

# Towards a Sea Level Rise Prediction System from Days to Decades

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Department of Atmospheric Sciences

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# Towards a Flood Risk Prediction System from Days to Decades

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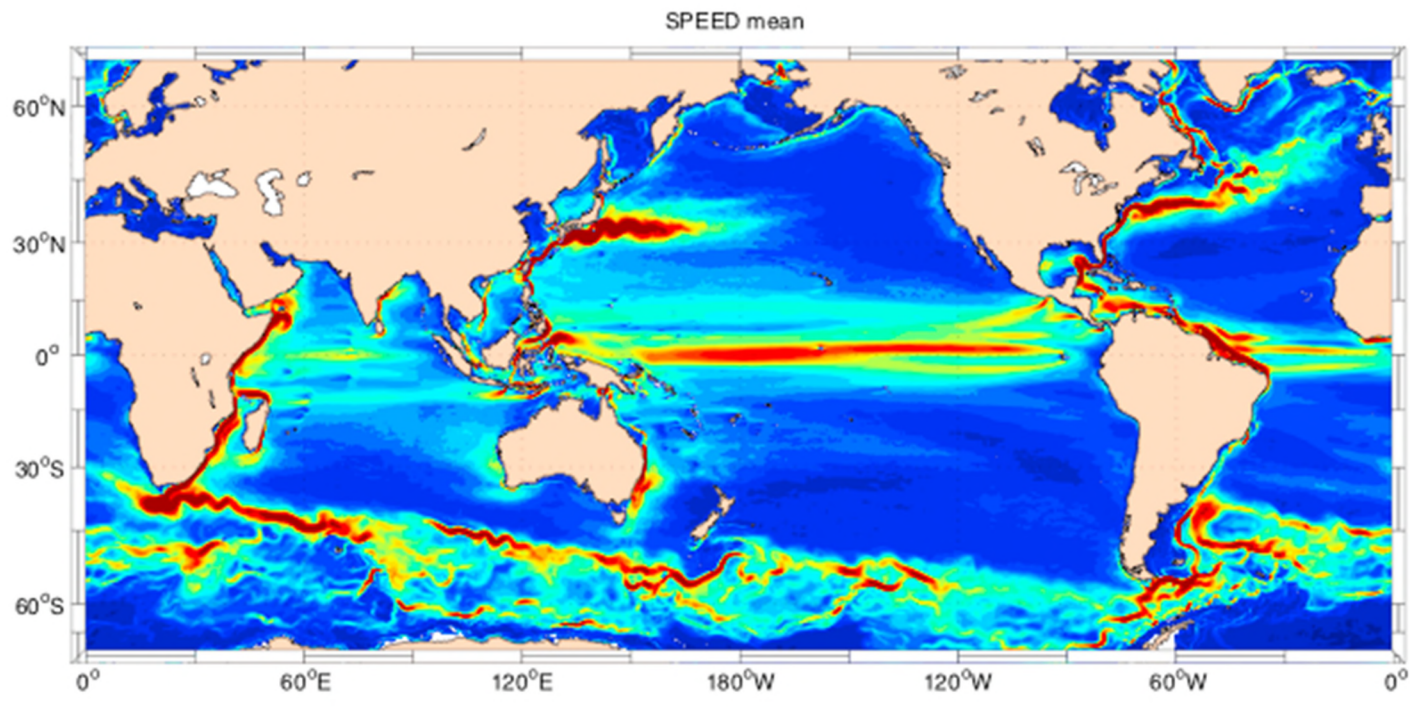
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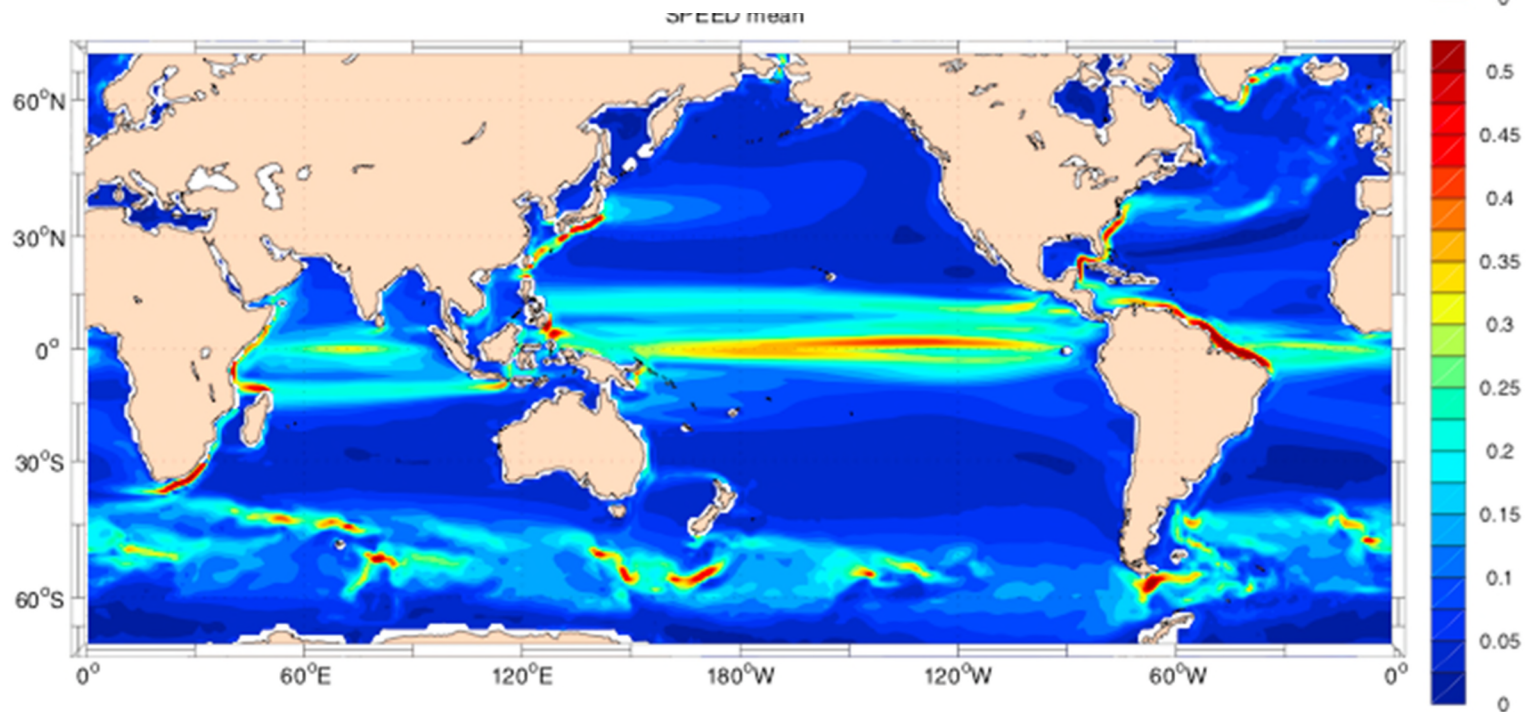
# Ocean Eddy Resolving Coupled Predictability and Prediction

- **CESM**
  - Atmosphere: 0.5x0.5
  - Ocean: 0.1x0.1 [HRC] vs. 1x1 [LRC]
- **Newly Resolved Sub-Seasonal-to-Decadal Variability**
  - Air-Sea Feedbacks: Who is Forcing Who
  - Predictability (Decadal) – and Prediction
    - SEUS Rainfall, SST and SSH
  - Prediction (Sub-Seasonal to Inter-Annual)

