A nested model for a water harbour circulation. The case of Barcelona (NW Mediterranean Sea)

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In this work we present the results for the implementation of the ROMS model (www.myroms.org) in Catalan Sea in three nested domains (A, B and C). The first model domain (A) includes the Gulf of Lions at north to Eivissa channel as a Southern boundary. This model domain is implemented at 2 km resolution. The second nested domain (B) is centred in the Catalan shelf at 0.5 km resolution. Finally, the third domain includes Barcelona harbour domain at 45 m resolution. The model is ran using climatologies at the boundaries and atmospheric fields coming from MFSTEP and ECMWF as a first model test. As is expected, the main oceanographic features in the A domain are well represented and the increasing resolution in the B and C domains shows richer patterns (eddies and filaments). The harbour model allows to determine the water circulation pattern, which can be useful for environmental management (e.g. determine water renewal patterns for water quality predictions). The model results in Catalan shelf have been compared with buoys of XIOM oceanographic measurements network (www.xiom.cat). Several sensitivity test and nesting procedures have been compared in order to obtain the best possible accuracy in the outputs. The relevance of the work focuses to implement nested strategies applied at regional ocean circulation models to solve fine resolution in the coastal shelf areas (bays and harbours) of (scientific and socio-economic) interest, such as Barcelona harbour, with an operational perspective.