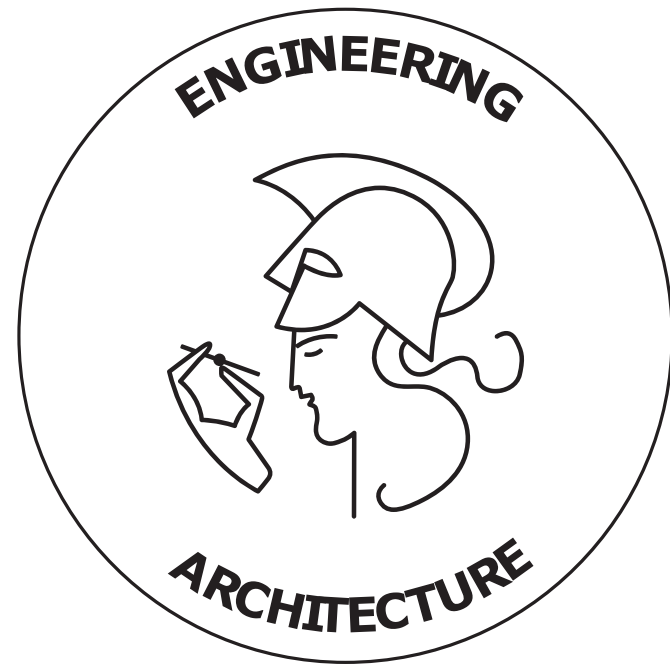


# Coastal safety in Belgium

Dept. of Civil Engineering, Ghent University



## Background

Devastating storm surges are formed when high tides fall together with high air pressure gradients, forming strong wind fields. Additional water is pushed towards the coast and large waves hit the coastal defense system. With rising global mean sea level and expected increase of storminess the risk for flood prone areas also increases.



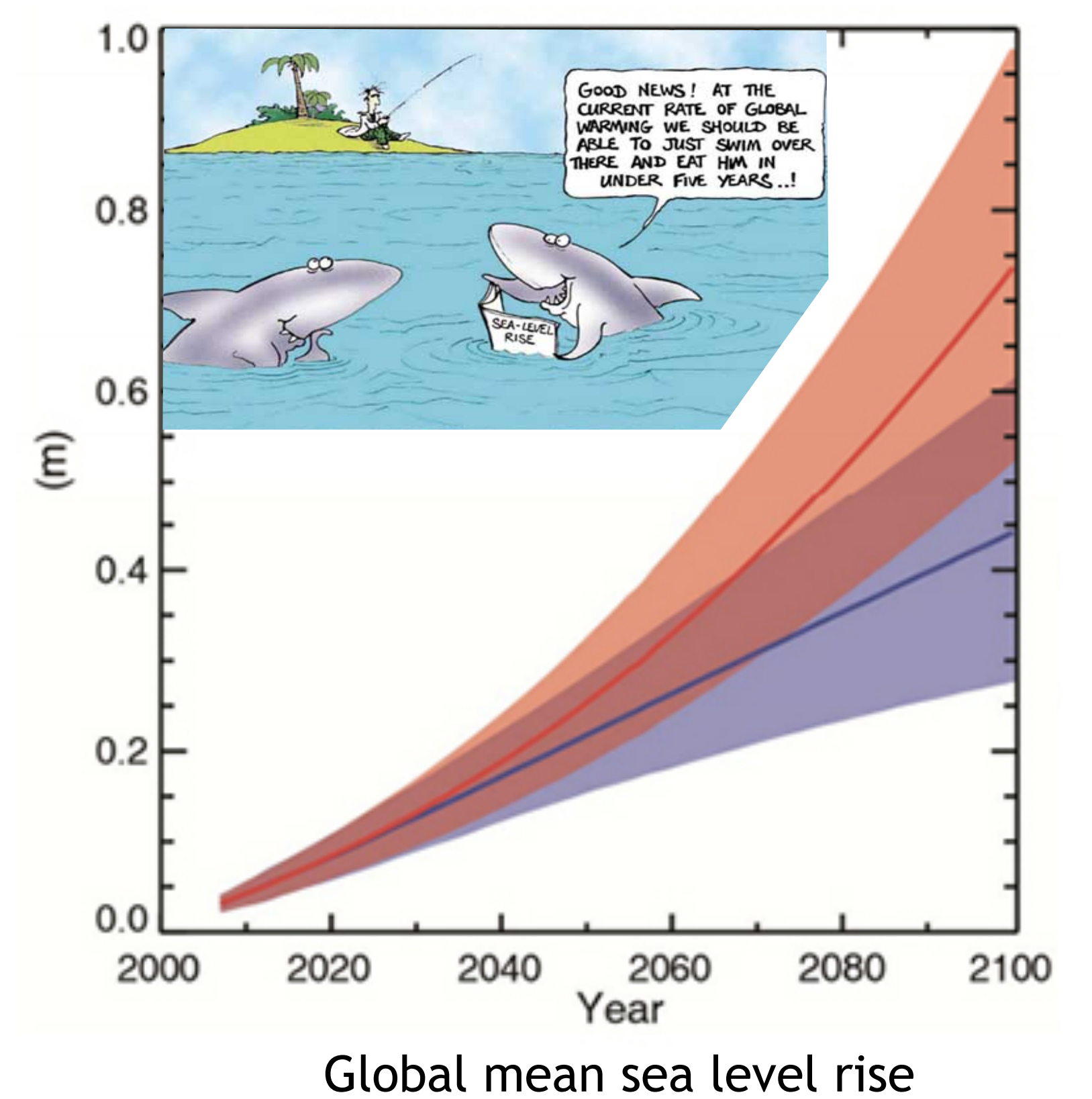
Storm surge 1. February 1953, Heist (Belgium)