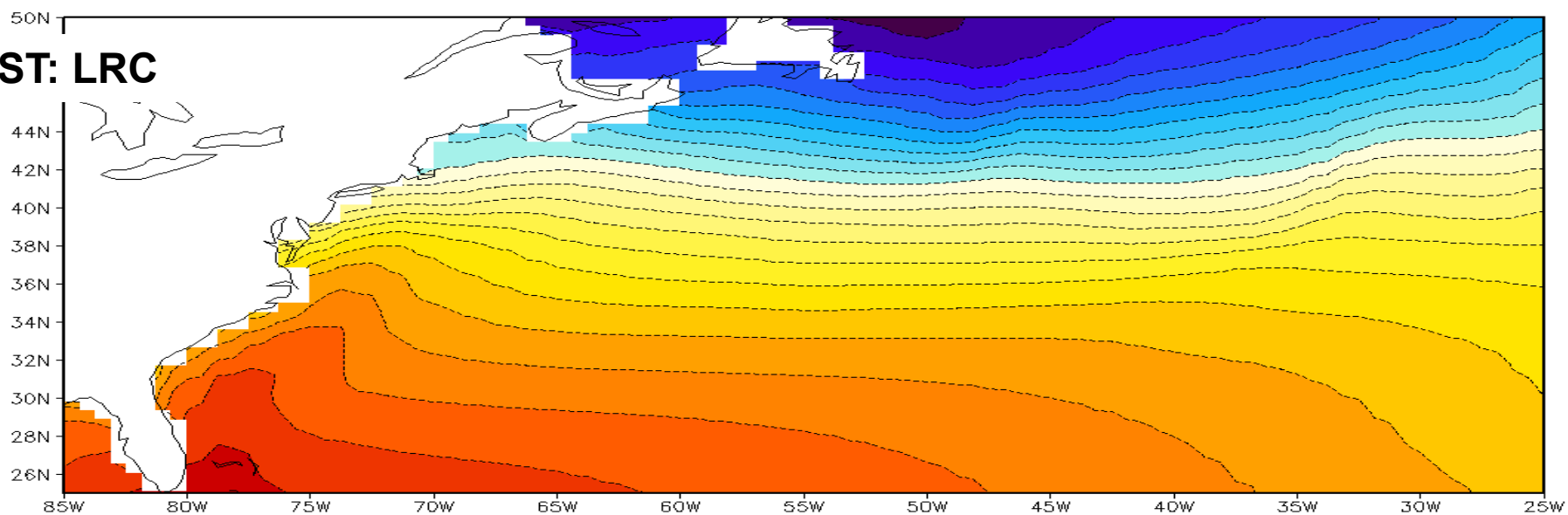
HRC



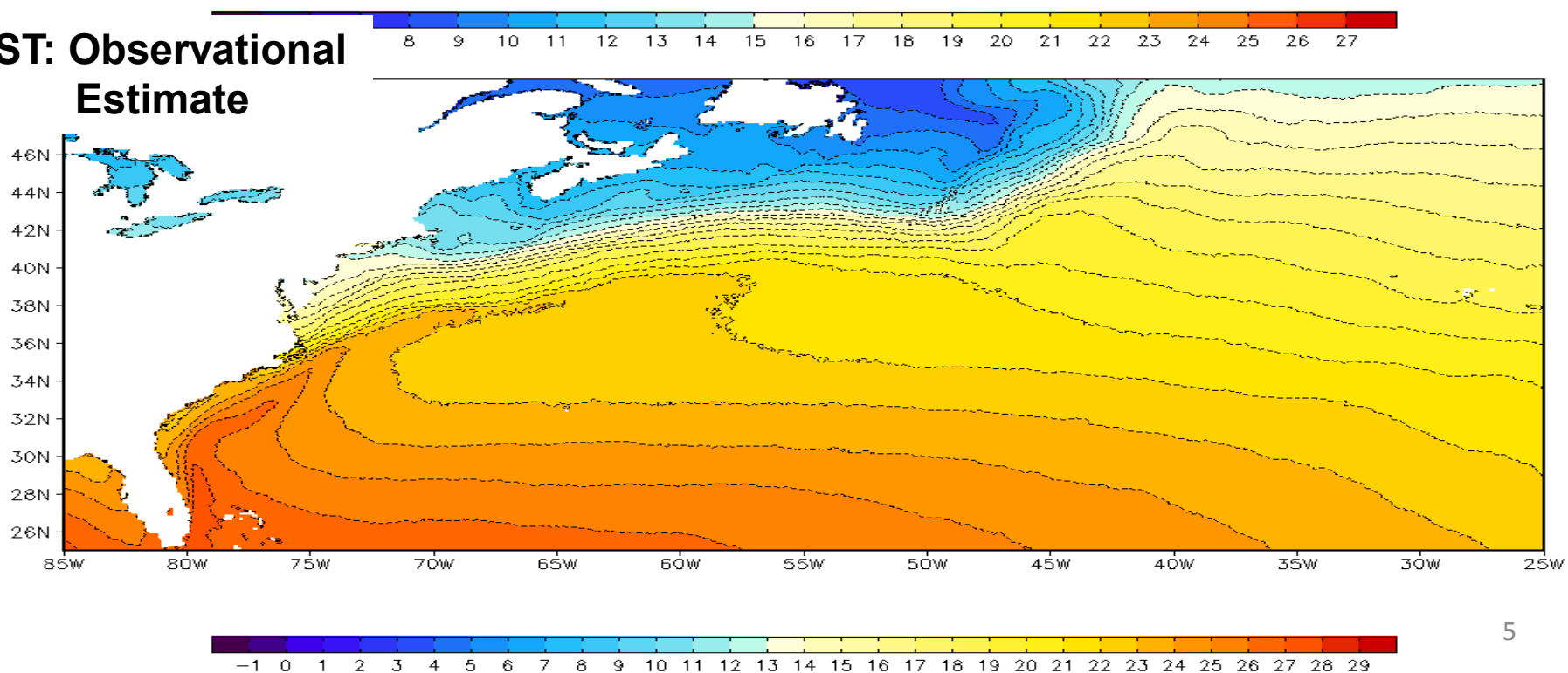
LRC



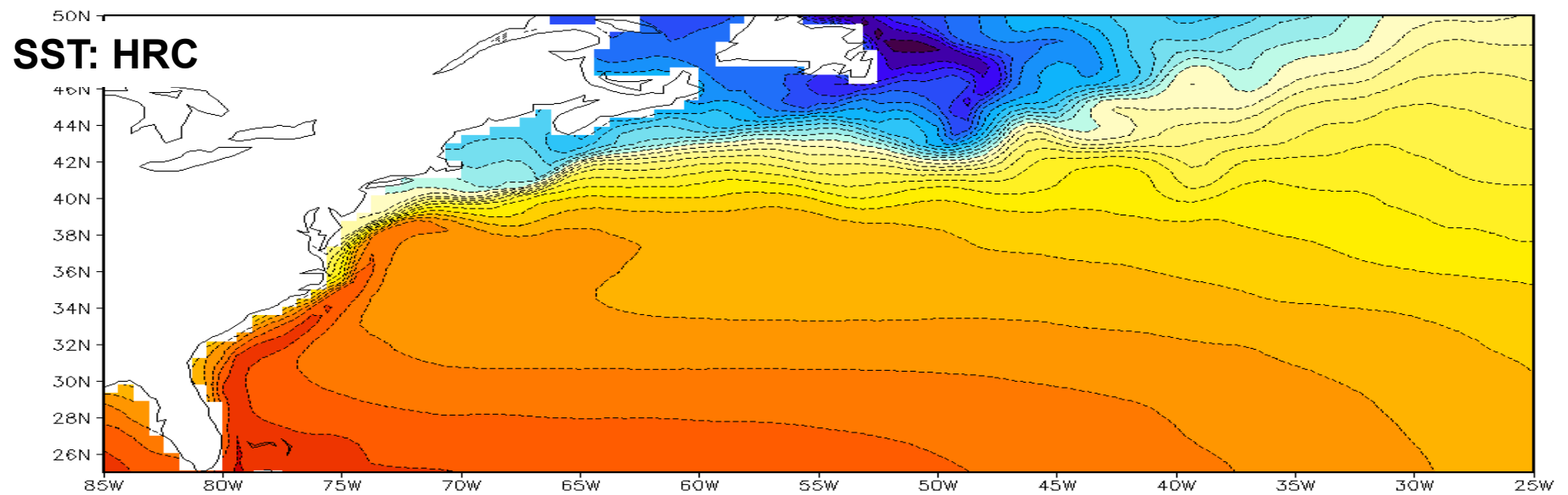
## SST: LRC



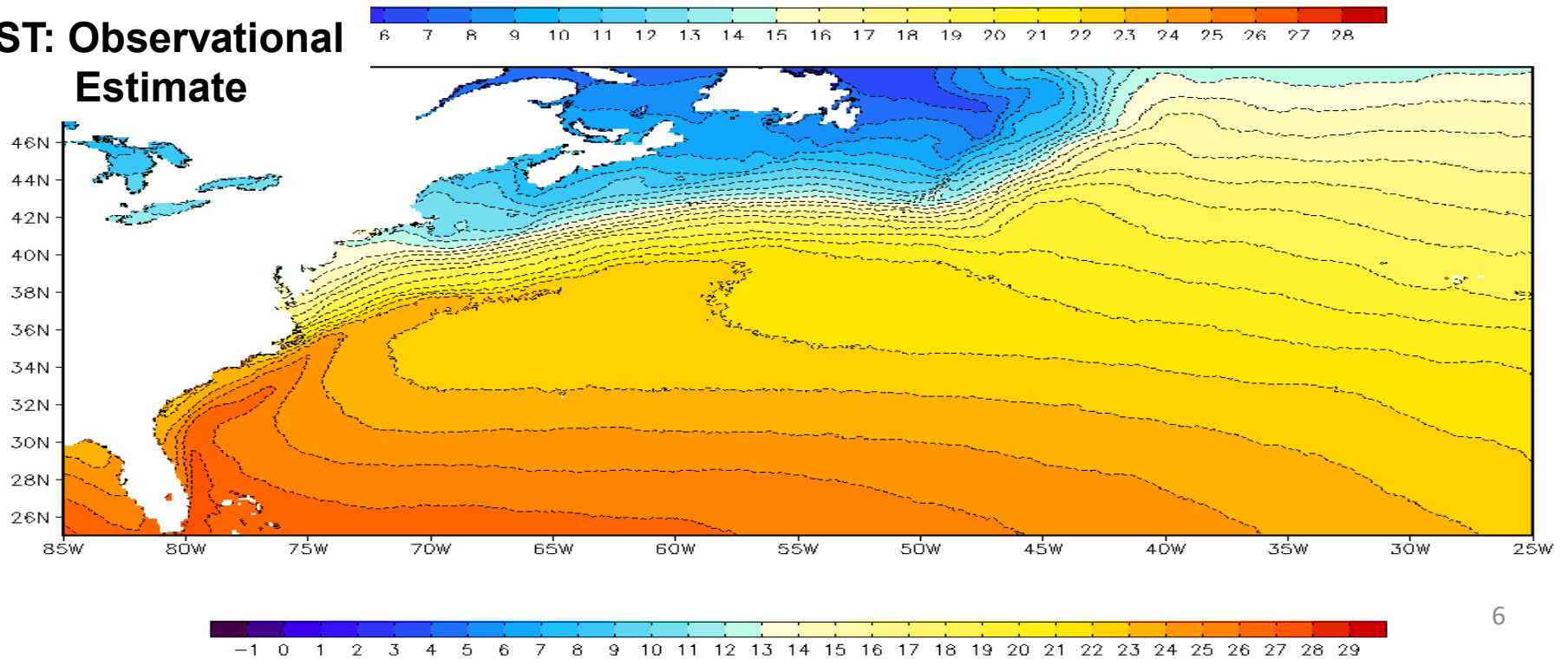
## SST: Observational Estimate

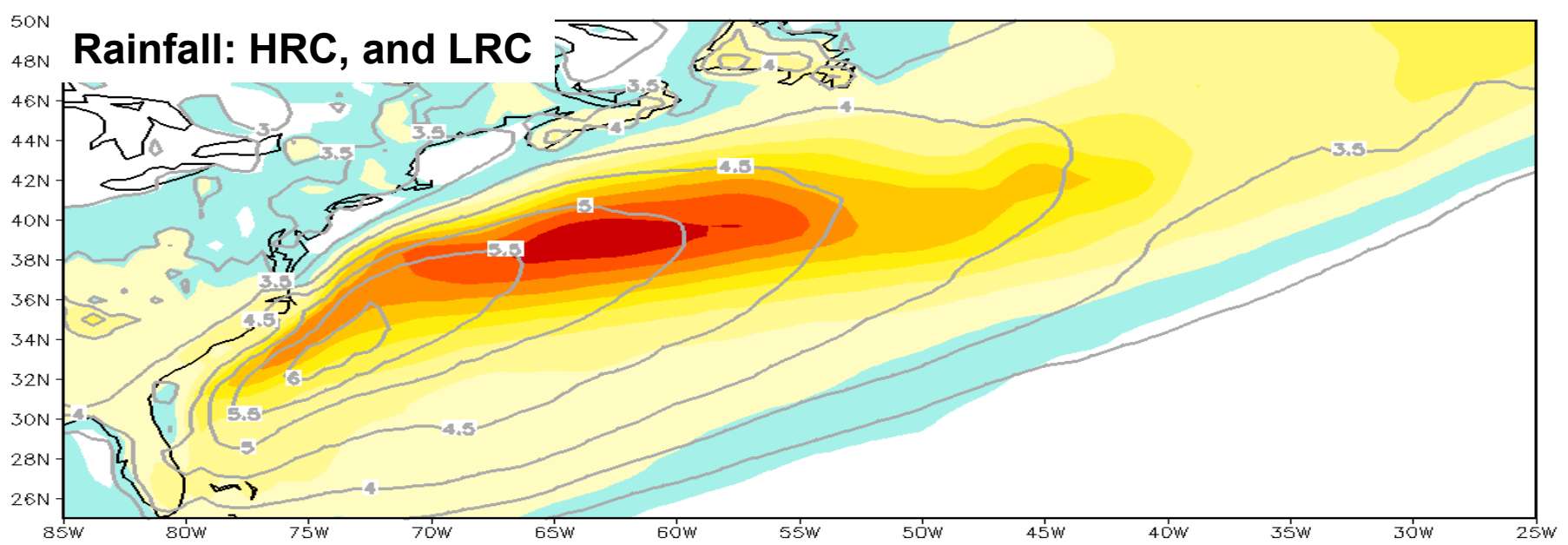




