Coastal water resources vulnerability to storm surge inundation

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Why coast?

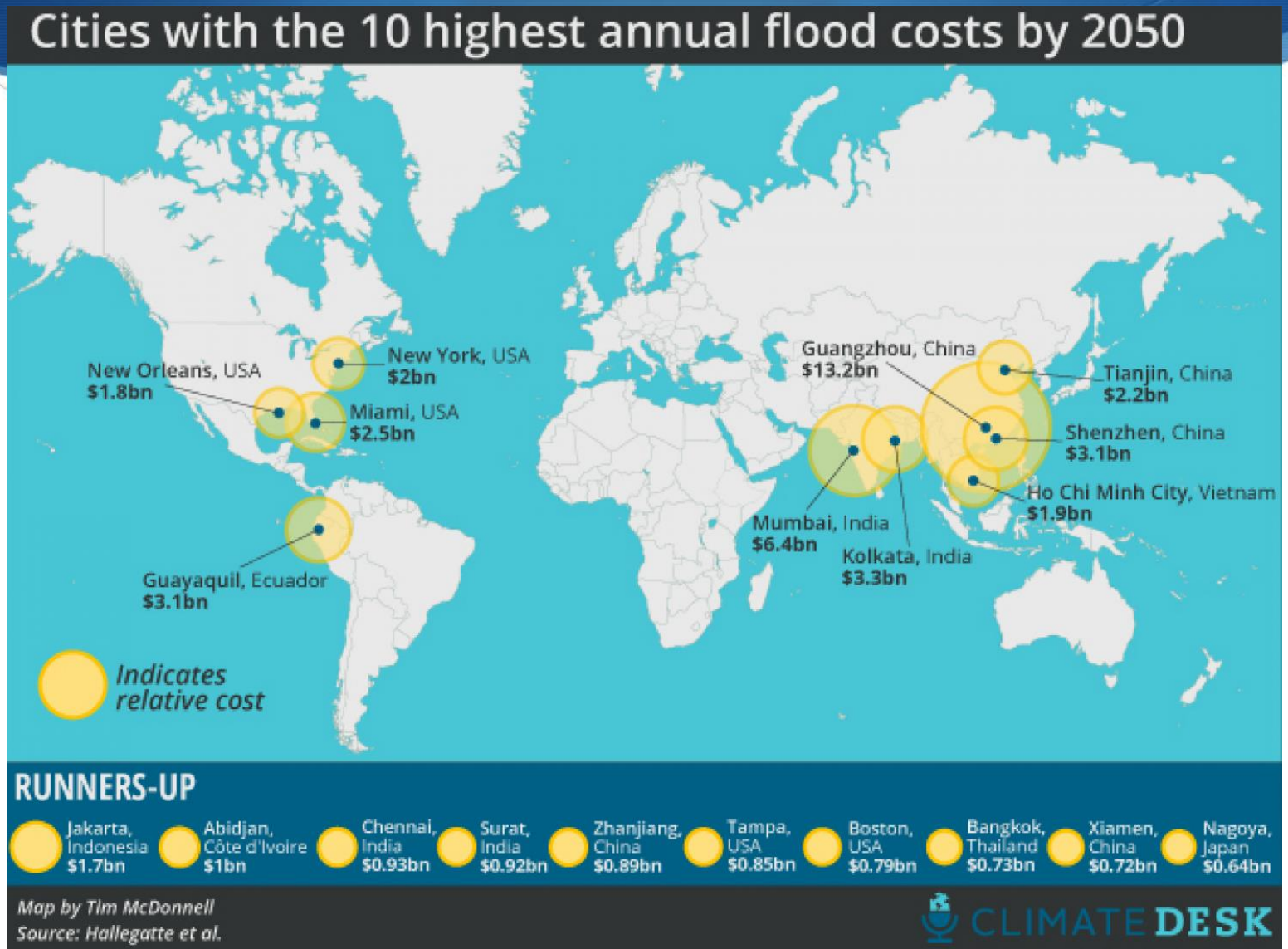
AP Photo/Michael Dwyer

Public attention goes to surface

