

復旦大學

Possible impacts of climate change

—from offshore to the coastal and estuarine regions

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Outline

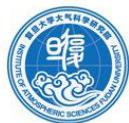
1. Background

2. Climate change—Ocean Basins — coastal processes

Ocean circulation& Sea Level

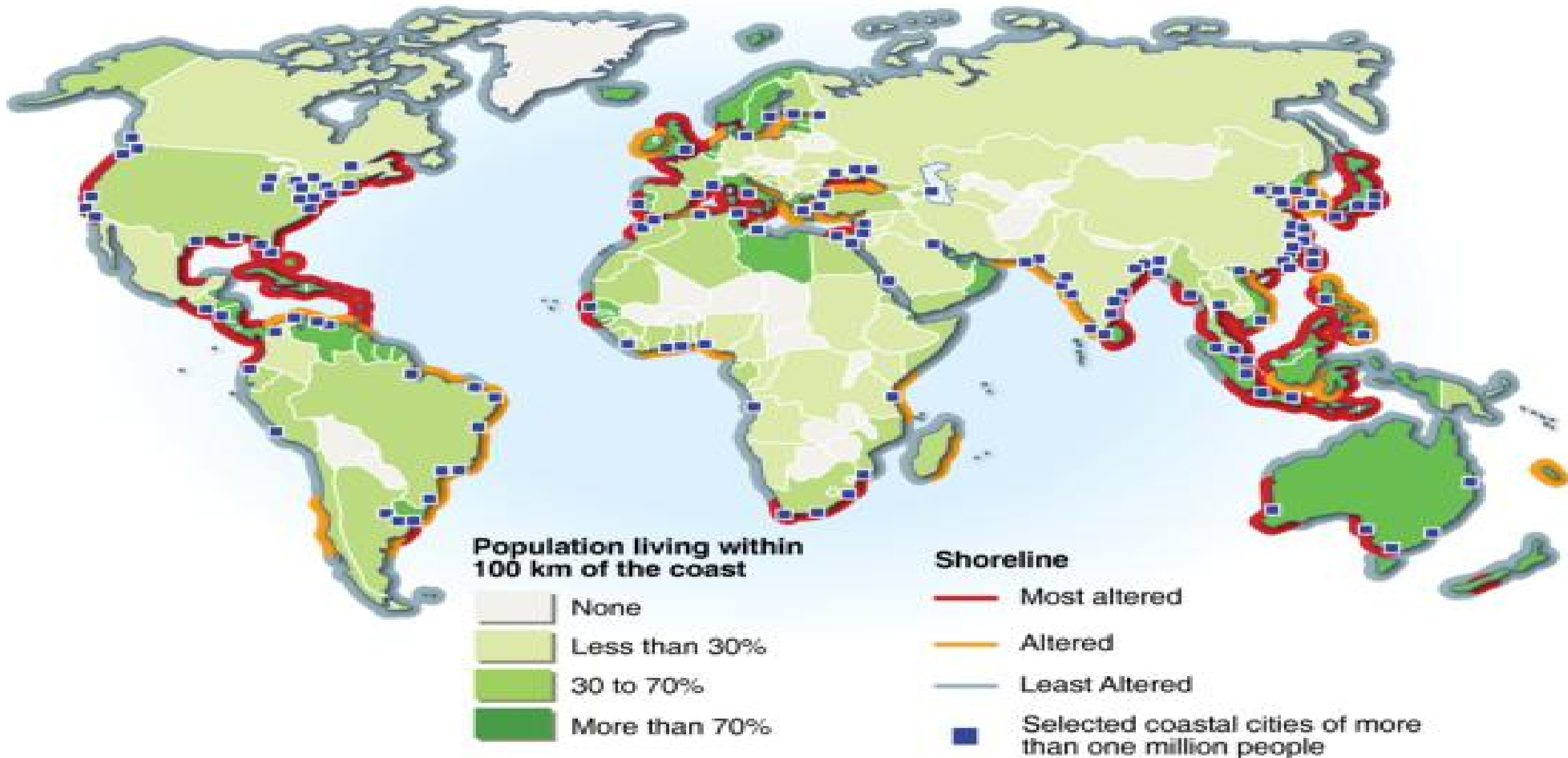
Tropical cyclones& Salt water intrusion

3. Discussion



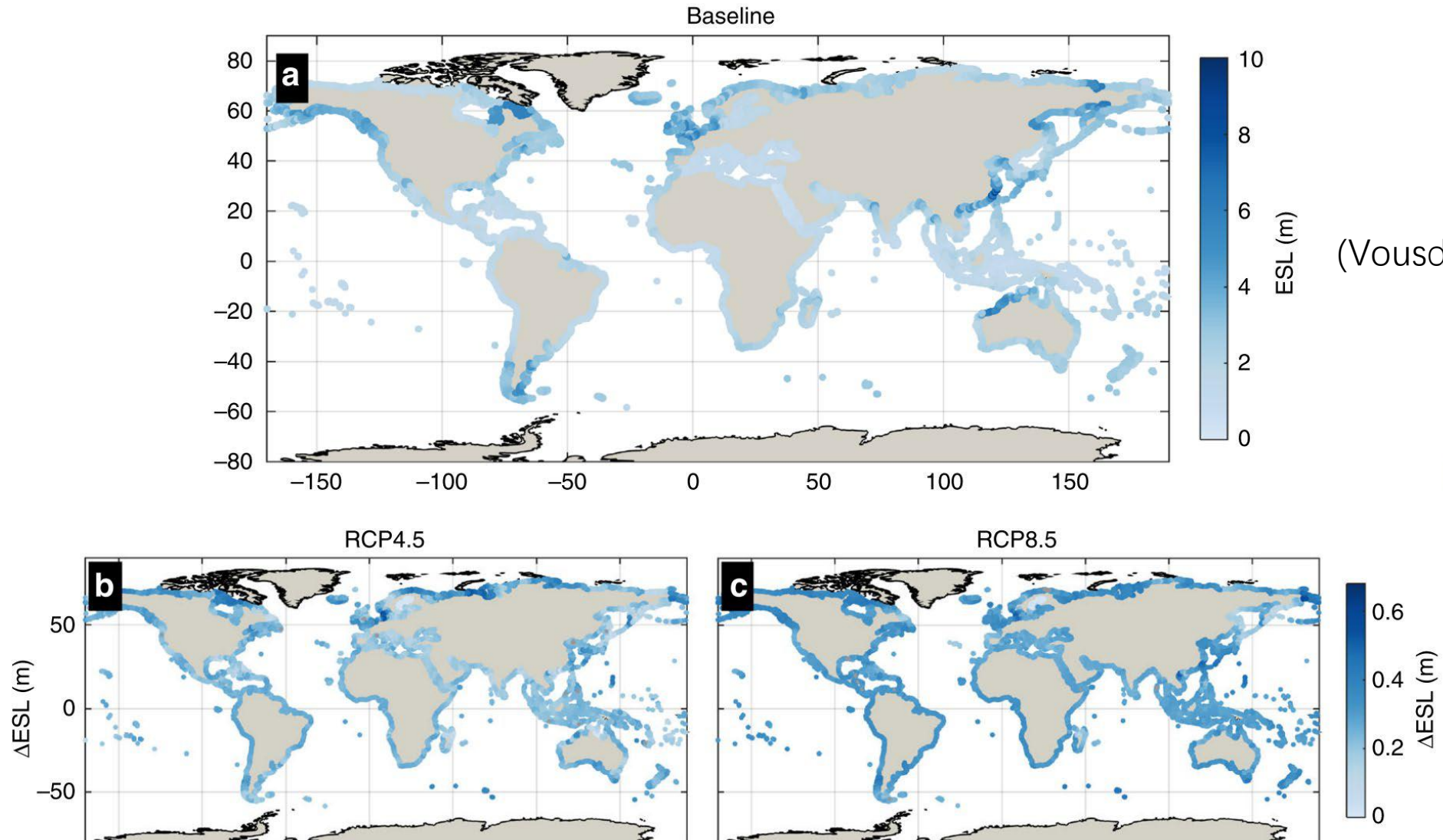


Background: Importance

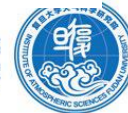




Background: coastal and climate change

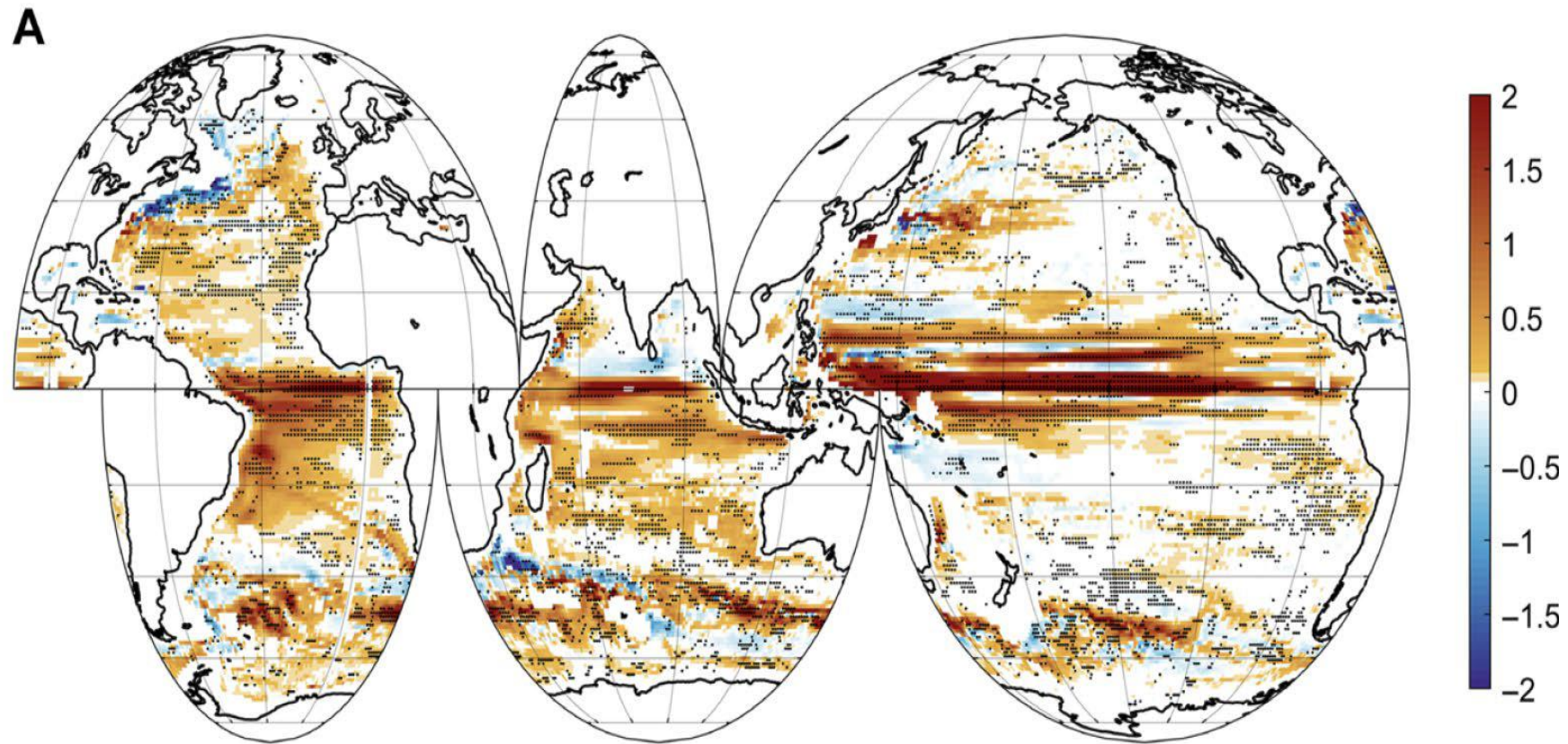


(Vousdoukas et al., 2018)