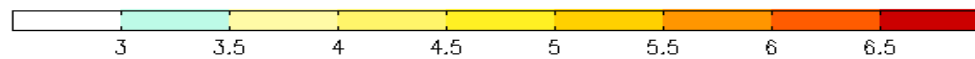
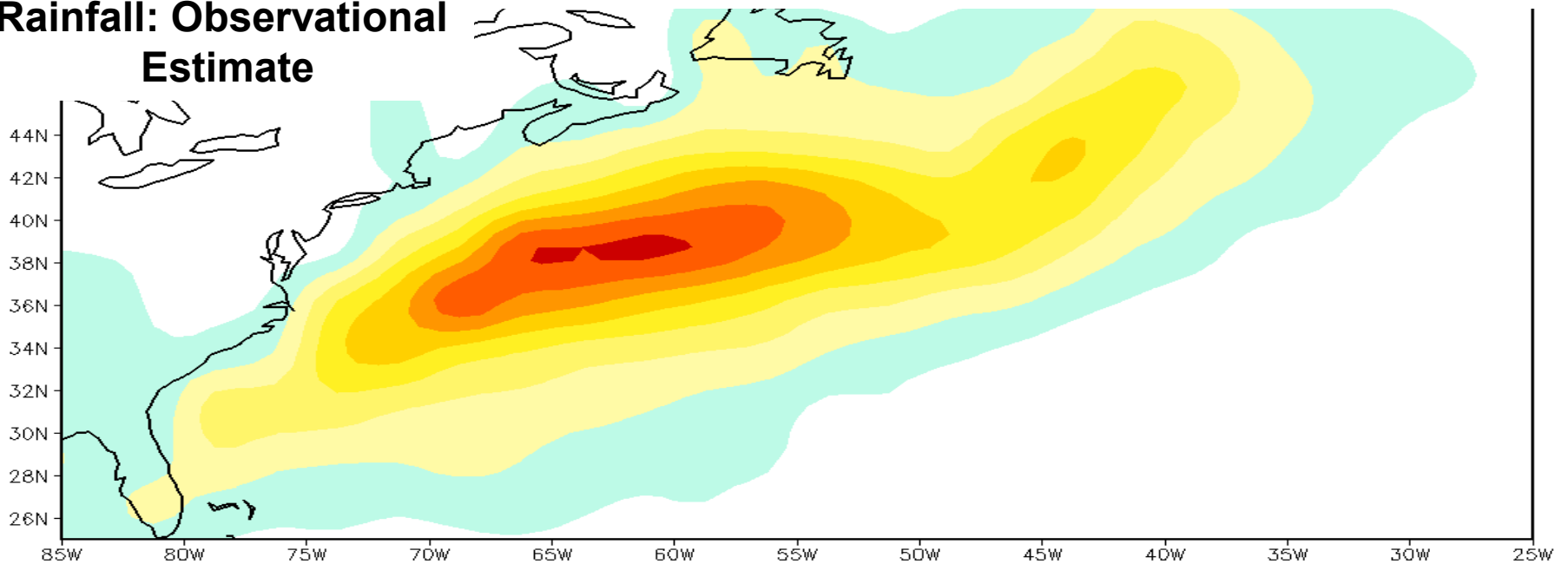


### SST: Observational Estimate

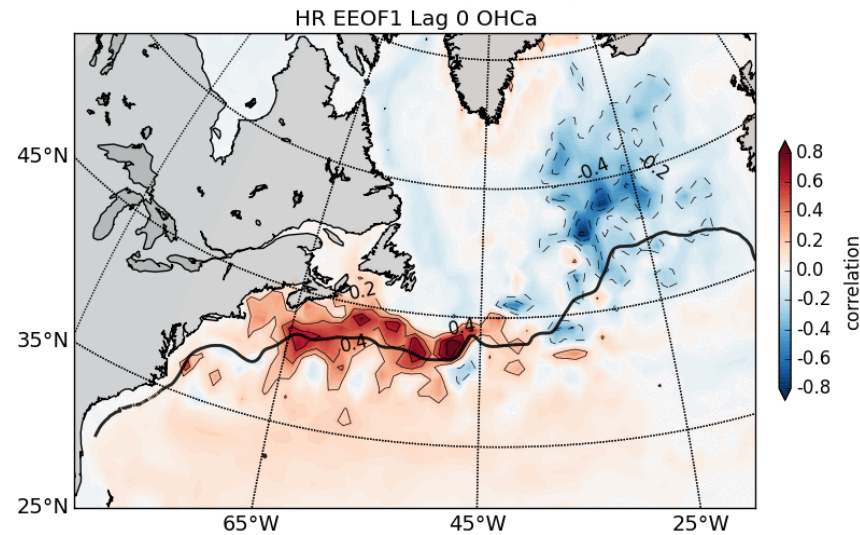
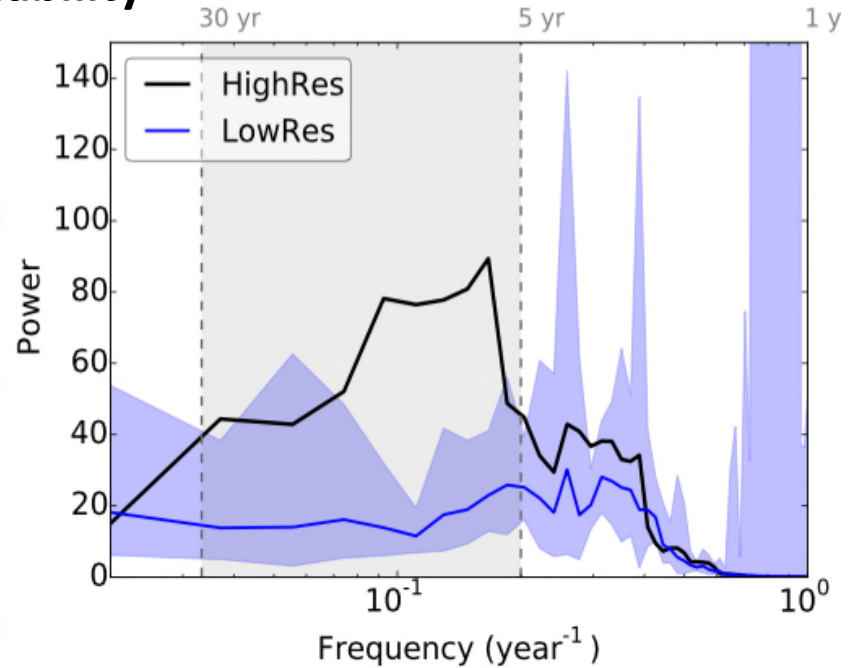
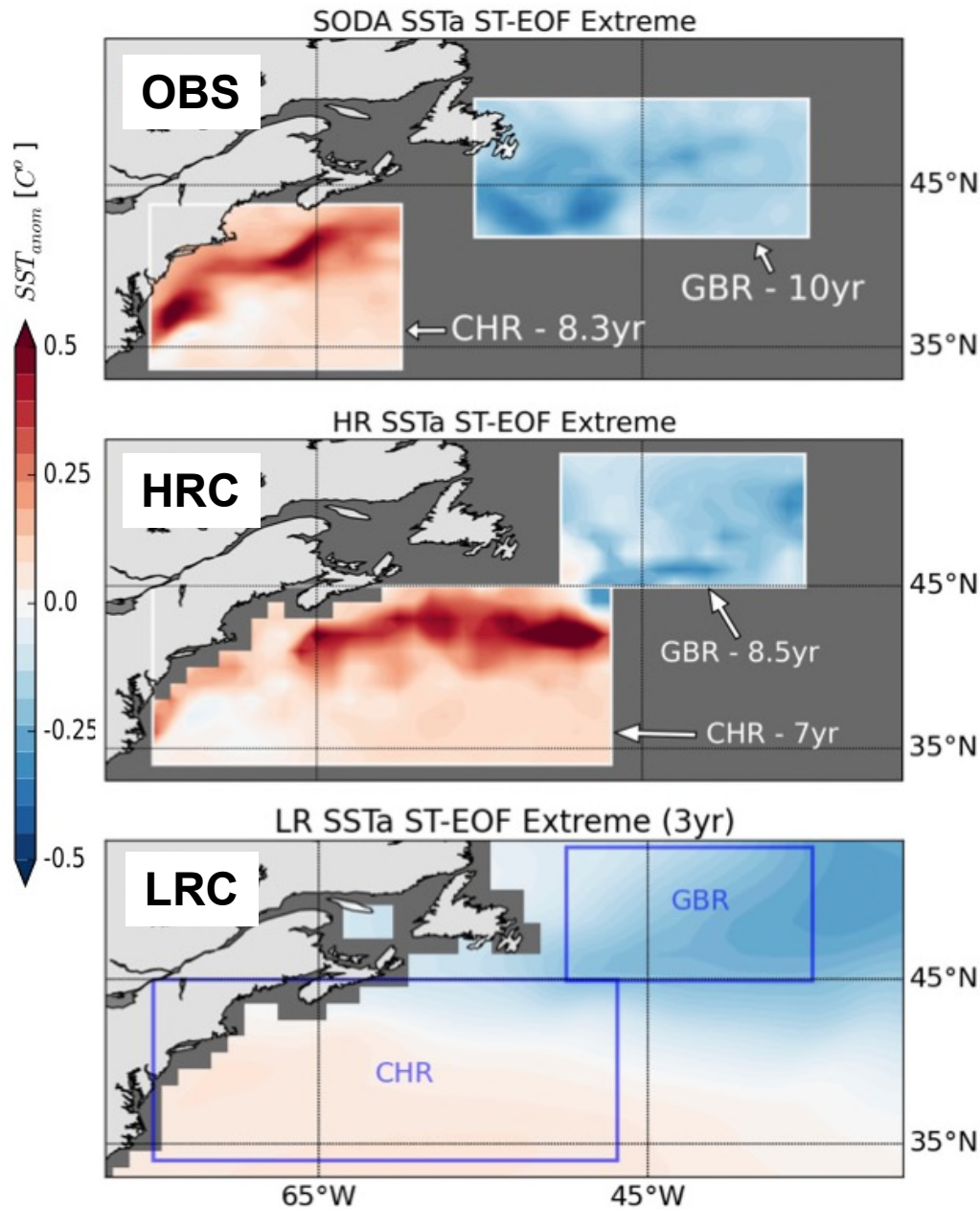