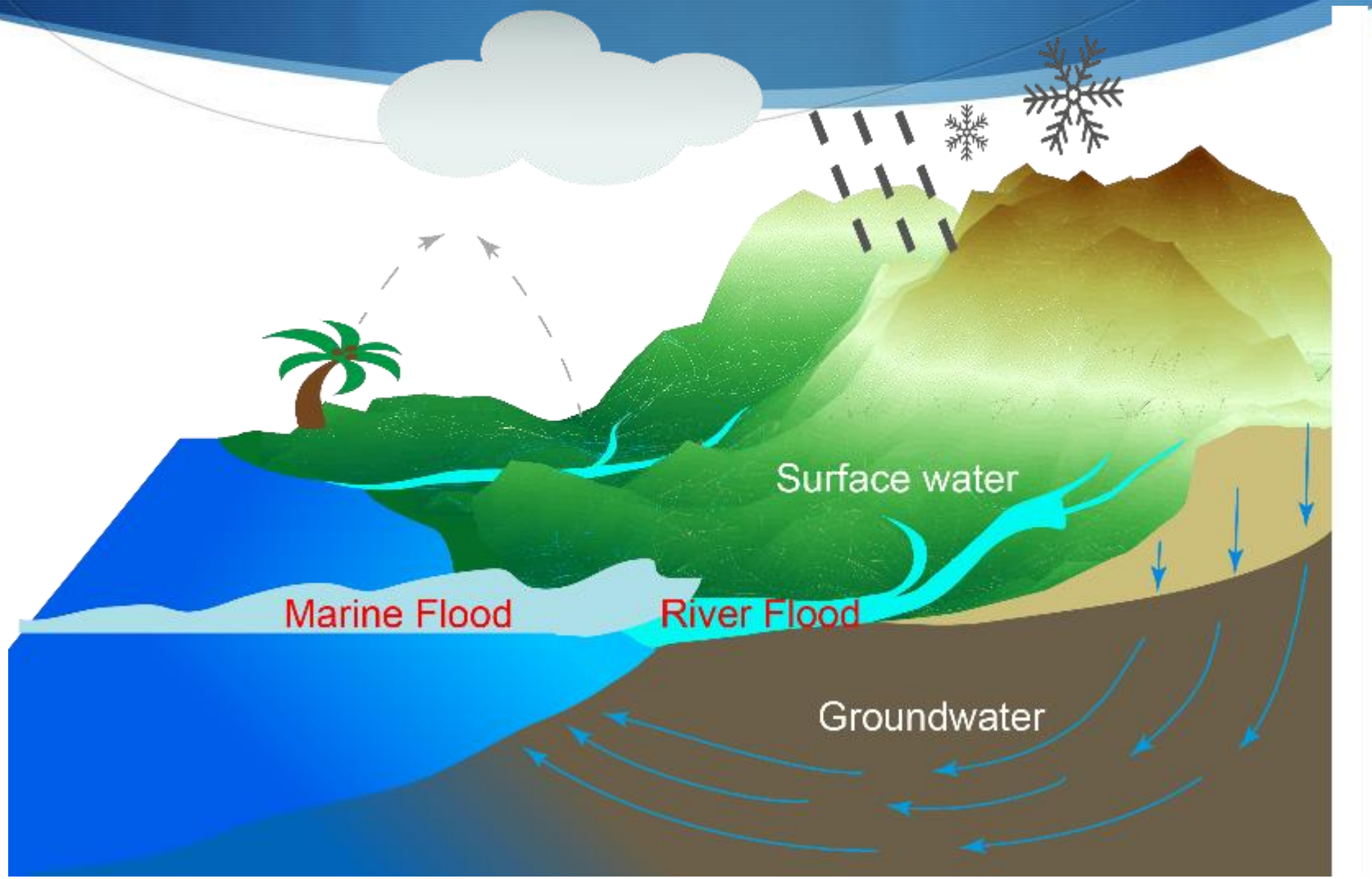
Nuisance flooding

Moftakhari, H. R., AghaKouchak, A., Sanders, B. F., Allaire, M., & Matthew, R. A. (2018). What is nuisance flooding? Defining and monitoring an emerging challenge. Water Resources Research, 54, 4218– 4227.