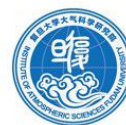
Background: large scale ocean basins and climate change



Hu et al., 2020



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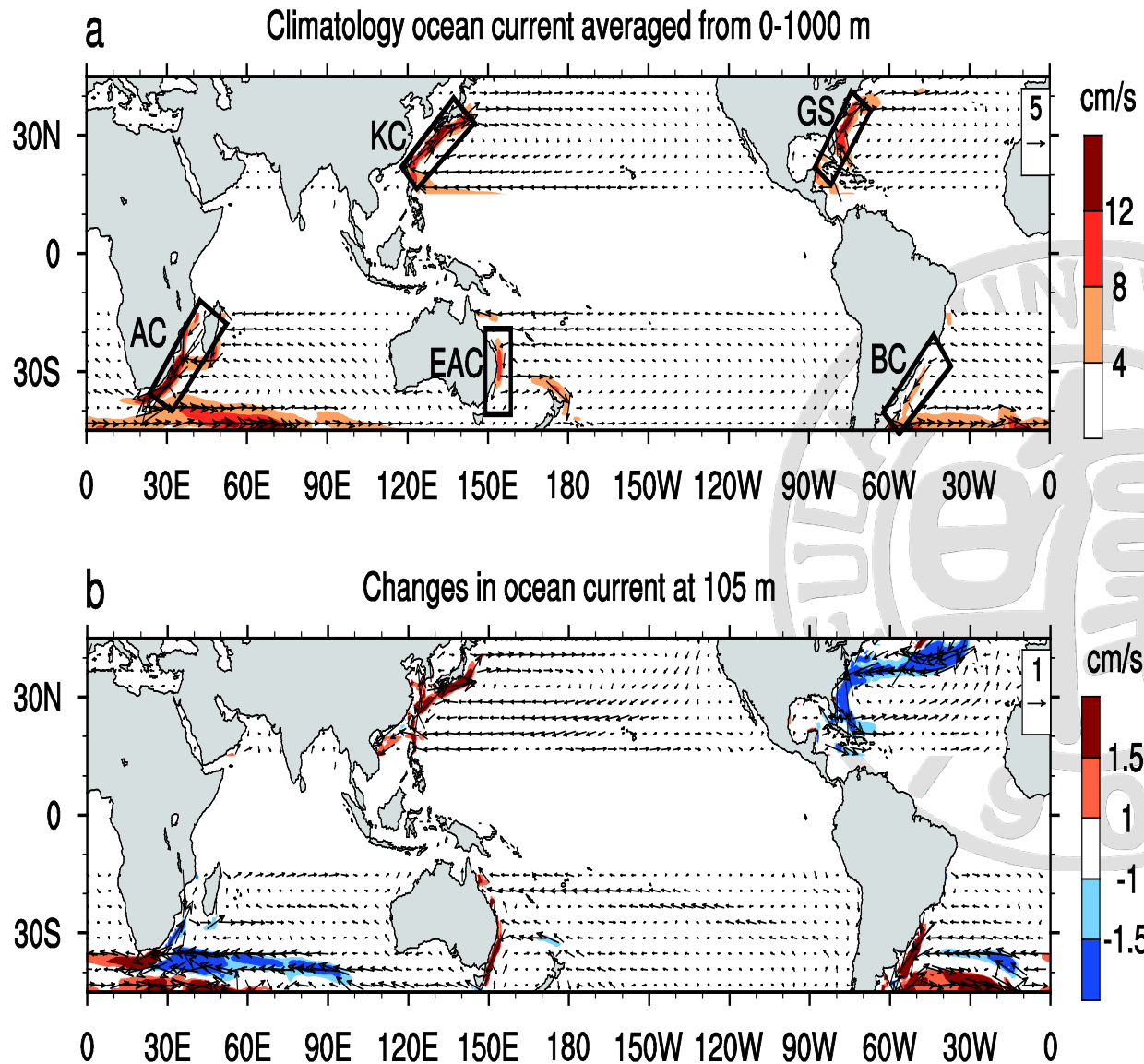
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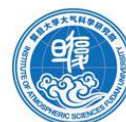


