



## **High-resolution modelling of waves, currents and sediment transport in the Catalan Sea.**

Agustín Sánchez-Arcilla, Manel Grifoll, Elena Pallares, and Manuel Espino

Politechnical University of Catalonia (UPC), Maritime Engineering Laboratory (LIM/UPC), Department of Hydraulic, Maritime and Environmental Engineering (DEHMA), Barcelona, Spain (agustin.arcilla@upc.edu)

In order to investigate coastal shelf dynamics, a sequence of high resolution multi-scale models have been implemented for the Catalan shelf (North-western Mediterranean Sea). The suite consists of a set of increasing-resolution nested models, based on the circulation model ROMS (Regional Ocean Modelling System), the wave model SWAN (Simulation Waves Nearshore) and the sediment transport model CSTM (Community Sediment Transport Model), covering different ranges of spatial (from  $\sim 1$  km at shelf-slope regions to  $\sim 40$  m around river mouth or local beaches) and temporal scales (from storms events to seasonal variability). Contributions in the understanding of local processes such as along-shelf dynamics in the inner-shelf, sediment dispersal from the river discharge or bi-directional wave-current interactions under different synoptic conditions and resolution have been obtained using the Catalan Coast as a pilot site. Numerical results have been compared with “ad-hoc” intensive field campaigns, data from observational models and remote sensing products. The results exhibit acceptable agreement with observations and the investigation has allowed developing generic knowledge and more efficient (process-based) strategies for the coastal and shelf management.