Most studies focus on surface water



Storm surges introduce marine flood threaten water resources



Salinization on agriculture

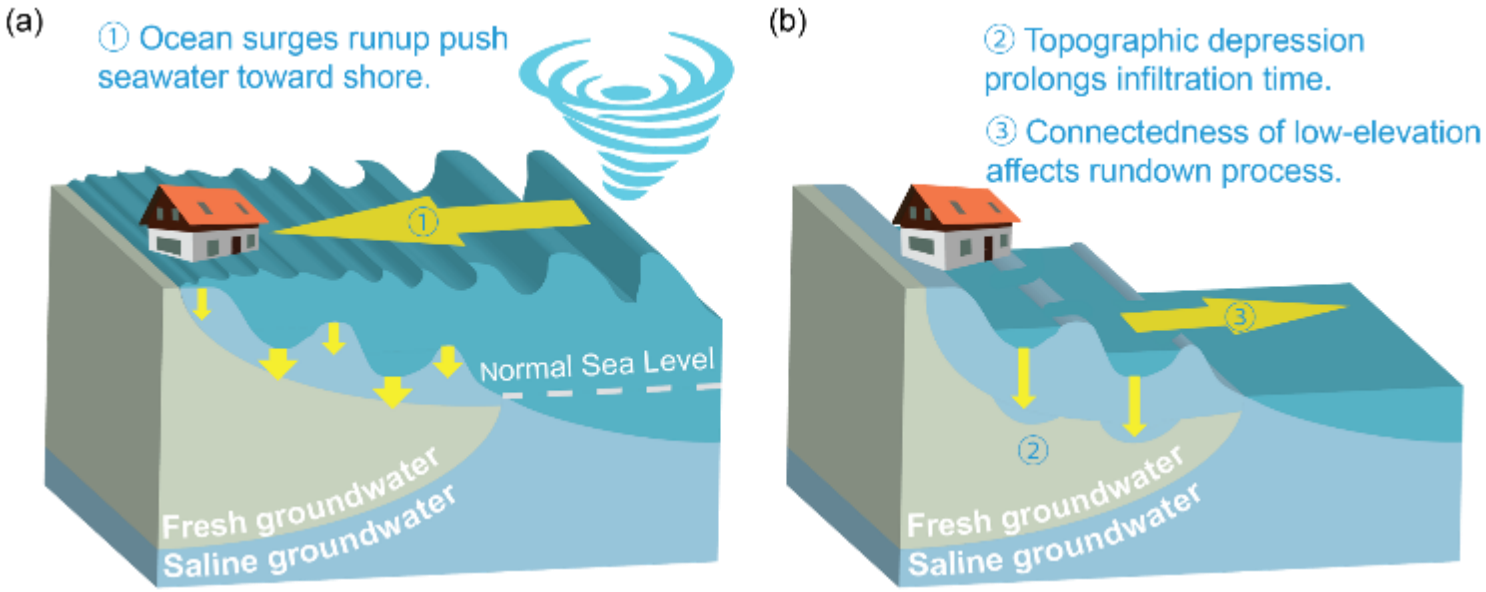
Hurricane Sandy (2012) affected trees for more two years

- London plane trees, once thought to be salt tolerant, fared poorly on Long Island and in NYC after Hurricane Sandy. Photo Courtesy Cornell Urban Horticulture Institute
- In the summer of 2014, Long Beach took down more than 1400 dead trees.

