**Topic sentences for introduction**

Sea level rise threats coastal environments through increasing coastal flooding (*Hauer et al.*, 2016; *Hinkel et al.*, 2014), rising ground water level, wetland loss (*Spencer et al.*, 2016). The rising ground water can result in increasing risk in pluvial, fluvial, and groundwater flooding (*Rotzoll and Fletcher*, 2013).

Previous studies have assessed the impacts of SLR to ground water by modelling the lateral flow at the land-ocean interface and seawater infiltration from flooding water during storm surge. The lateral flow is driven the hydraulic gradient between ground water table and sea surface height.

**Flooding types**

Pluvial flooding: surface runoff

Fluvial flooding: total runoff

Coastal flooding: sea surface height

Groundwater flooding: ground water table/saturation fraction

**Ground water flooding**

Definition: When the water table rises and reaches ground level, water starts to seep through to the surface and flooding can happen.

Let’s look at **annual maximum ground water table at daily scale** to assess groundwater flooding.

Groundwater rise can result in an increasing risk of groundwater flooding (*Bosserelle et al.*, 2022; *Rotzoll and Fletcher*, 2013).

Previous studies evaluate the impacts of lateral flow at the land-ocean interface at regional (*Befus et al.*, 2020; *Ferguson and Gleeson*, 2012; *Knott et al.*, 2019; *Masterson and Garabedian*, 2007; *Prieto and Destouni*, 2005) and site scale (*Heiss et al.*, 2022). *Jasechko et al.* (2020) suggests potential seawater intrusion due to the landward hydraulic gradient based on groundwater level observation.

Another type of land-ocean coupling is thorough seawater infiltration during storm surge or tsunamis (*Cardenas et al.*, 2015; *Chui and Terry*, 2015; *Gingerich et al.*, 2017; *Post and Houben*, 2017; *Yu et al.*, 2016). A brief review of current research about seawater infiltration is provided by (*Cantelon et al.*, 2022).

*Post and Houben* (2017) found seawater infiltration is more significant than the lateral flow for the seawater intrusion.

We follow the lateral flow scheme of *Fan et al.* (2007) to simulate the lateral flow exchange at the land-ocean interface.

Lateral flow between grid cells is insignificant at coarse spatial resolution (*Krakauer et al.*, 2014) Although bathtub method shows reasonable performance in capturing inundated area, it commonly results in overestimation as compared to numerical model (*Didier et al.*, 2019).

Land subsidence is not considered in this study, thus our projection underestimates the coastal flooding. Specifically, the relative SLR when considering land subsidence are found to be more significant than the climate-induced SLR (*Fang et al.*, 2022).

https://www.sciencedirect.com/science/article/pii/S1463500319302173#!

<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019JC015822>

<https://www.sciencedirect.com/science/article/pii/S0303243417301289?via%3Dihub#tbl0005>

* Use 1-D HEC-RAS
* Floodplain delineation was performed using the water surface TINs generated from the HEC-RAS simulation results and topography data to calculate the floodplain boundary and inundation depths. The floodplain is calculated where the water surface is higher than the terrain, and the inundation depth results from the rasterized water surface and terrain comparison.

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