Changes of Western Boundary Current (WBC)



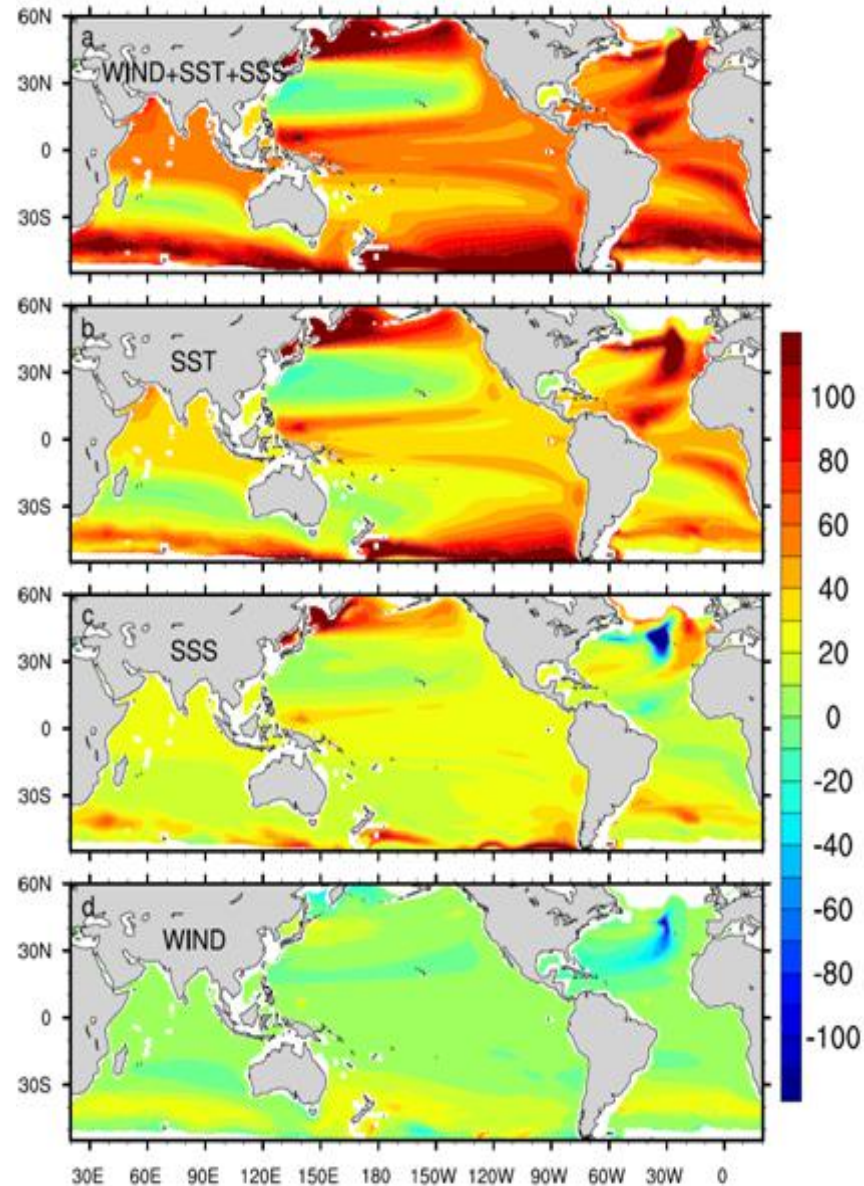
- There are strong WBCs in subtropical Oceans : Kuroshio Current, Gulf Stream, East Australia Current, Agulhas Current and **Brazil Current**.
- Under global warming, the KC, EAC and **BC is projected to intensified**.
- What's the impact?