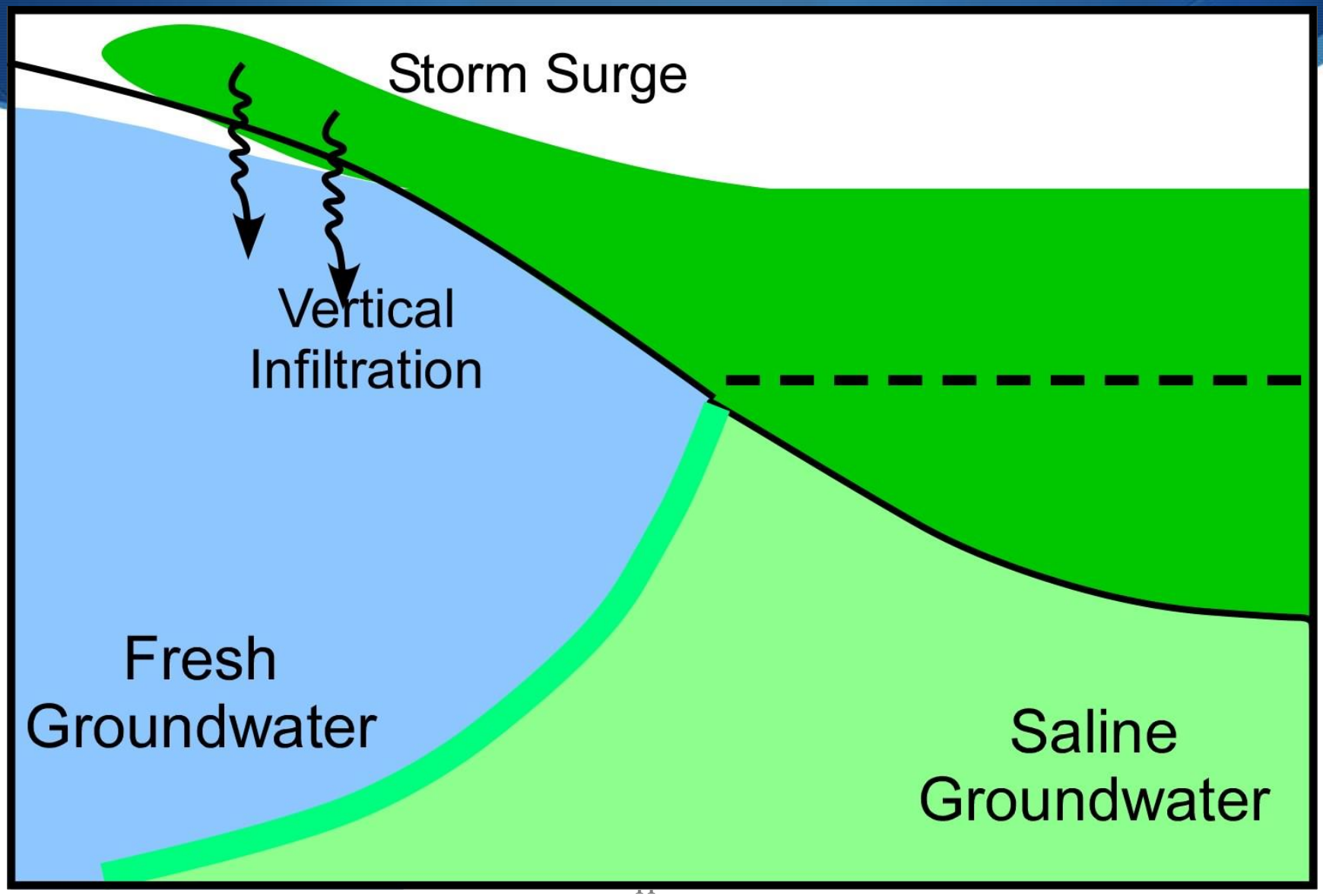
Understand the process by land ocean interaction modeling

- What types of topography are vulnerable to storm surges?
- How to mitigate groundwater salinization?