### Rainfall: Observational Estimate

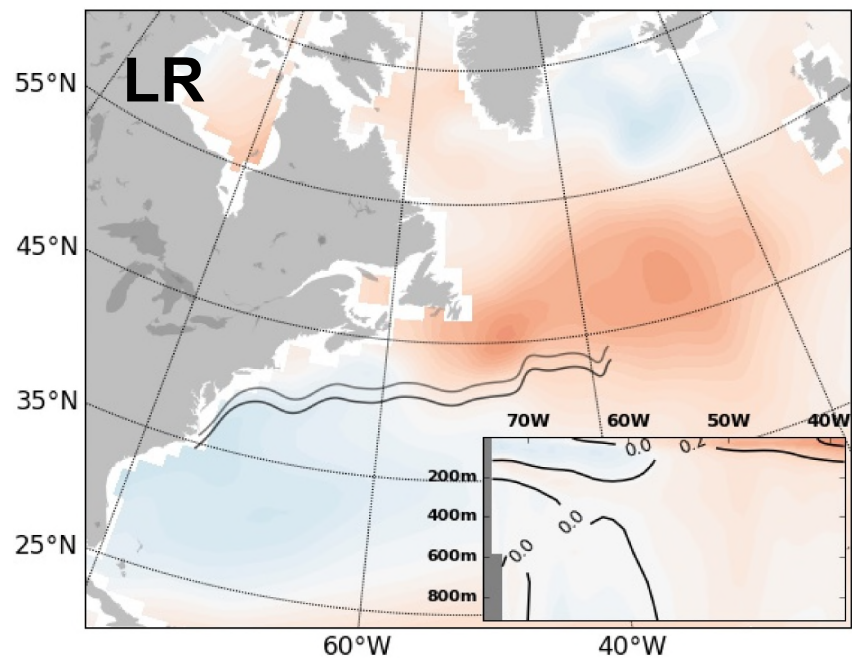
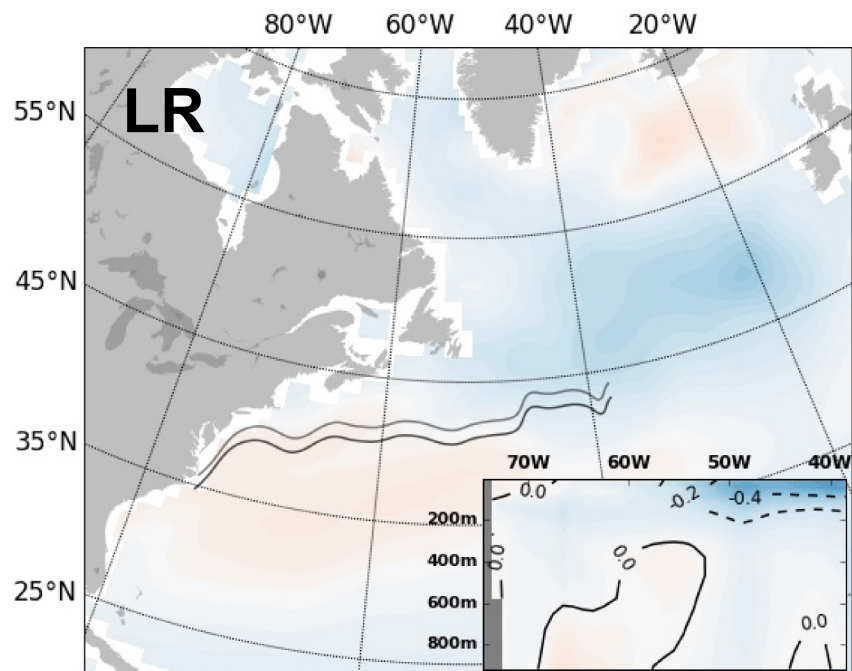


# Natural Decadal Variability

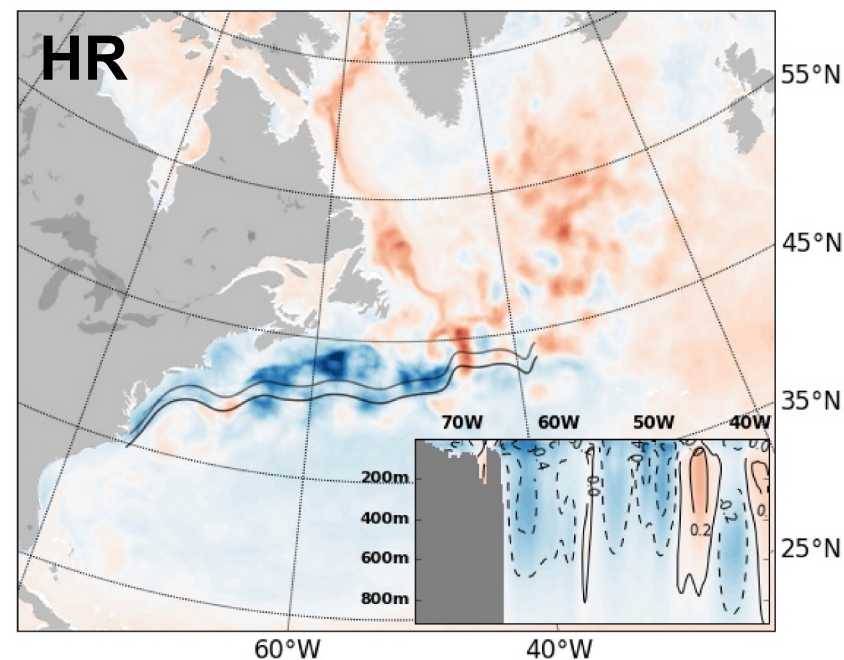
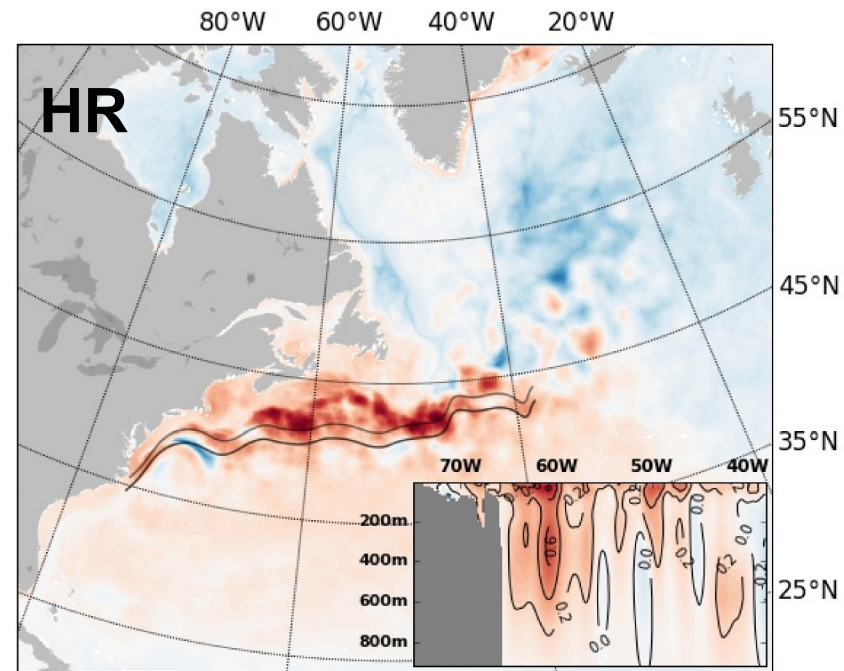




