Resumo

Neste trabalho faz-se um estudo de melhoria da previsão hidrodinâmica do Sistema de Previsão do Estuário do Tejo para alcançar-se o estatuto operacional. As melhorias são procuradas primeiro por configurações alternativas de condições de fronteira de modelação: maré astronómica, nível médio do mar, condições de estratificação vertical, tensão de corte do vento e batimetria. Em segunda lugar, tenta-se desenvolver de uma configuração da versão 2D do sistema com assimilação de dados através da implementação e aplicação, numa experiência de modelos gémeos, de filtros SFEK e SEEK para reduzir o erro da previsão hidrodinâmica por assimilação de medidas de marégrafos.

Verifica-se que a actual reprodução da maré no modelo é adequada mas que a previsão de nível de água é grandemente melhorada através da consideração do efeito de larga-escala da pressão atmosférica sobre o nível médio do mar. Igualmente, a reprodução pelo modelo da variabilidade térmica e salina fornecida por medidas *in-situ* e images de detecção remota por satélite melhora consideravelmente. Quanto à assimilação de dados, verifica-se que o filtro SFEK assimilando 10 medidas é capaz de reduzir o erro do nível de água na gama de 10-45% apesar de afectar negativamente a velocidade em alguns locais; o filtro SEEK não produz uma correcção expressiva. Encontram-se evidências que ligam este desempenho à grande heterogeneidade e não linearidade dos efeitos dinâmicos considerados no modelo.

Abstract

In this work is made an improvement study of the hydrodynamic forecast of the Tagus Estuary Forecasting System to reach operational status. Improvements are pursued first through alternative configurations for model boundary conditions: astronomical tide, mean sea level, vertical stratification conditions, wind shear stress and bathymetry. Secondly, it is attempted to develop a data assimilation configuration for the system's 2D version by implementing and applying, in a twin experiment framework, SFEK and SEEK filters to decrease the hydrodynamic forecast error through the assimilation of tide gauge measurements.

It is found that current tide reproduction in the model is adequate but that water level forecast is greatly improved by considering the large-scale atmospheric pressure effect on mean sea level. Also, the model reproduction of thermal and saline variability provided by *in-situ* measurements and remote sensed satellite images is very much improved. As for data assimilation, the SFEK filter assimilating 10 measurements is able to reduce the error of water level in the range of 10-45% although negatively affecting velocity in some locations; SEEK filter provides no expressive corrections. Evidence is found linking this performance to large heterogeneity and non-linearity of dynamical effects considered in the model.

Palavras-chave

Modelo Operacional, Hidrodinâmica, Assimilação de Dados, Filtro SEEK, Estuário do Tejo, MOHID Water.

Key-words

Operational Model, Hydrodynamics, Data Assimilation, SEEK filter, Tagus Estuary, MOHID Water.

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