Wang et al., 2015; Chen et al., 2019

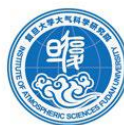




Change of large scale ocean circulation



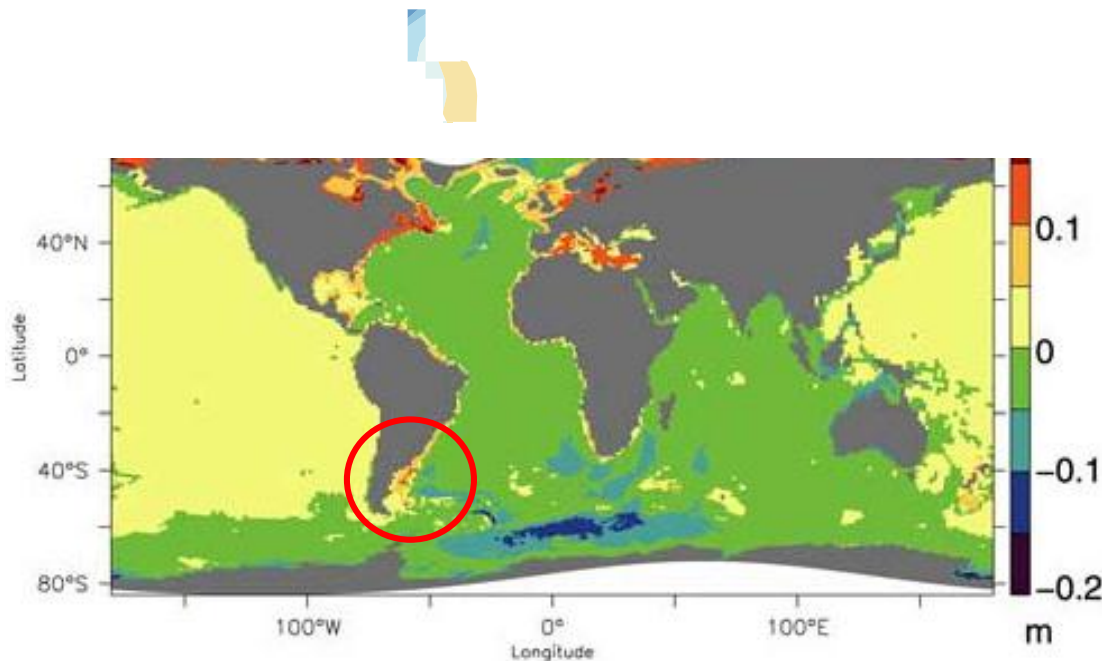
Wang et al., 2015





Water mass load onto the continental shelves

Chen et al., 2021



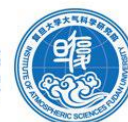
Landerer et al., 2007

- More than **90% of the total projected sea level rise** over the continental shelves of the China Seas will **result from mass contributions** and only a minor contribution will result from local steric.
- Mean that **global warming tend to push water mass onto the continental shelves from the open oceans.**
- So as the **shallow sea near Brazil.**
- **What's the impact?**

c)



