Modelling the effect of mussel beds on the hydrodynamics

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Against the background of increased demand of coastal protection measures in coastal zones due to climate change and enhanced anthropogenic pressure, the Coastbusters 2.0 project deploys several systems to facilitate mussel biogenic reef formation in an exposed-offshore site and a sheltered-nearshore site located near De Panne in Belgium coast. To study the effect on the hydrodynamics, the anticipated mussel bed growth in subtidal zones of Coastbuster 2.0 is modelled in the TELEMAC current and TOMAWAC wave numerical models. Friction dissipation due to mussel beds is adapted in the TELEMAC current model by changing the Nikuradse roughness length in the Bi & Toorman friction law and by changing the dissipation coefficient in the Jonswap bottom friction formulation in the TOMAWAC wave model. Research studying the interaction between reefs and hydrodynamics through integrating aquaculture structures in hydrodynamic models is still limited. The present work aims to document the implementation of mussel beds in numerical models for currents and waves.

Keywords
Mussel Beds; Friction Dissipation; TELEMAC; TOMAWAC