Sea Surface Temperature impact on the Sea Level Changes Over North Pacific

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I. Tropical – Polar Teleconnections

Observed Changes in Sea Surface Height

- Observed Changes in Satellites (TOPEX / Jason1 / Jason2) and Coastal Stations

  SST drives SLA over North Pacific

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Regional Sea Level Changes after Removing the Global Mean

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SST drives SLA over North Pacific
Recent Climate Changes over Antarctica

- Sea Surface Temperature
- Surface Wind
- Sea Surface Height

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- Sea Surface Temperature
- Surface Wind
- Sea Surface Height
- Sea Surface Temperature

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Questions

- Whether SST induced Surface Wind Changes can Drive the Observed Sea Level Changes?
- Whether Inter-basin Teleconnections can Trigger These Changes?
Observed Changes in Sea Level, SST, and Atmospheric Circulations
SLA SST and Surface Atmospheric Circulation Changes

SST drives SLA over North Pacific
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Observed SLA SST and Surface Atmospheric Circulation Changes

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England et al, 2014; McGregor et al, 2014; Li et al, 2016;

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I. Observed SLA SST and Surface Atmospheric Circulation Changes

SLA

SST

Surface Wind

SLP

Zhang et al, 2006; Yu et al, 2016

SST drives SLA over North Pacific
Ocean Model Simulations Forced by Surface Wind Changes
Observed Changes VS. Ocean Model Simulations

*Using Observed Atmospheric Forcing to Drive the Ocean Model (POP)*

SST drives SLA over North Pacific

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Observed Changes VS. Ocean Model Simulations

I. Observed Changes In SLA

Ocean Model Results In SLA

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Coupled Model SST Restoring Simulation and Atmospheric Simulation Results
Restoring the SST over Atlantic and Pacific in CESM system

**Coupled Model Simulation Forced by Atlantic SST**

**Coupled Model Simulation Forced by Pacific SST**

SST drives SLA over North Pacific
I. Observed Changes

Sea Level Response in Coupled Simulations

Atlantic Forcing

Pacific Forcing

SST drives SLA over North Pacific
Surface Wind Responses in Coupled Simulations

- SST drives SLA over North Pacific

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Surface Wind Responses in Coupled Simulations

I. Atlantic Forcing

Observed Changes

Pacific Forcing

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I. SST drives SLA over North Pacific

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Surface Wind Responses in Atmospheric Simulations

Observed Changes

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Summary

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Thank you 😊

Xichen Li