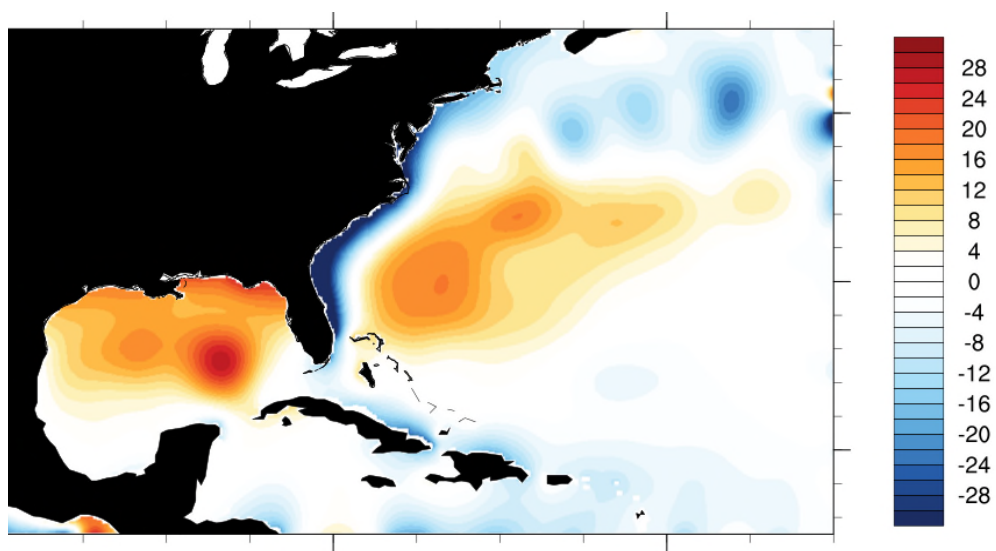
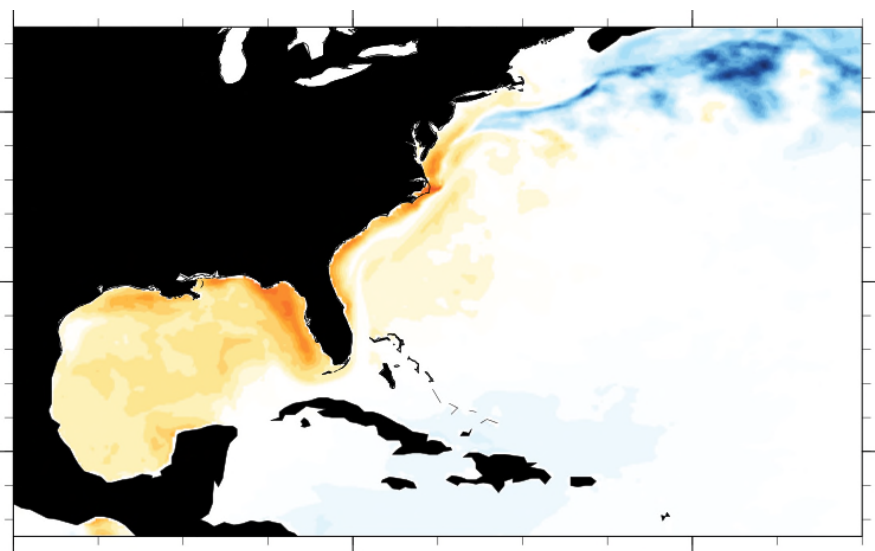
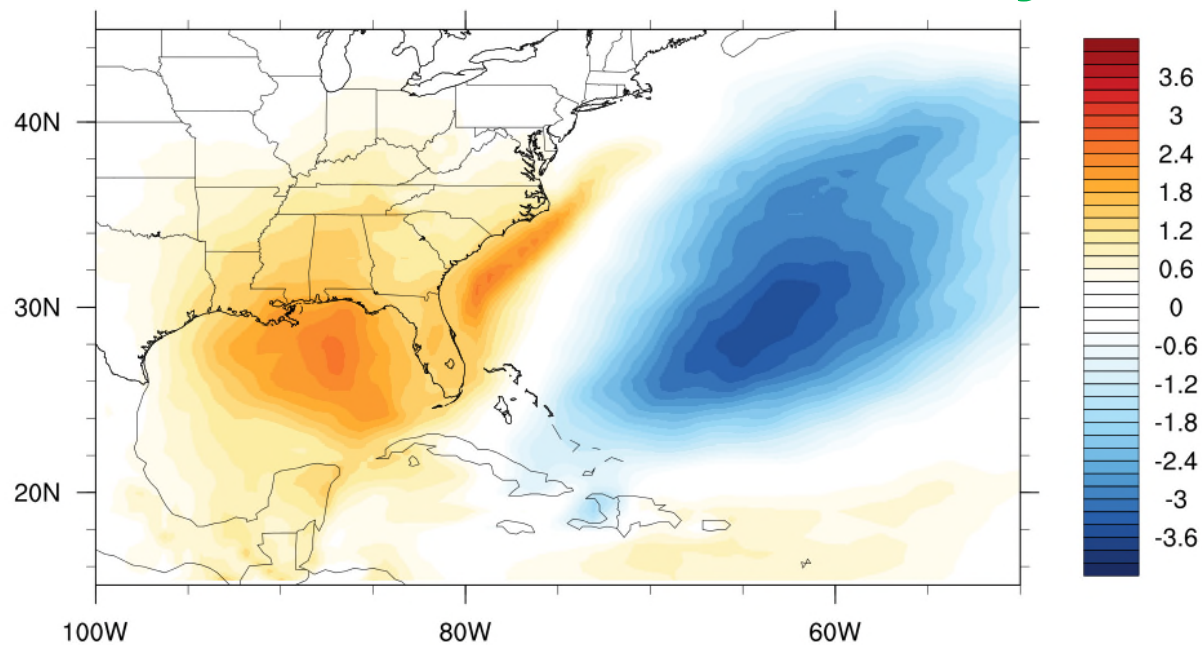
CMIP5 Class Resolution (1 Degree):

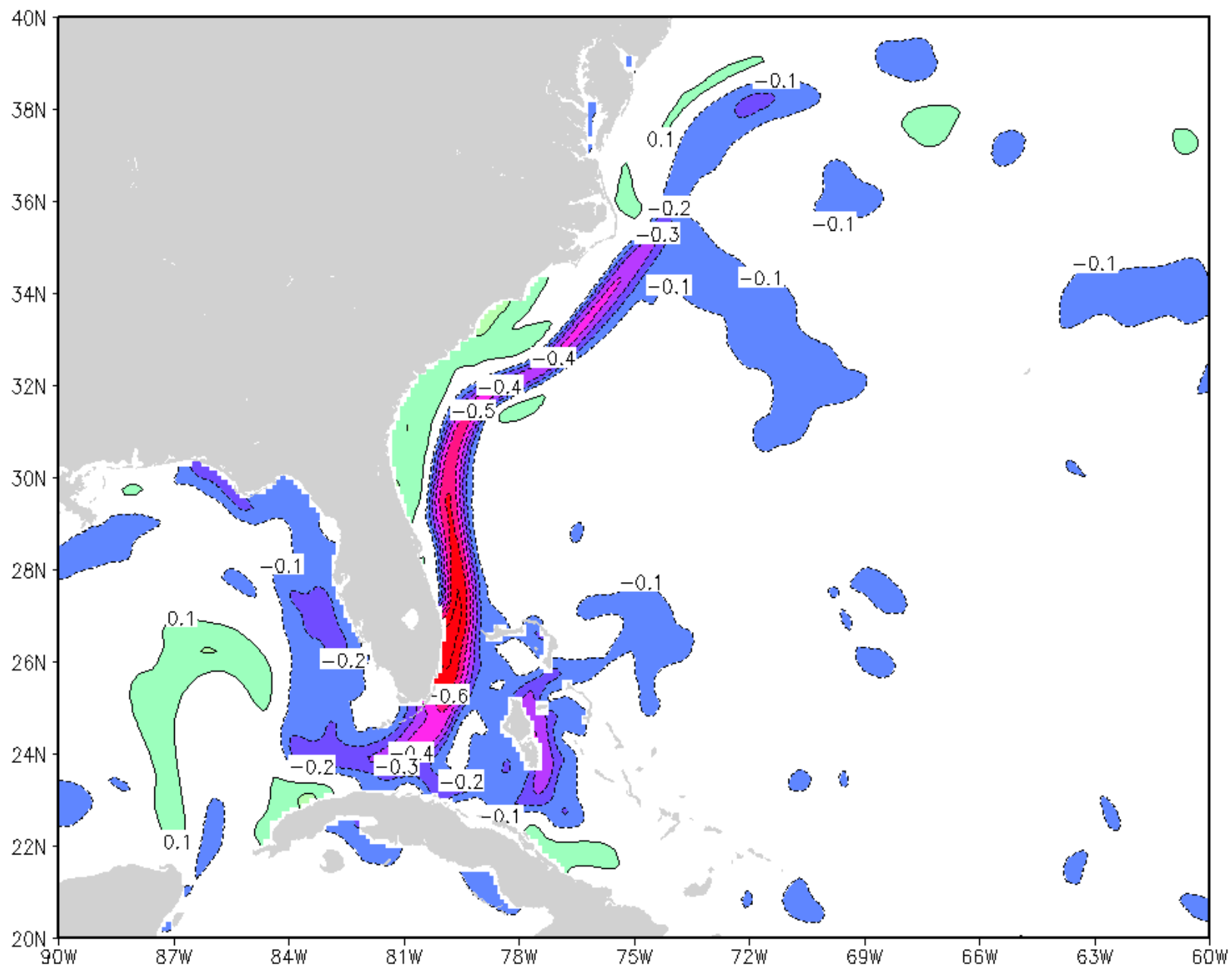


Ocean Eddy Resolving (0.1 Degree)!



