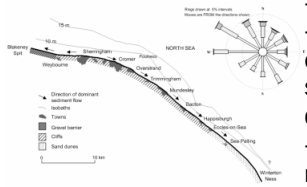
Introduction: Coastal regions are vulnerable to the increases in sea level and storminess, and significant impacts are inevitable through the twenty-first century and beyond without adaptation. Successful adaptation demands a scientific understanding of coastal dynamics at broad scales, including the interaction with ecological and human systems. This research aims to develop a regional coastal simulator that includes fully integrated tools for coastal simulation and analysis including process-based models of the effect of climate change on the wave and surge climate, and resulting erosion and flood risk, and ecosystem responses, taking account of local socio-economic scenarios.

Summary

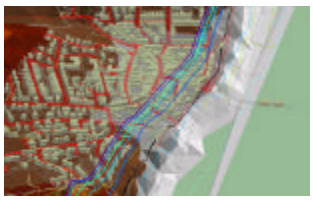
The regional coastal simulator will be used to
- identify how the future coastline may evolve
- determine what constitutes a sustainable coastline by quantifying ecosystem, flood and erosion risks
- explore how best to deliver sustainable natural and social capital in the coastal zone in the face of climate change.

Integrated framework





Modelling Coastal Flood and Erosion Risk



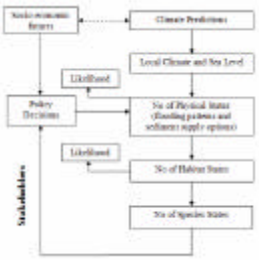
It will include:
- Improved driver description
- Linked morphological change over 50-km of shoreline, including effects of different protection options
- Resulting flood and erosion risk estimates.

Urban Landuse Modelling

Changes to regional urban land use in East Anglia will be determined using an agent-based model; it applies quantitative algorithms derived from qualitative storylines and surveys with relevant stakeholders.

Ecosystem Modelling

The implications on coastal resources will be assessed by investigating ecosystem changes and addressing uncertainties associated with these processes. The best information available from available models and experts will be used to construct ranges of possible outcomes, and estimate the likelihood of occurrence. The approach is flexible and easily updated.



User Interface

ArcGIS Desktop is the selected platform for development of the regional coastal simulator because of its rich functionality and open system for development.

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