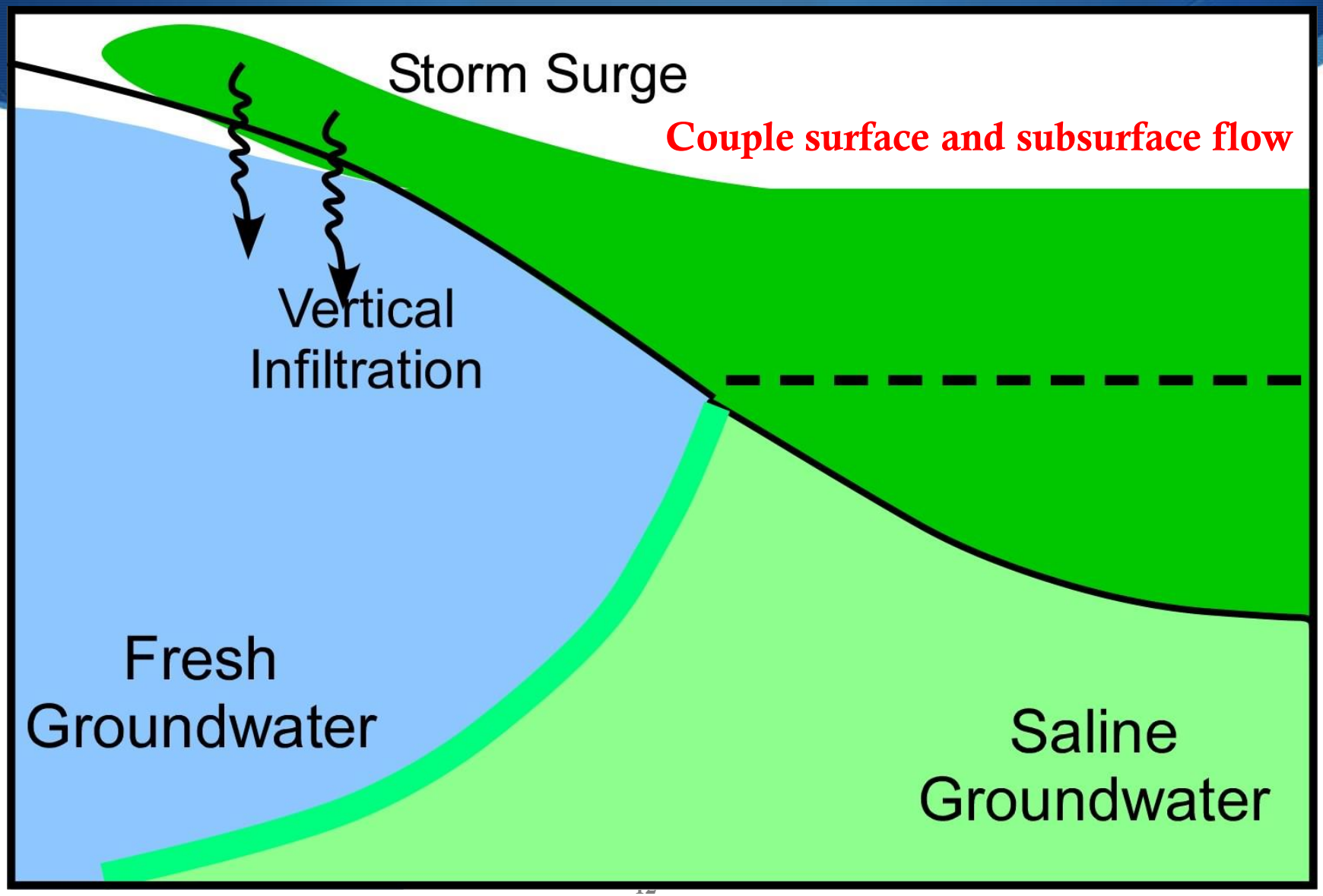
Storm surges and groundwater salinization