# Natural Decadal Variability





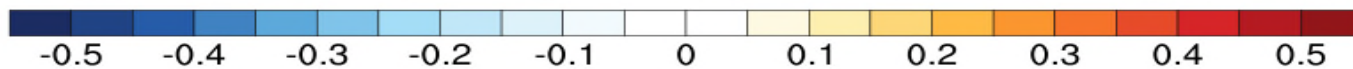
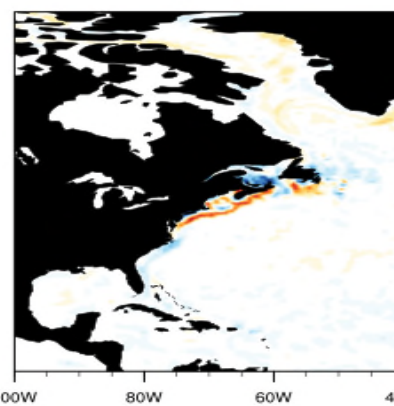
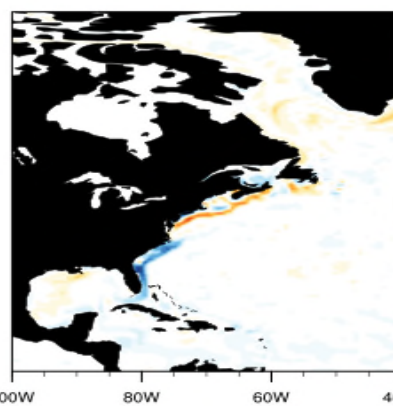
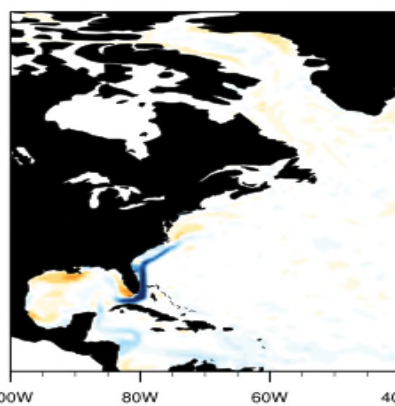
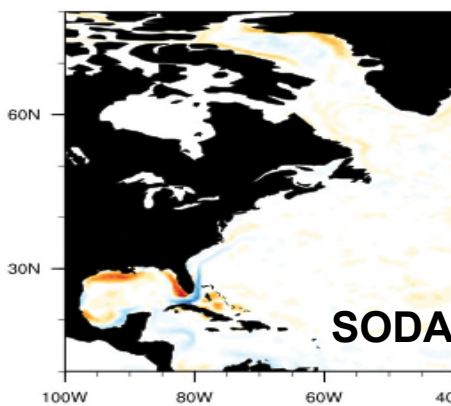
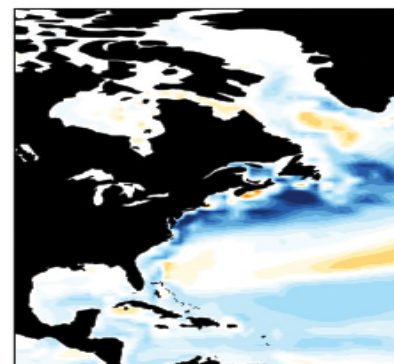
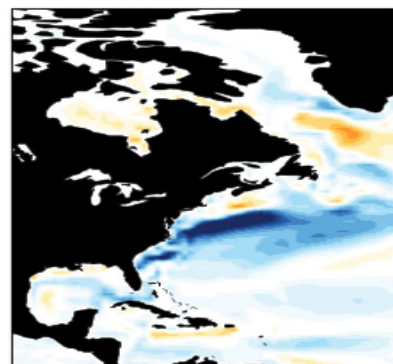
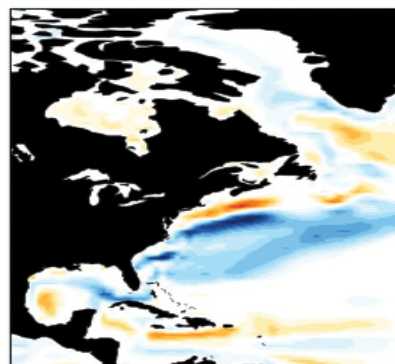
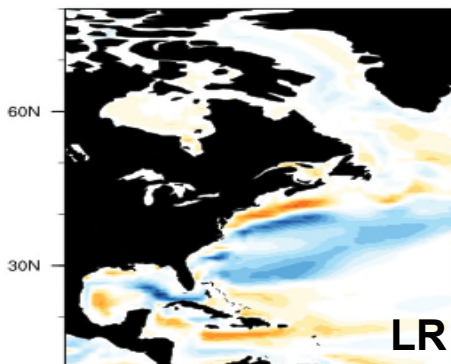
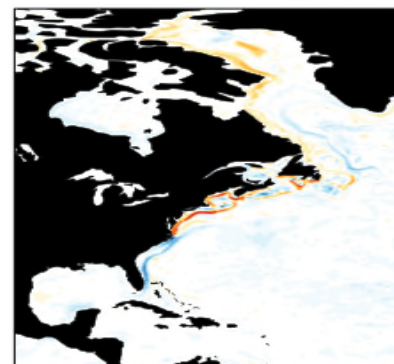
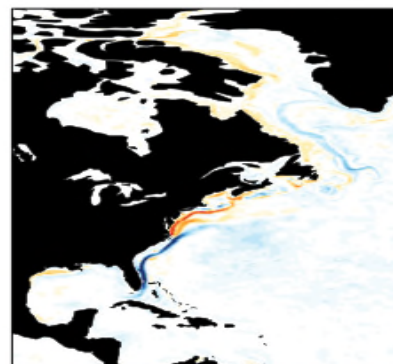
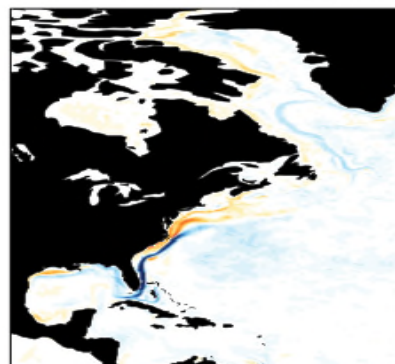
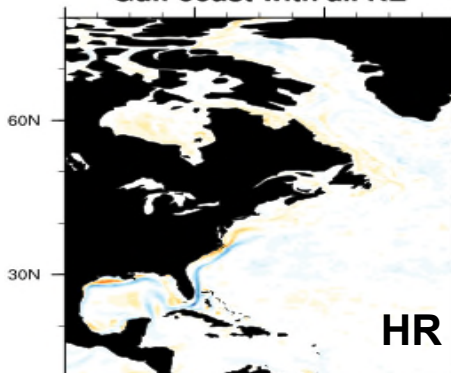


Gulf coast with all KE

South-Atlantic with all KE

Mid-Atlantic with all KE

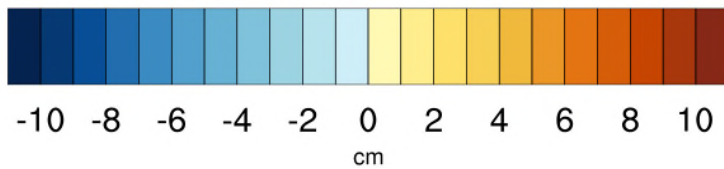
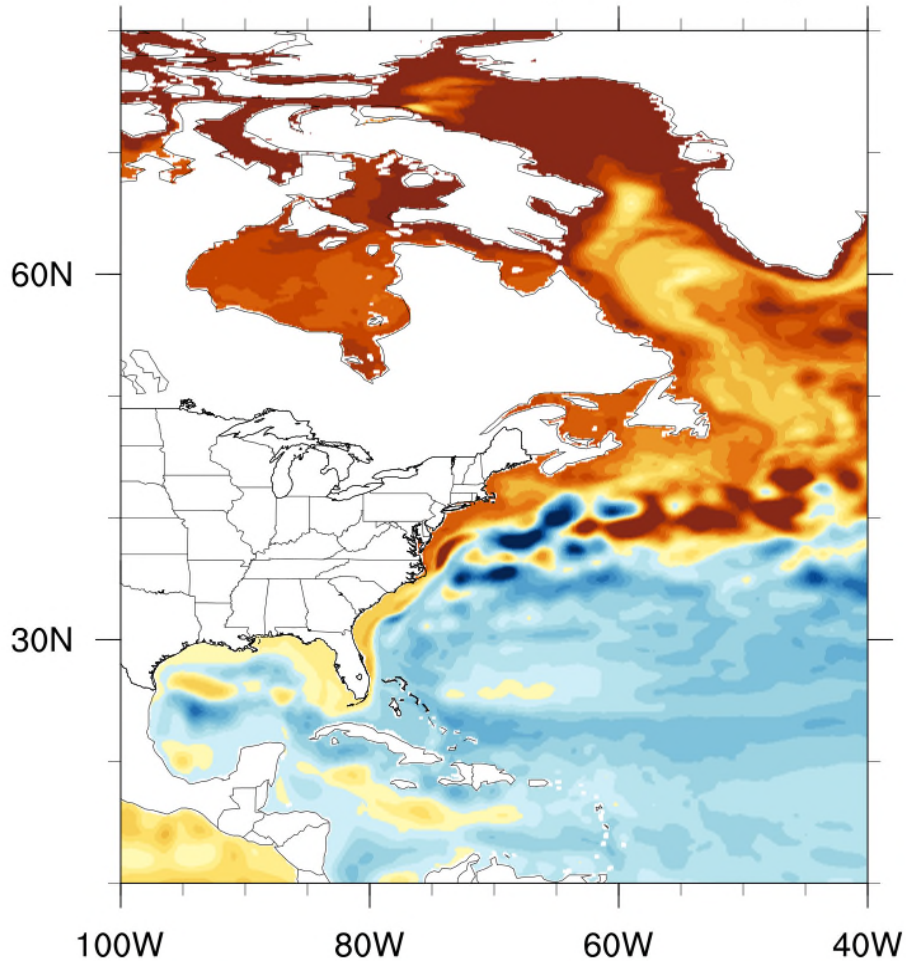
North-Atlantic with all KE