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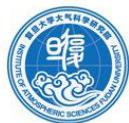
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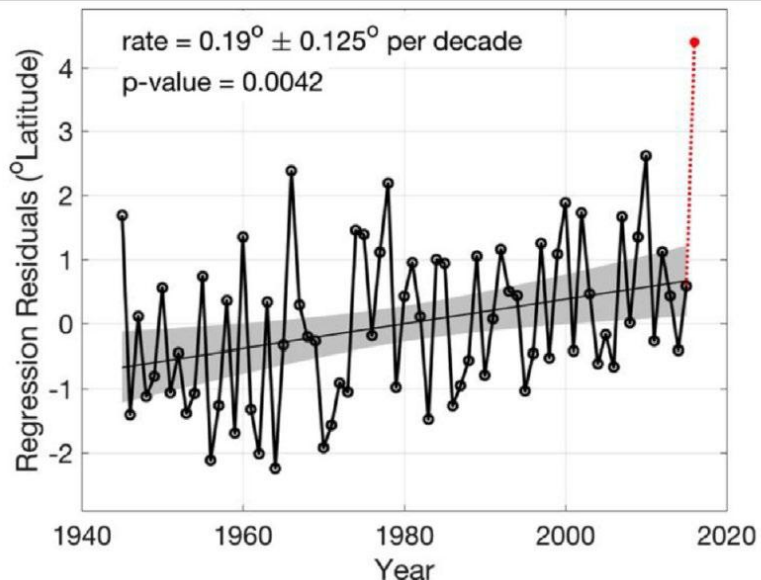
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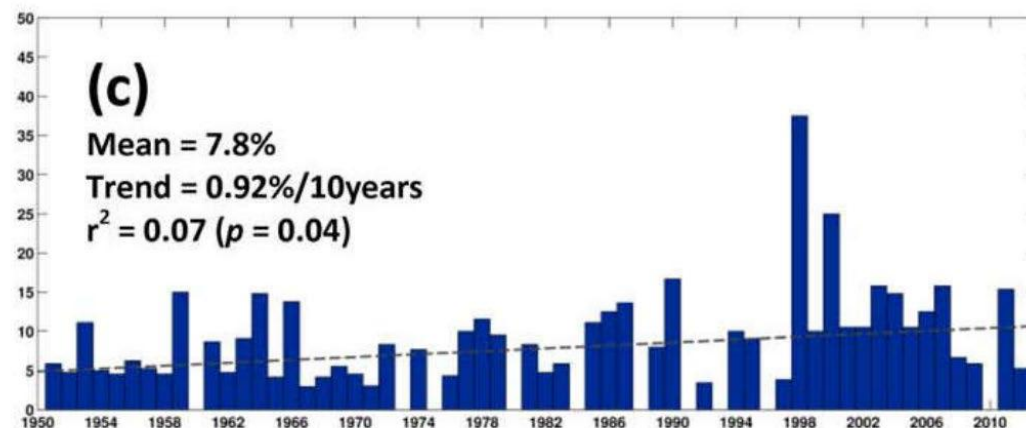
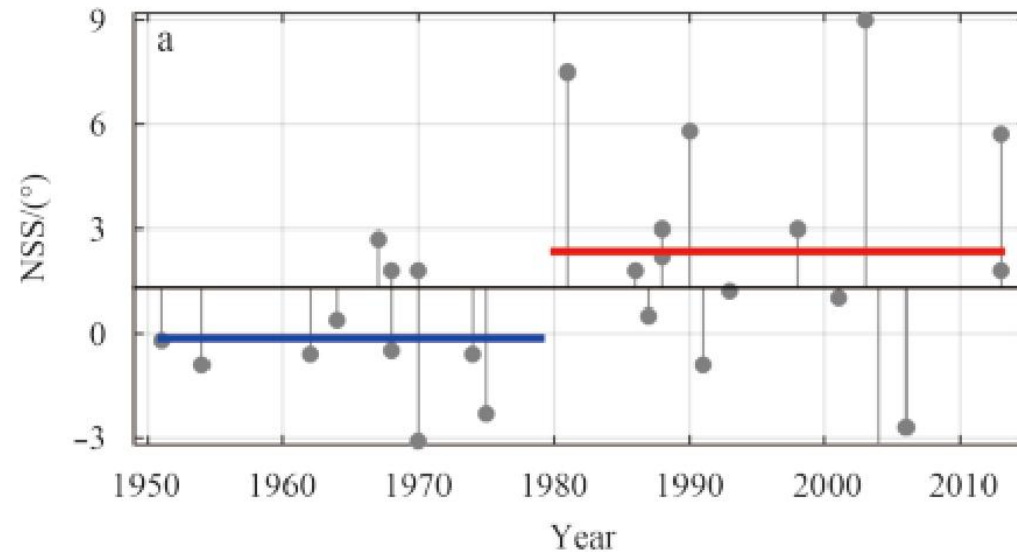
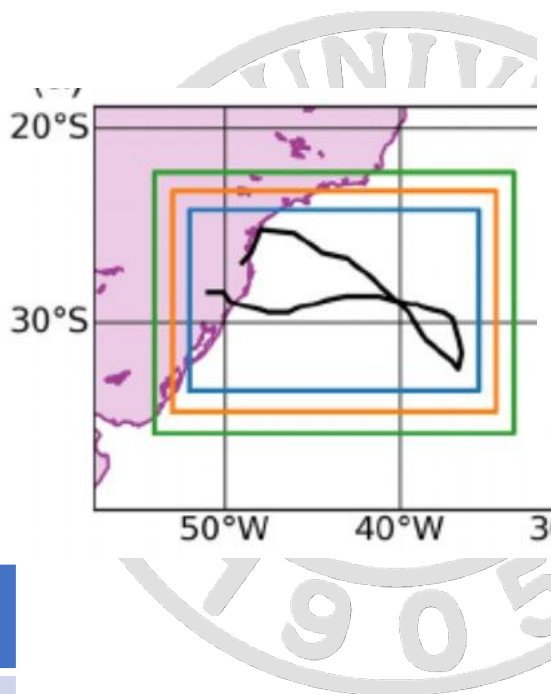
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Northward shift of tropical cyclone tracks over the North Pacific

