

**Title:**

**3D hydrodynamic model as a tool for more efficient port management and operations.**

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**Abstract:** (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Ports have been attempting to increase their competitiveness by enhancing their productivity and operate in a more environmentally friendly way. The Port of Seville is located in the Guadalquivir River in the south of Spain and it is the unique Spanish inland port. The estuary has generated and is still generating conflicts of interests. The access channel to the port is being periodically dredged, the natural course has been anthropologically modified several times, original salt marshes have been transformed to grow rice and approximately one-fourth of the total surface of the estuary is now part of two protected areas, one of them is a UNESCO\_MAB Biosphere Reserve. Despite its socio-economic and environmental significance there is a surprising lack of scientific and technical information about the environmental interactions between the port activities and the Guadalquivir estuary stakeholders.

A 3D hydrodynamic model has been developed to study the tidal regime, water circulation, temperature and salinity distributions, flooding areas and the sediment dynamics in the estuary. The model output has been validated with *in situ* current speed, direction, water elevation and also with temperature and salinity measurements. Good agreement between modeled and real measurements have been obtained. Our preliminary results show that the vessel traffic management could be improved by using the tidal elevations and currents calculated by the model in the whole estuary. The interactions among the port activities (mainly due of changes in the sediments dynamics), the watershed management and the saline intrusion evolution will be studied in detail.

3D Hydrodynamic Modelling provide spatially explicit information on the key variables governing the dynamics of estuarine areas. The numerical model is a powerful tool to effectively guide the management and operations of ports located in a complex socio-ecological systems.