Storm surge 1953, Zeeland (The Netherlands). 1835 casualties and 140 dike breaks



Destruction due to wave run-up and wave overtopping



Global mean sea level rise

## Coastal defence system

The Belgian coastal defense system consists typically of a combination of hard (e.g. dike, storm wall, breakwater) and soft (e.g. beach nourishment, dune stabilization) protection measures. The integrated masterplan for coastal safety of the Belgian government foresees a protection level able to withstand a 1/1000 year storm surge.



Dune system in Belgium (source: afdeling KUST)



Typical situation at the Belgian coast. Foreshore, dike and promenade (source: W. Vaele)



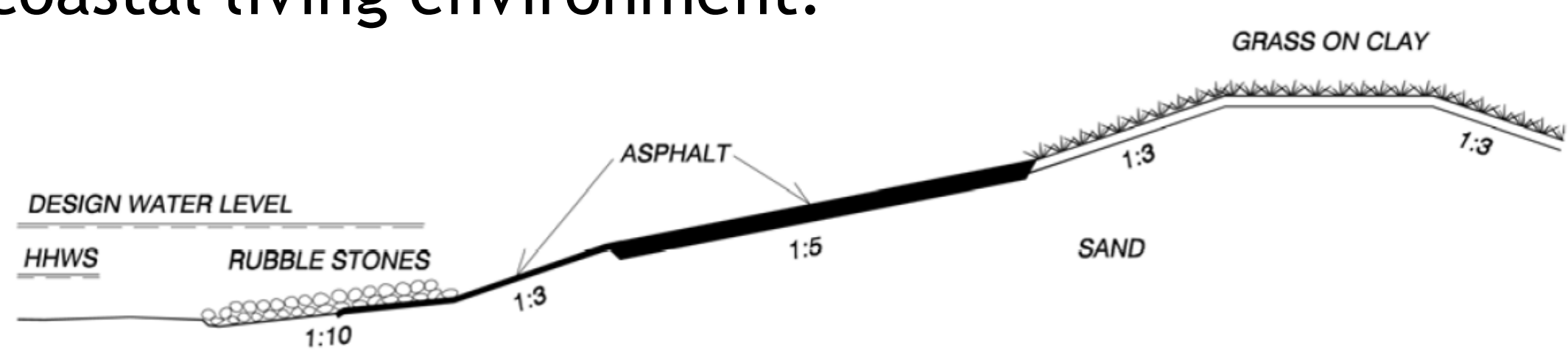
Groynes along the Belgian coast (source: afdeling KUST)



Beach nourishment in Knokke (Belgium) (source: afdeling KUST)