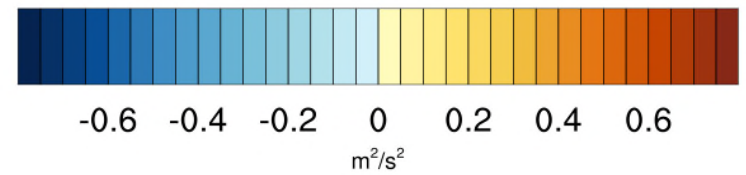
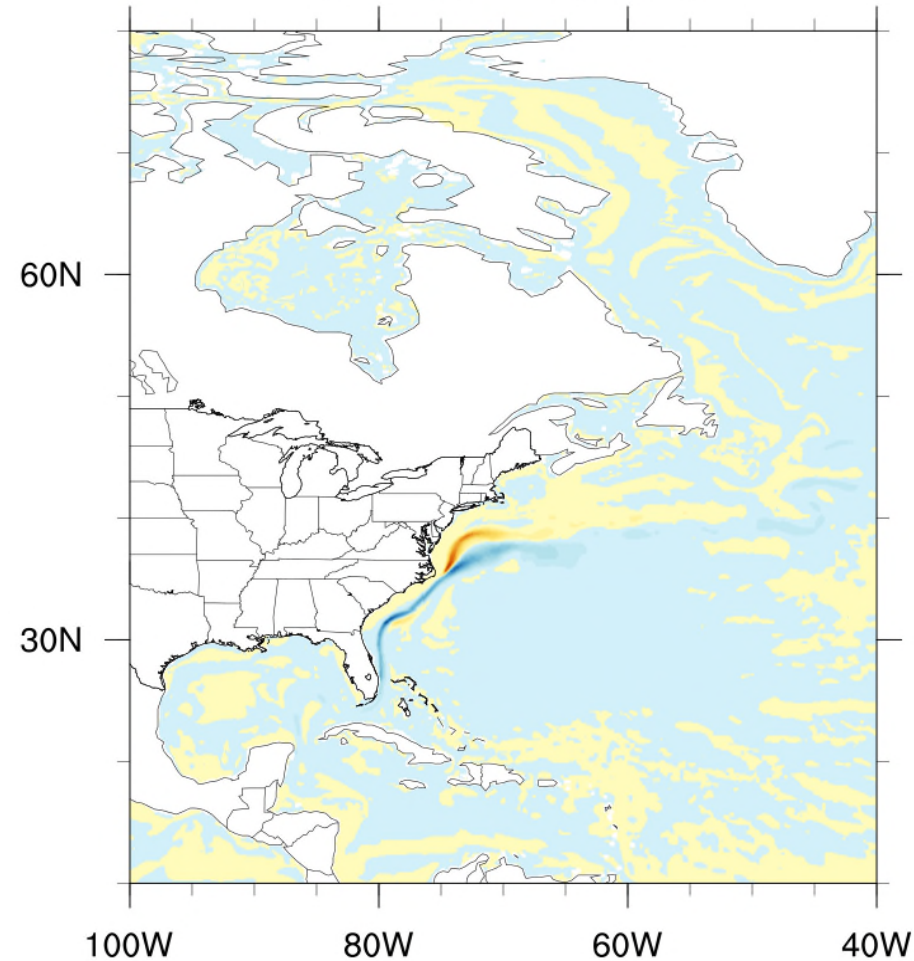
Correlation

