Simulation enables assessing the risk of storm surge!

Storm surge simulation for inundation risk assessment

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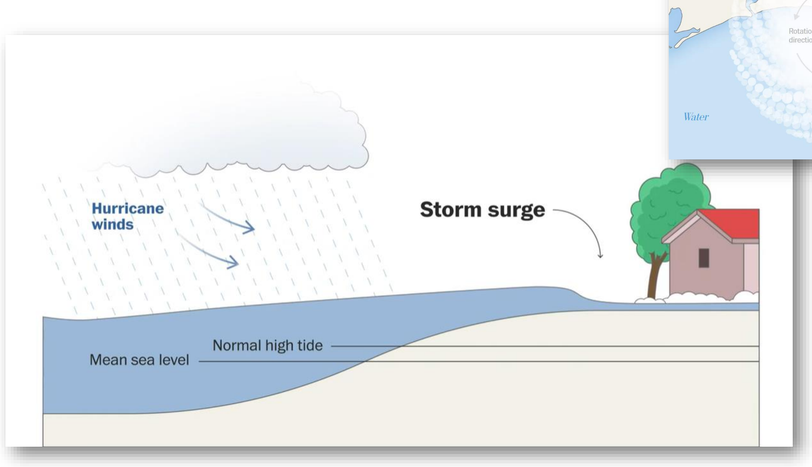
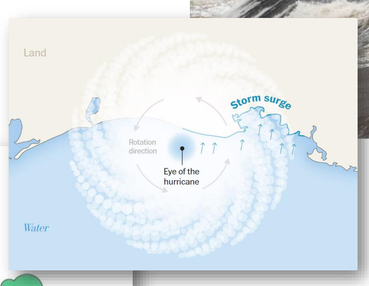
What is storm surge?

Storm surge is the rise in seawater level caused solely by a storm.





Storm surge combined with waves can cause extensive damage. It can severely erode beaches and coastal highways.

Necessary reasons for studying storm surges:

- Consequences of climate change

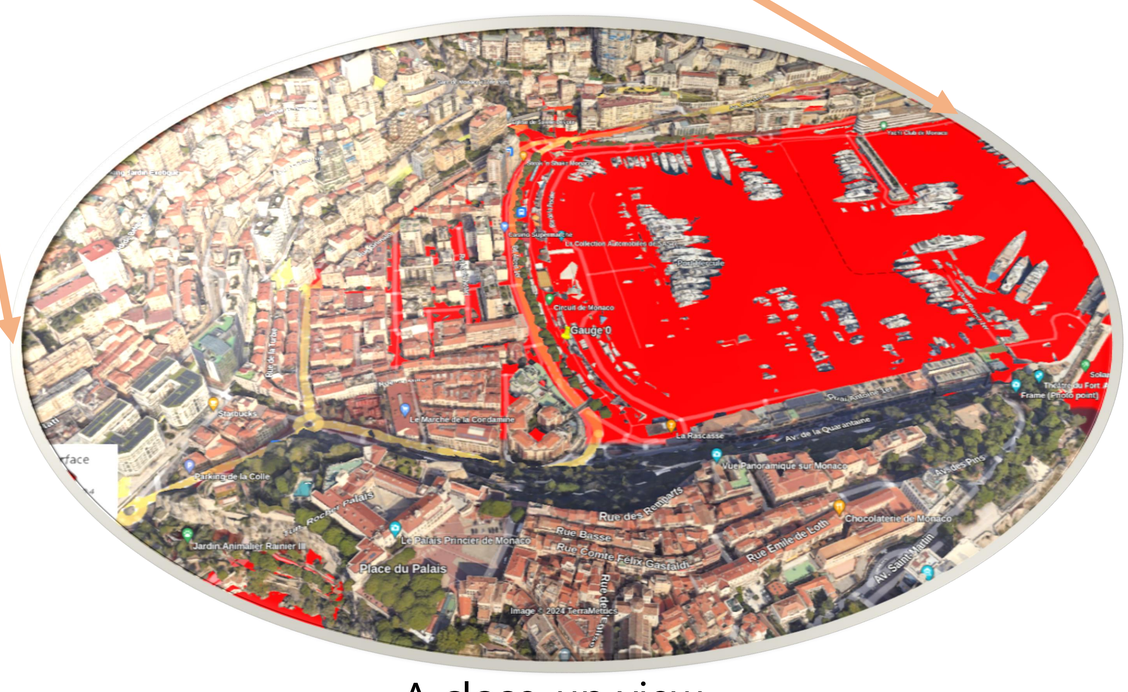
Accelerating sea level rise from ocean warming increases coastal flooding and erosion, threatening communities, infrastructure, and ecosystems

- A historical example

Storm Alex 2020 caused a storm surge in Southern France, Monaco, and Italy

Saint-Martin-Vésubie

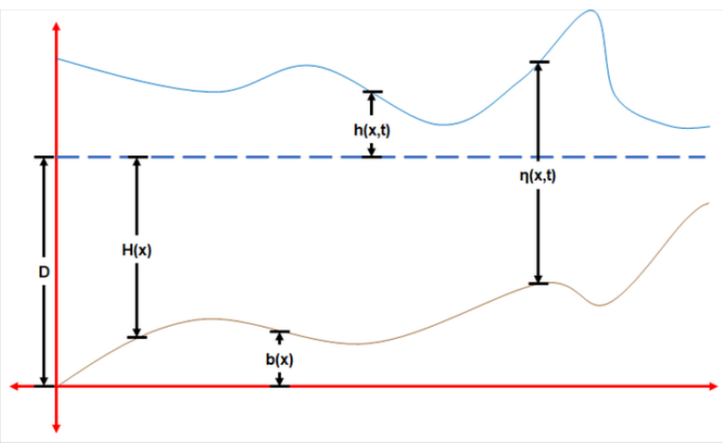
Example: Inundation simulation for **Storm Alex 2020** in **Monaco** (preliminary)



A close-up view

Methodology:

Simulating rising sea water levels using the GeoClaw



H : is the mean height of the water
b : is the topographical or bathymetrical height
$\eta(x, t) = H(x) + h(x, t)$, where x is location and t is time

What is the task?

Simulating h(x,t), the deviation from the mean height for each x and t.

What is GeoClaw?

GeoClaw is a simulator for geophysical flows, originally developed for tsunamis. It numerically solves 2D depth-averaged shallow water equations modelling wave flow over varying topography, including underwater and surface landscapes.

Ongoing task: Sensitivity analysis of the effects of input parameters on the simulation results.