

A Rapid Response Prediction System for the Northern Persian Gulf Blain, C

The quick-response prediction of coastal currents and water levels at unprecedented, meter resolutions during Operation Iraqi Freedom in March-April, 2003 resulted from the development of a rapidly re-locatable forecast system based on unstructured grids and the finite element coastal circulation model, ADCIRC. The prediction strategy, based upon the automated generation of a computational mesh that is limited in expanse but highly resolved in its representation of local bathymetric and coastline features, was realized by implementing a methodology for the automated generation of unstructured meshes, utilizing parallel processor computer architectures for model computations, and configuring a location-independent, automated forecasting infrastructure. Details of the developed forecast system along with examples demonstrating the benefit of modeling at such high resolution will be presented. The need for relevant forecast products is stressed. Validation of the developed model is achieved after-the-fact through model-data comparisons at nearby tidal stations and by correlation of the tidal currents to the MODIS satellite-derived visibility over the region. Using this forecast system quantitative analyses are conducted to more closely examine the relationship between tidal dynamics and remotely-sensed ocean color. Such understanding will begin to provide a foundation for the assimilation of such observations into coastal ocean models.