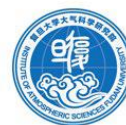
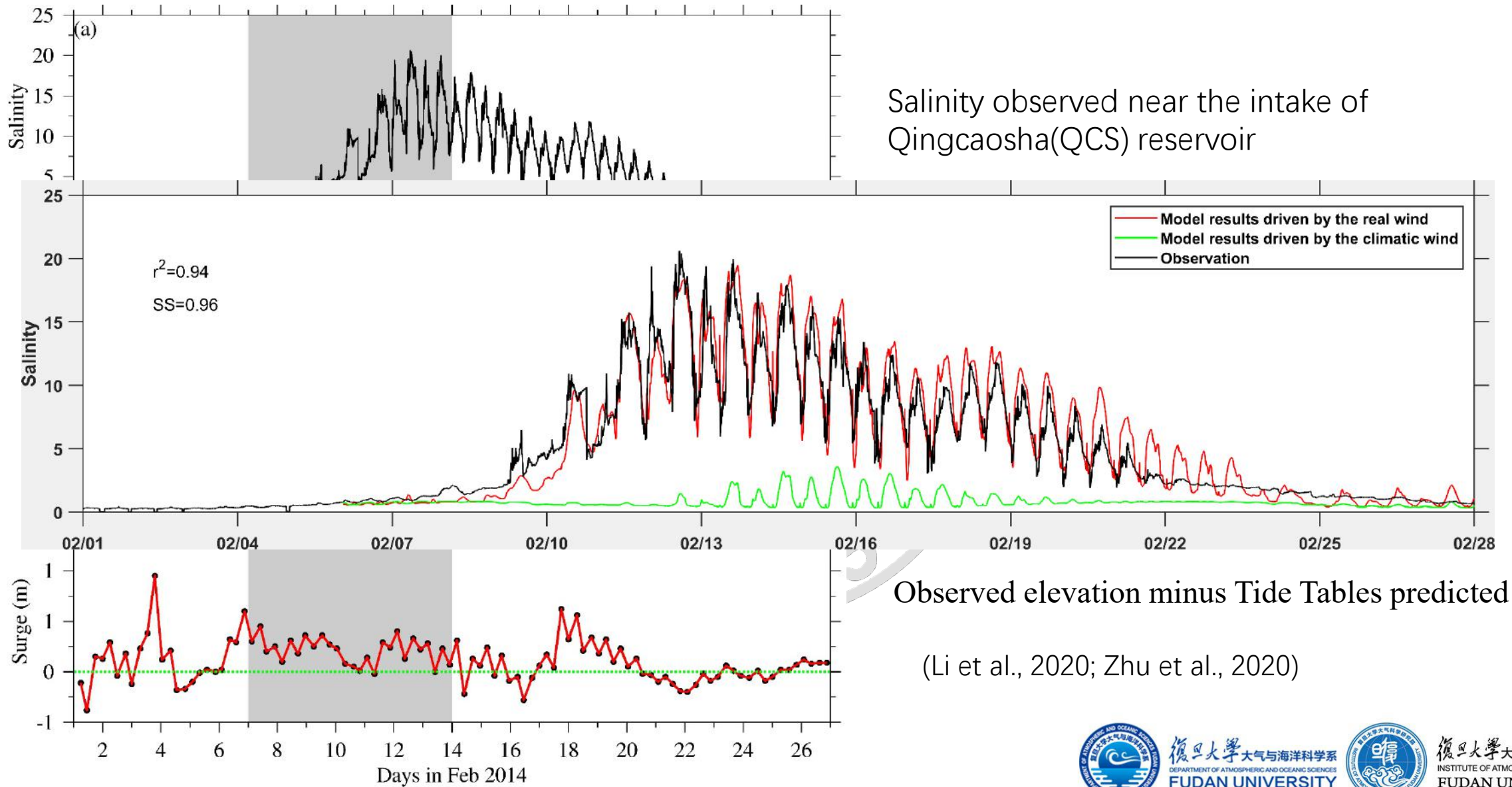


Average (July-November) latitude of tropical cyclones in the western North Pacific at the time of their maximum intensity based on surface winds. (Lee et al., 2020)



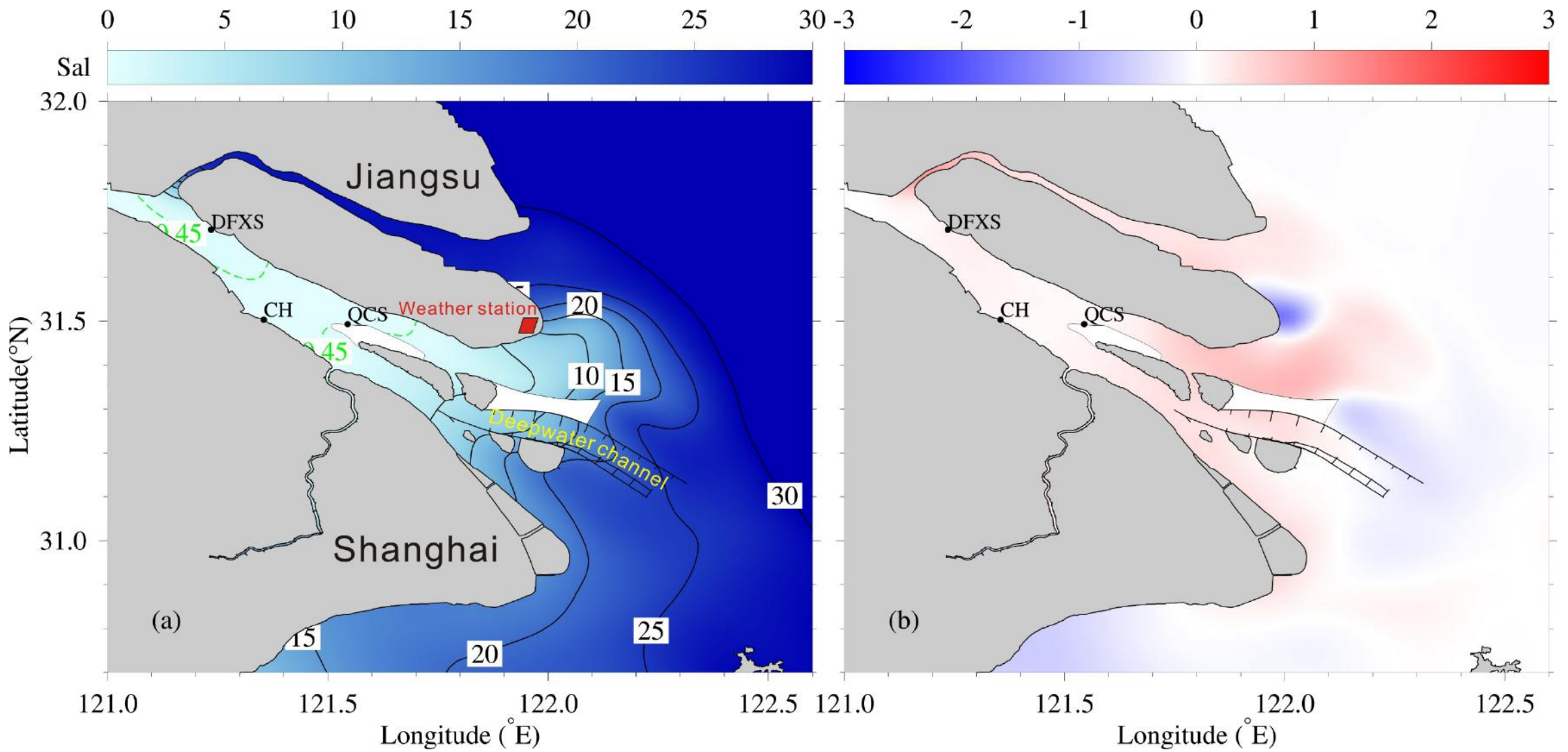
Hurricane occurs in South Atlantic	year
Catarina	2004
Iba	2019