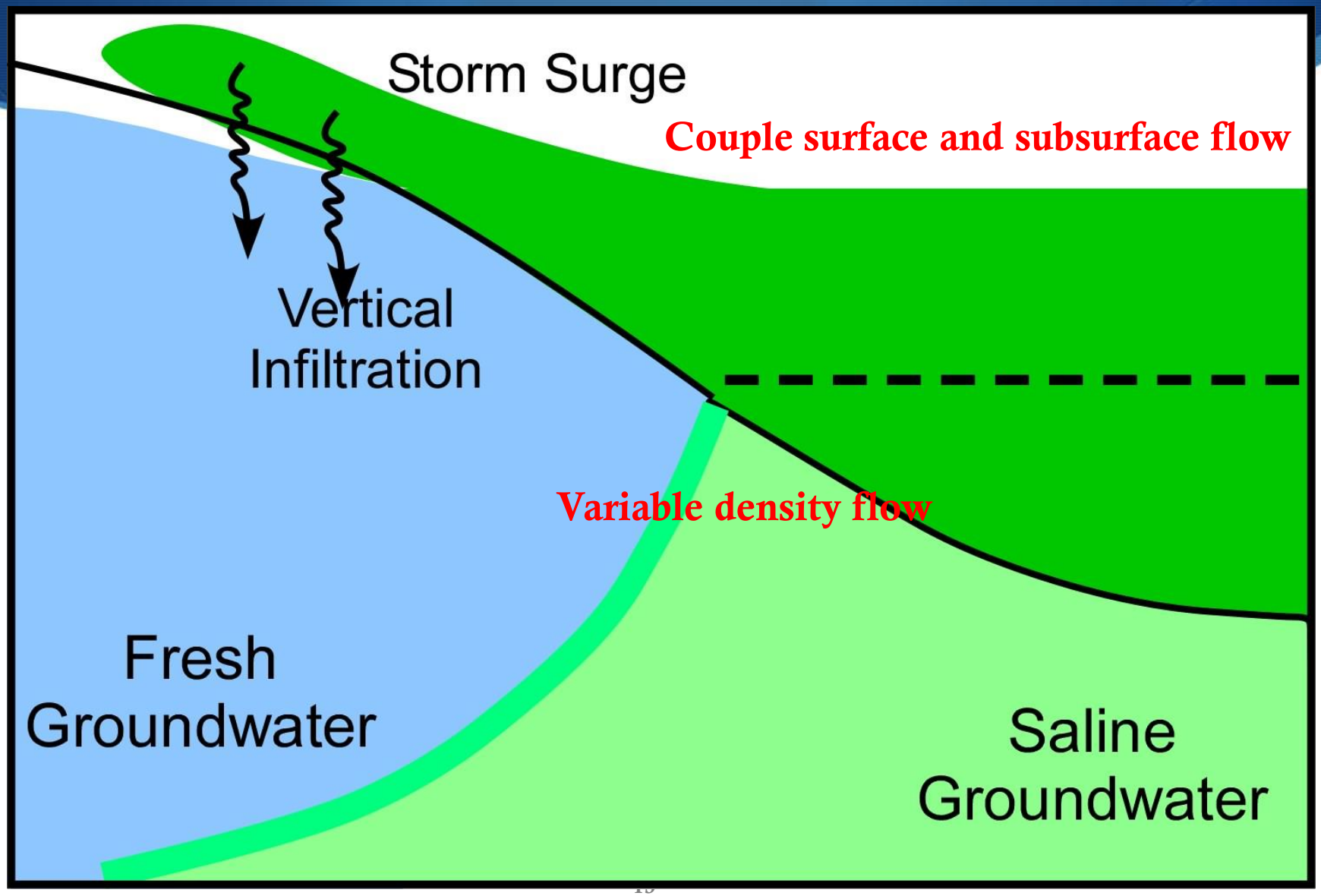
Land – ocean interaction model



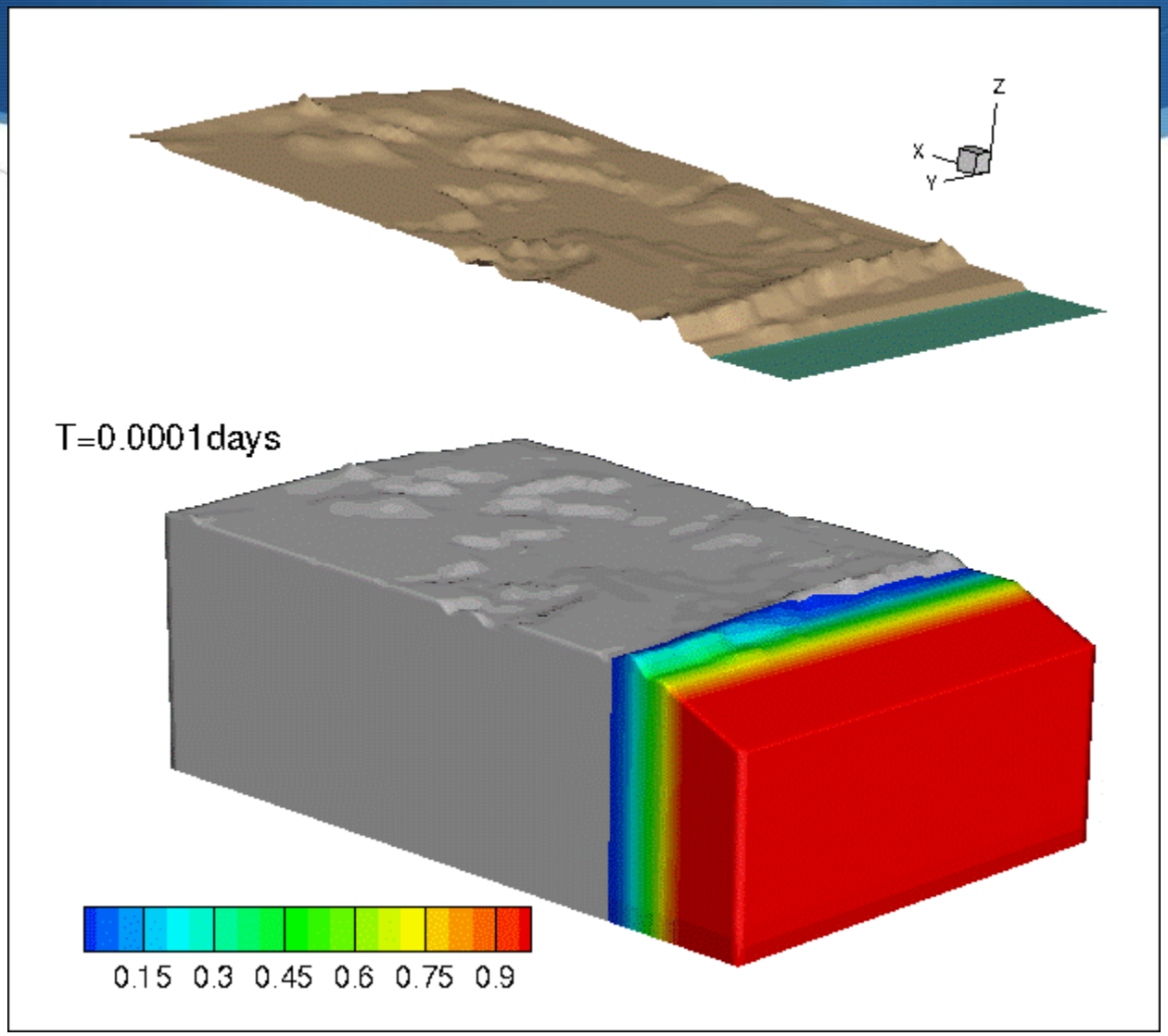
Land – ocean interaction model



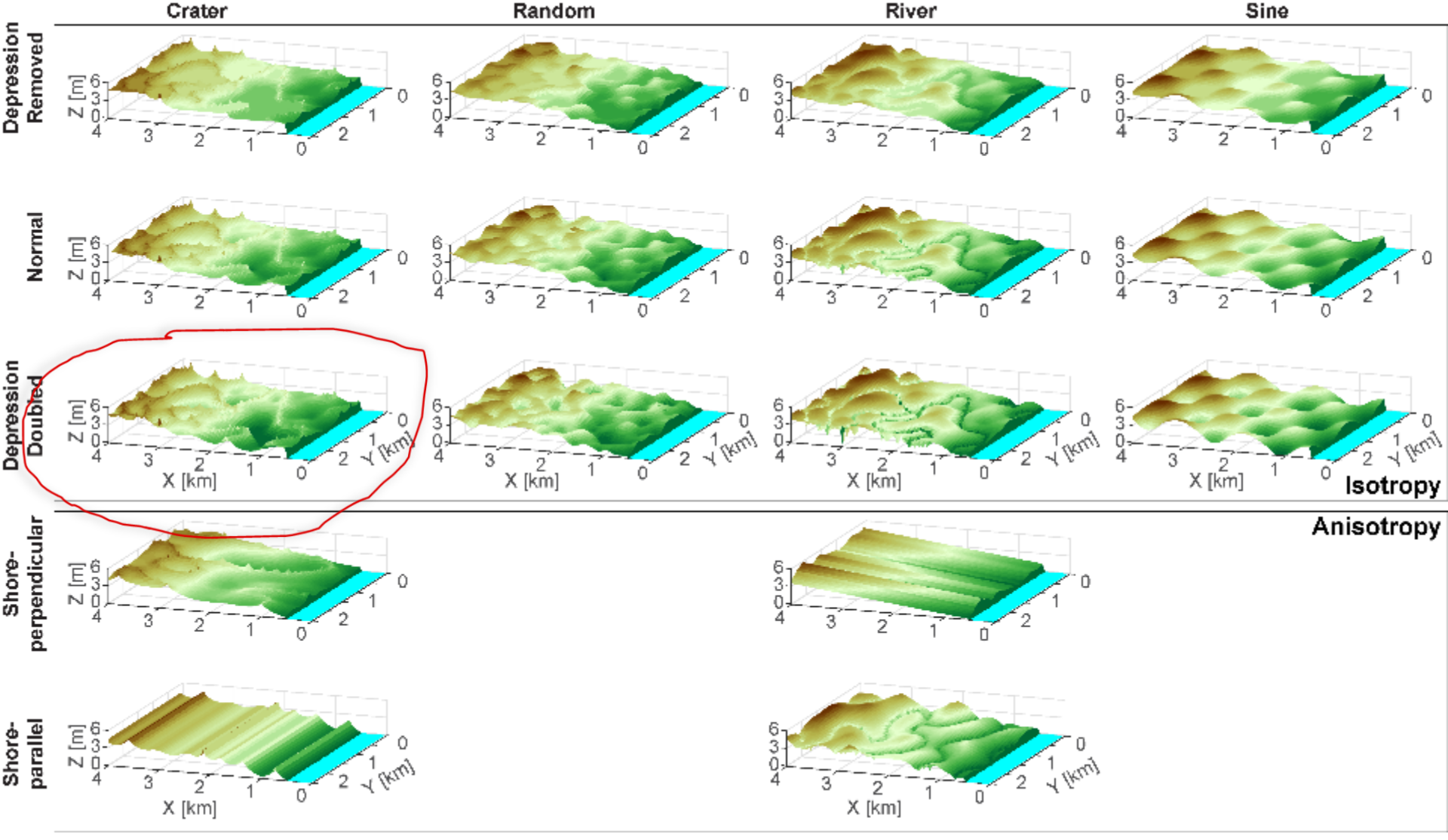
Land – ocean interaction model



Model simulation starts from hours to decades



Topography varies laterally and vertically



Sea-level rise in the past

