Abstract No : 295

Coastal processes, erosion control and shoreline management

Morphostatic Study Of The Bine El Ouediane Lagoon, Tunisia

Christophe Briere [(1)] and Robert McCall [(1,2)]

(1) Deltares, 2628 AR delft, Netherlands (Holland, Europe)
Telephone: 0031883358289 Email: christophe.briere@deltares.nl
(2) Telephone: 0031883358106 Email: robert.mccall@deltares.nl

Studies show that the water exchange, between the Bou Ghrara lagoon (South of Jerba island, Tunisia) and the Mediterranean Sea, is limited. The lack of water renewal, especially through the Bine El Ouediane eastern passes, is a real threat to the sustainability of tidal channels. In 2006, the opening in the causeway, that separates the Bou Ghrara lagoon from the Bine El Ouediane lagoon, was widened aiming at facilitating the water exchange. A detailed numerical model is set up to simulate waves, currents and sediment transport in the Bine El Ouediane lagoon and along the coastline between Aghir and Hassi Jerbi. The numerical model used in this study is the Delft3D suite, which is able to simulate coupled hydrodynamics and sediment transport due to tides, wind and waves. Boundary conditions for water level, flow and sediment concentrations at the boundaries of the detailed model are retrieved by means of nesting from a large scale hydrodynamic model of the Gulf of Gabes. Wave boundary conditions at the offshore boundary of the Bine El Ouediane model are retrieved from the large-scale and intermediate scale wave models. The numerical model is initially used to simulate the flow and discharge characteristics with the current configuration for the opening in the causeway. The model is first applied with only astronomical (tidal) forcing, without wind and wave processes, in order to gain greater insight into the dynamics of the tidal basin. Subsequently two representative periods for summer and winter wind and wave conditions are included in the model to analyze the effect of meteorological and wave climate variations on the general current and sediment transport patterns in the Bine El Ouediane lagoon. In the last phase of the study, the discharge imposed on the model through the opening in the Bou Ghrara causeway is reduced in order to simulate the situation in the Bine El Ouediane lagoon before the widening of the opening in the causeway. The results of these simulations are compared to the results of the simulations with the current causeway configuration in order to study the effect the widening of the opening in the causeway has had on the current and sediment transport patterns in the lagoon.