Abnormal salinity increase under strong north wind





Saltwater intrusion in the Changjiang Estuary



Modeled salinity during the winter/dry season

Salinity difference when sea level rise 30 cm (Tang et al., 2020)



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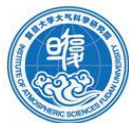
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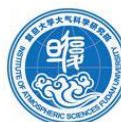
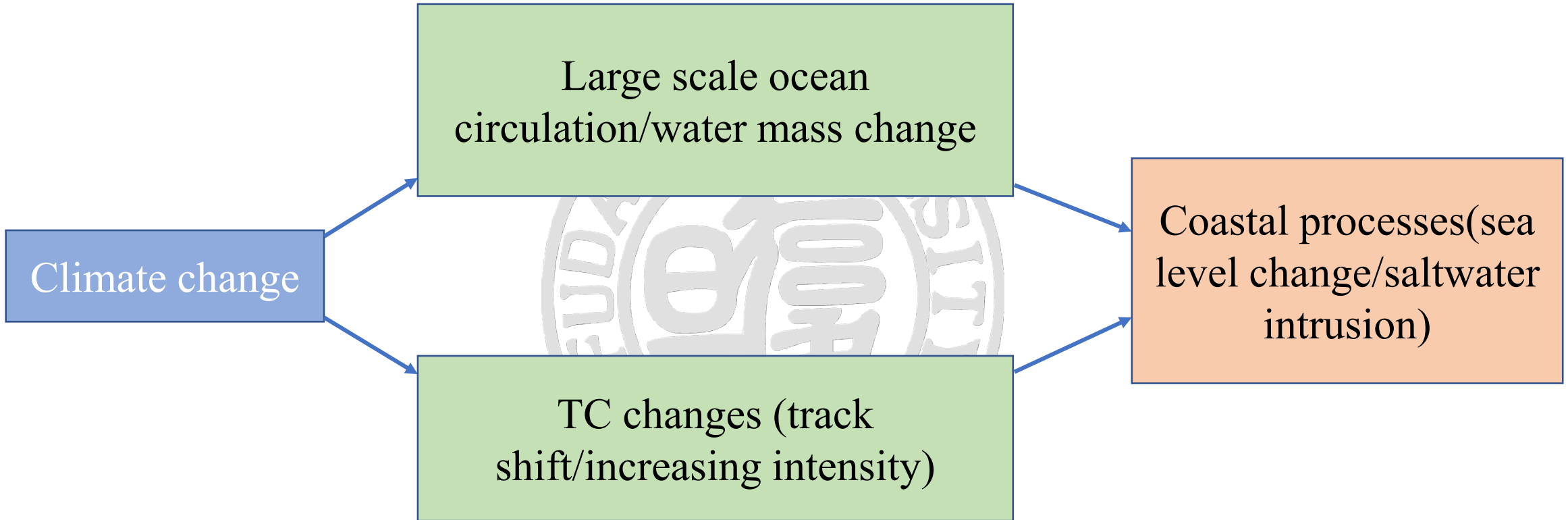
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Discussion

1. Although we discuss the coastal processes under climate change today, the linkages among climate change, basin scale ocean and coast are very important.
2. We need to pay more attention the ways that the climate change affects coast processes.