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Sea-level rise in the future

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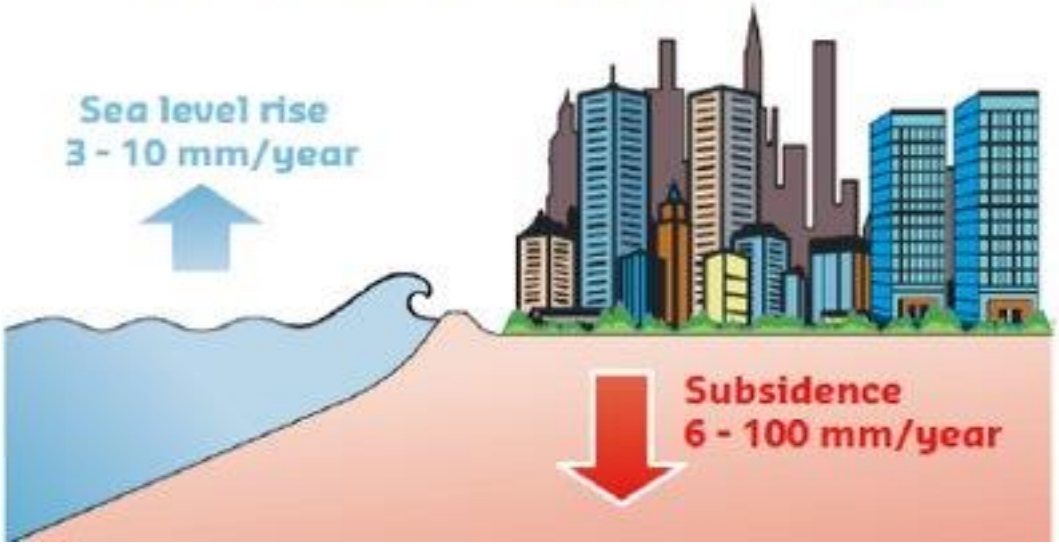
CLIMATE CENTRAL

Coastal water resources and flood



Climate change

- Accelerated sea level rise
- Extreme weather events

Socio-economic development

- Urbanization and population growth
- Increased water demand

Impacts

- Increased flood risk
- Damage to buildings, infrastructure
- Disruption of water management

Causes

- Groundwater extraction
- Oil, gas, coal mining
- Tectonics

Erkens, G., Bucx, T., Dam, R., de Lange, G., and Lambert, J.: Sinking coastal cities, Proc. IAHS, 372, 189-198, 2015