

# OPERATIONAL FORECASTING SYSTEM FOR DUBAI COASTAL WATERS

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## INTRODUCTION

The abstract is based on decision support system for Dubai Coastal Zone and Waterway Operations. This is a sophisticated project to couple a suite of meteorology and ocean models with data management infrastructure and web-based tools to deliver data and decision support information to Dubai Municipality as well as public users. The latest open-source modeling technology available from the research and academic communities to build an operational forecast system that is a suite of interconnected components that allows for seamless interaction of different models, real-time data, and custom web-based reports and tools that access model forecasts and real-time observations. This included measurements taken in the Dubai coastal zone, satellite and atmospheric measurements across the Arabian Gulf, and from a variety of online global environmental models. The data specifically used to create each of the meteorological, hydrodynamic, spectral wave, inundation and oil-spill models. The circulation modeling studies of the Arabian Gulf were carried out by Kampf (2006), Thoppil (2010) and Xue and Eltahir (2015).

## FORECASTING MODELS

The meteorology and ocean models are Arabian Gulf meteorology (WRF), offshore and near shore wave models (SWAN), offshore and near shore hydrodynamic models (ROMS), Flood Inundation Analysis and wave based oil spill model (OILMAP) as shown in Figure 1. The models are well calibrated as automated operational system. These models are connected to external models for model boundary conditions. The connection of operational model forecasts to prediction and coastal forecast and warning system website. Also, connection of operational model forecasts to web-based oil spill system and to database of inundation model predictions. The website - <http://www.dubaicoast.ae/> allows the users to find out latest model generated conditions as well as provides information on waves, current, surface elevation, wind, oil spill and inundation along Dubai coastline and the Gulf waters. Model coupling was achieved through a series of shell scripts. These scripts are responsible for execution of the Operational Forecasting System (OFS) steps, which can be monitored using dated log files, as each step is completed the next step begins automatically. All interaction between the models and the external forcing, among the models, and between the models and the data management system is performed using NetCDF files. The model coupling includes daily download of operational forcing information from GFS and WW3, a nested approach for the low and high resolution grids within the WRF and ROMS models, the formatting and

delivery of outputs from WRF to ROMS and SWAN, the formatting and delivery of outputs from ROMS to SWAN, and the creation of data products for presentation of forecasts and warnings in the coastal forecast and warning system website and uses in the oil spill and inundation models.

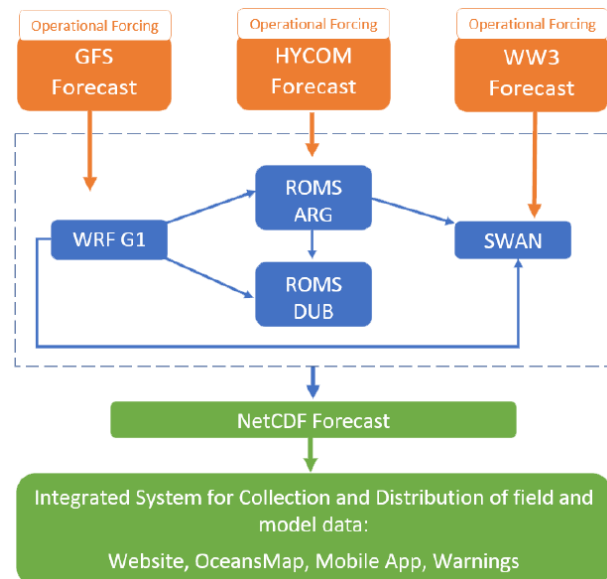


Figure 1 - Diagram of Model System for Operational Forecasting System, Dubai coastal waters

## EARLY WARNING TO THE PUBLIC

Based on the model results the warning Email /SMS are received by the registered user from the web site. Based on the forecasting results, the inundation and oil spill worst scenarios are predicted and given early warning to the public. The Coastal Zone & Waterways Management Section (CWMS) of Dubai Municipality uses its monitoring & forecasting programme to provide expertise to the implementation and maintenance of marine projects, ensuring a clean and sustainable environment in the Dubai coastal zone.

## REFERENCES

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