



The sensitivity of the coastal and shelf seas and their primary production to changes in the climate.

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The coastal and shelf seas account for around 8% of the global ocean surface area and yet host up to 30% of the primary production. The high biological productivity found in the coastal and shelf seas form an integral component of the earth system. They are also of great socio-economic importance. The developing world particularly depends on the marine ecosystem (e.g. fisheries) both as a key resource and as a significant economic provider through net export to developed countries. What is less clear is the additional impact a changing climate may have on the coastal ocean and its ecosystems, owing to the fine scales required to resolve dominant processes here.

As part of the QUEST-Fish project we investigate how changes in the climate are likely to affect the physical properties of the coastal and shelf seas and hence influence the marine ecosystem. In doing so, we have to generate climate information on the scale of the coastal and shelf seas. This is achieved by employing the Global Coastal Modelling System (GCOMS), downscaling global climate data to provide the forcing for the coupled physical-ecosystem model POLCOMS-ERSEM. A total of 12 domains, of differing characteristics, covering 20 Large Marine Ecosystems and accounting for over 60% of the global fish catch have been simulated. For each domain one re-analysis and four climate simulations have been performed, each for a 13 year period. The forcing data for the climate scenario runs (Pre-Industrial, Present Day, 2047-2059 and 2082-2094) were taken from the climate model IPSL CM4 under the IPCC SRES A1B 'business as usual' emissions scenario. This will allow us to evaluate how different shelf sea types respond under various climate forcing.

Results and analysis of the physical model from a selection of the QUEST-Fish domains are presented, along with the impacts on the primary production. These are considered in the context of observations and of this particular realisation of a climate change emission scenario.