## Research at UGent

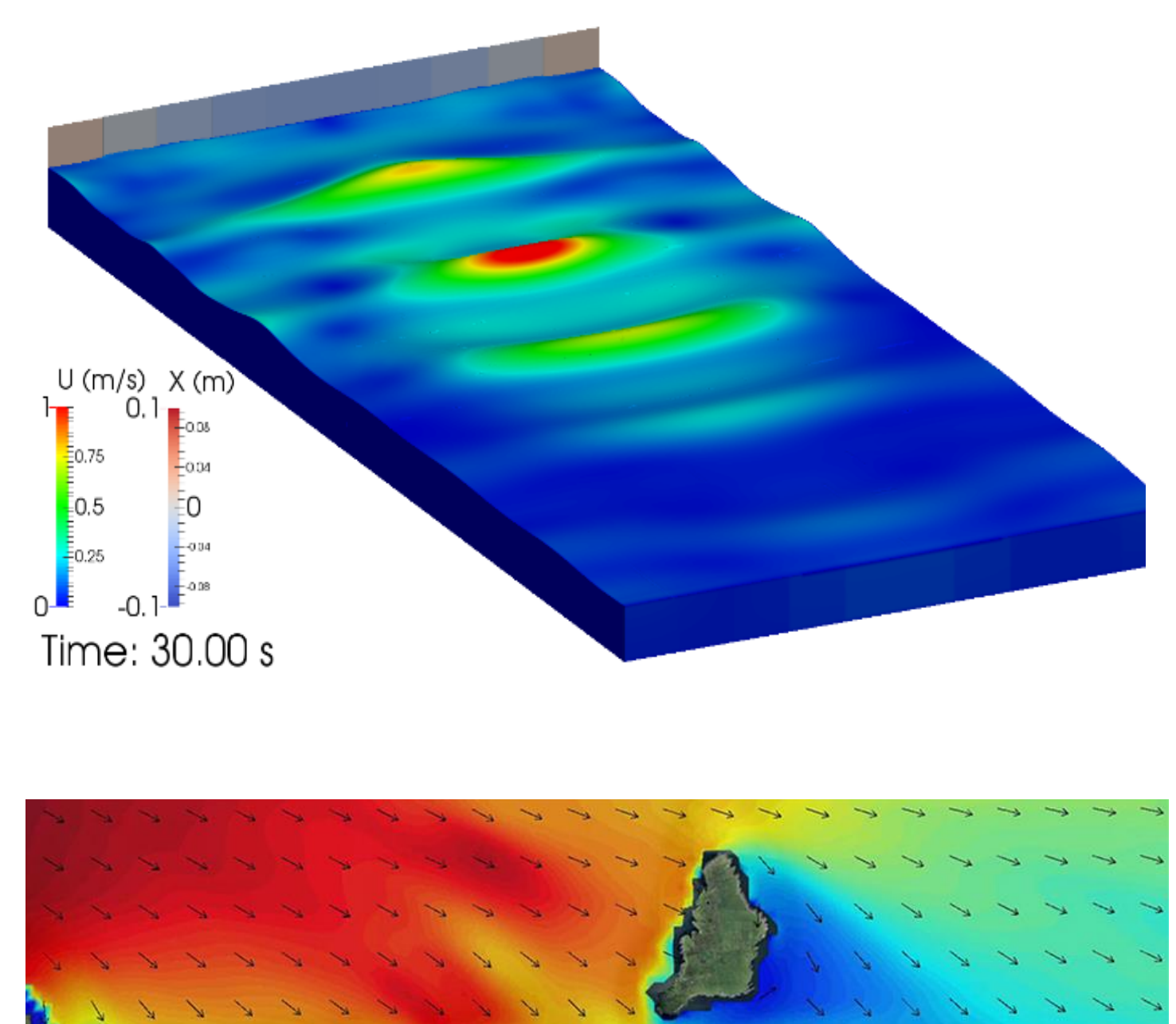
At the Coastal Engineering Research Group from Ghent University we support the decision making, planning and design of the Belgian coastal defense system by means of hydraulic and numerical models and with innovative solutions to provide a safe coastal living environment.



Sketch of a typical dike cross section



Hydraulic modelling using the 30 m long wave flume facility at Ghent University



Numerical modelling of wave transformation processes and wave-structure interaction