# Greenland Ice Melt: Water Hosing Experiments

**SSH 1Sv first 5yr - last 5yr**

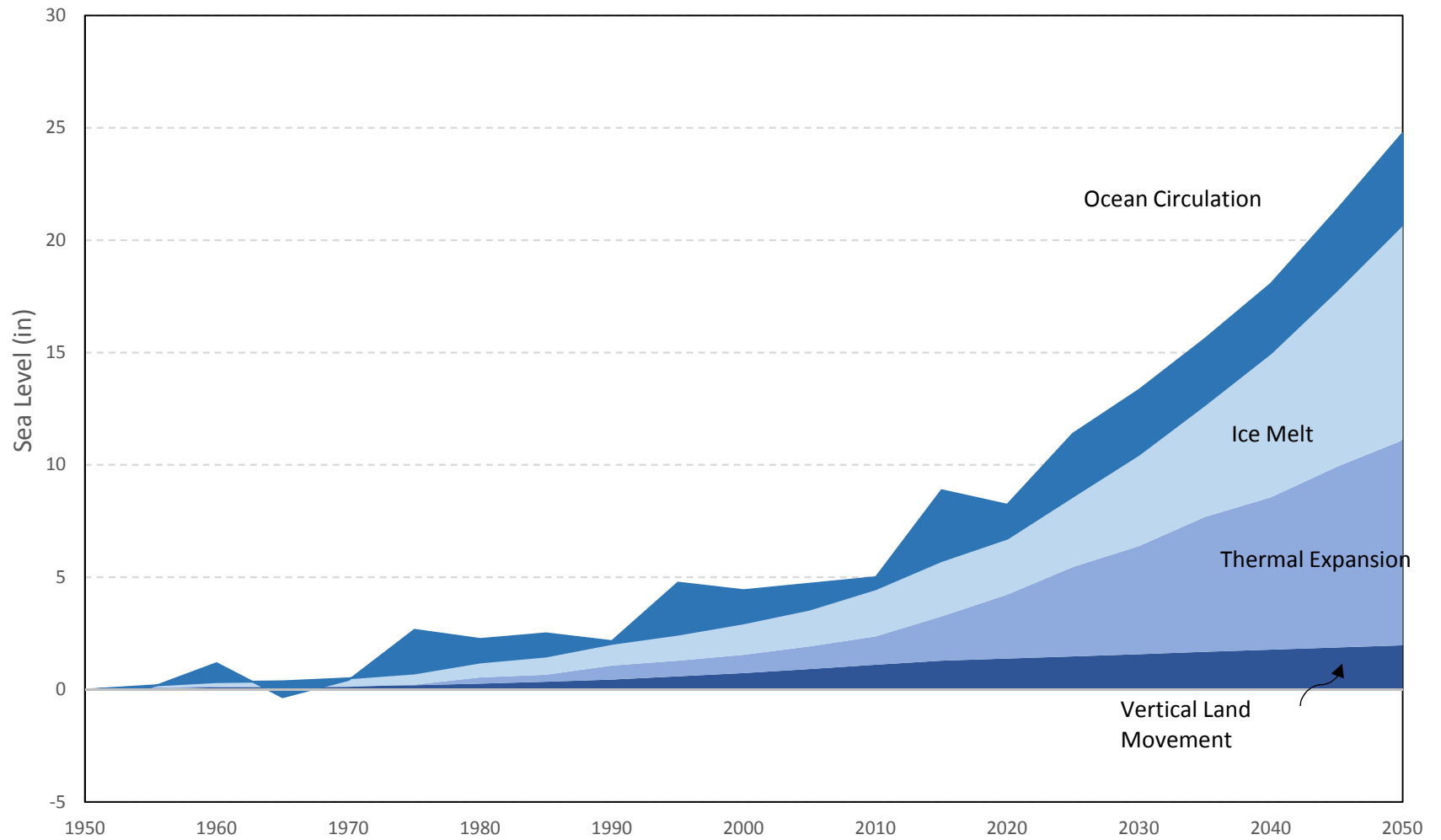


**KE 1Sv - control**

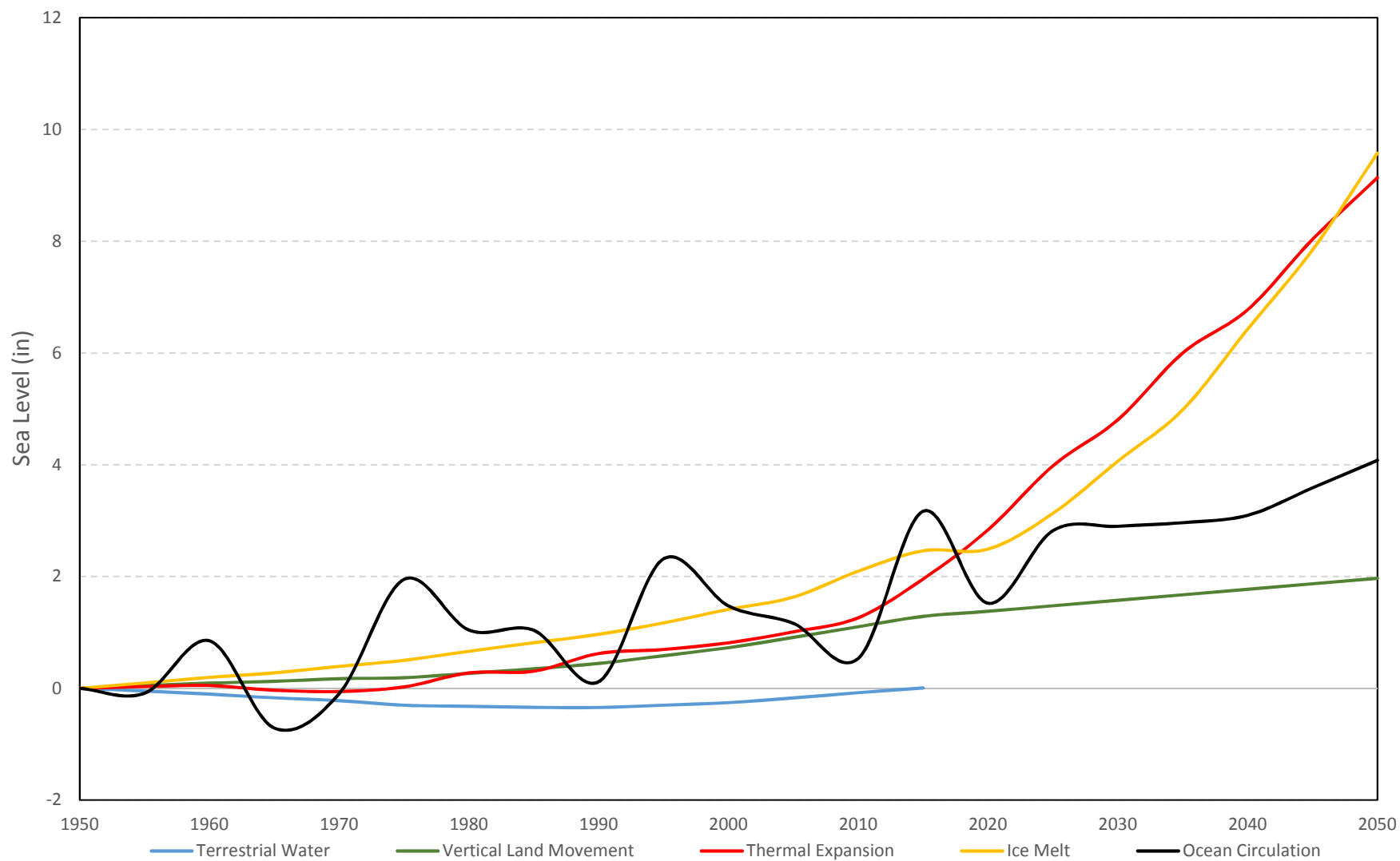




Cummulative contributions to sea level rise at Key West, Florida



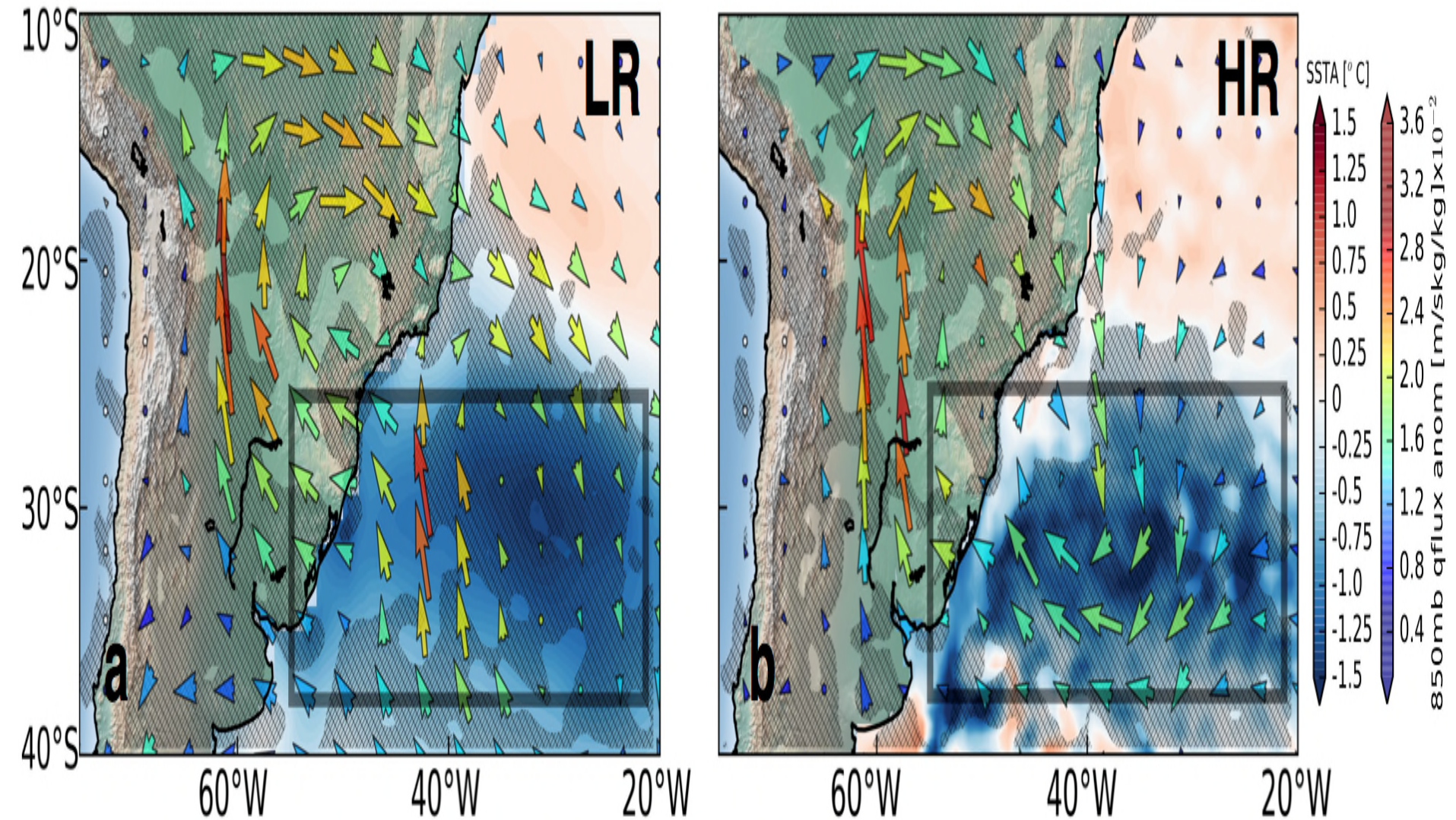
Individual contributions to sea level rise at Key West, Florida



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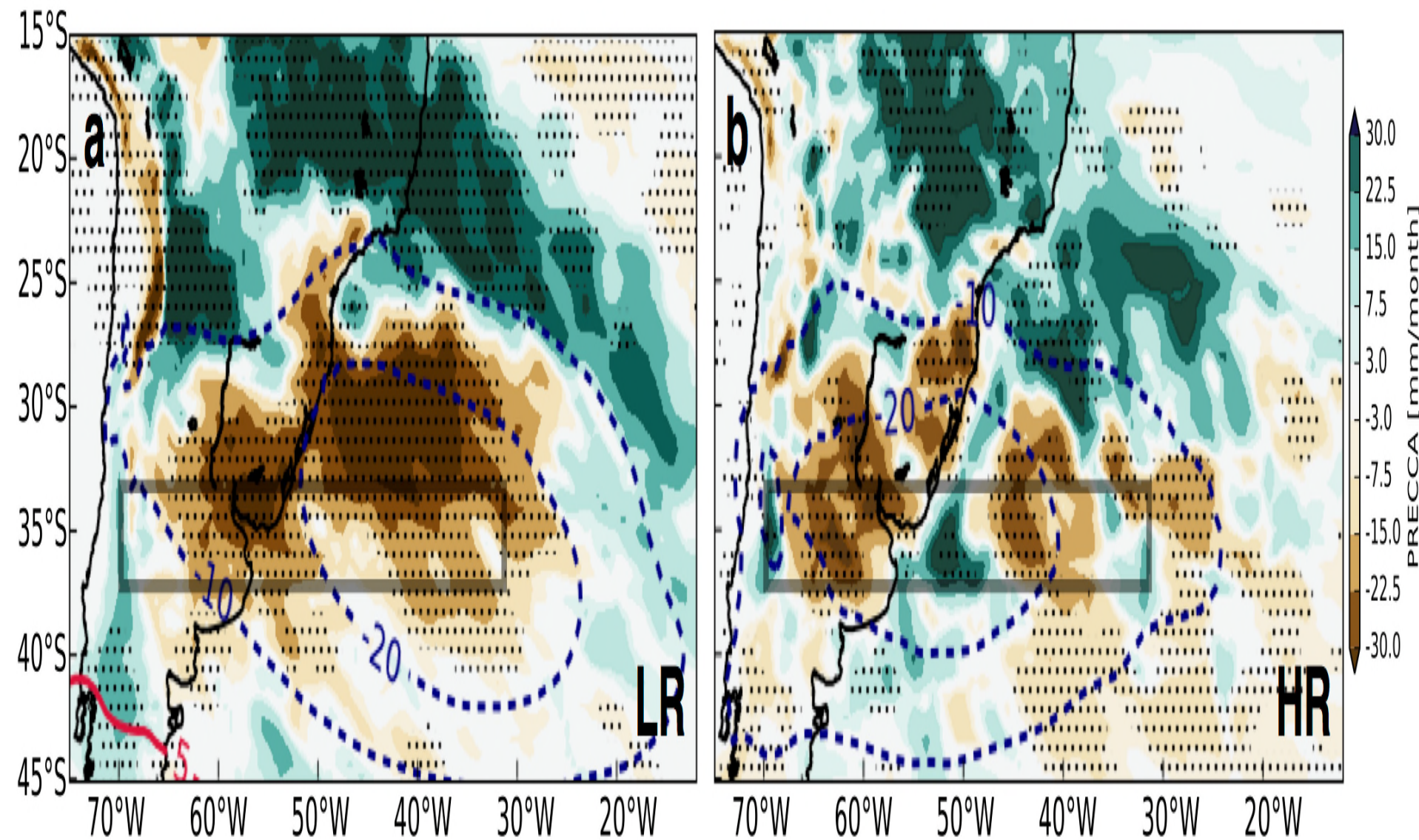
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# LR and HR Simulated COLD WSSA Events



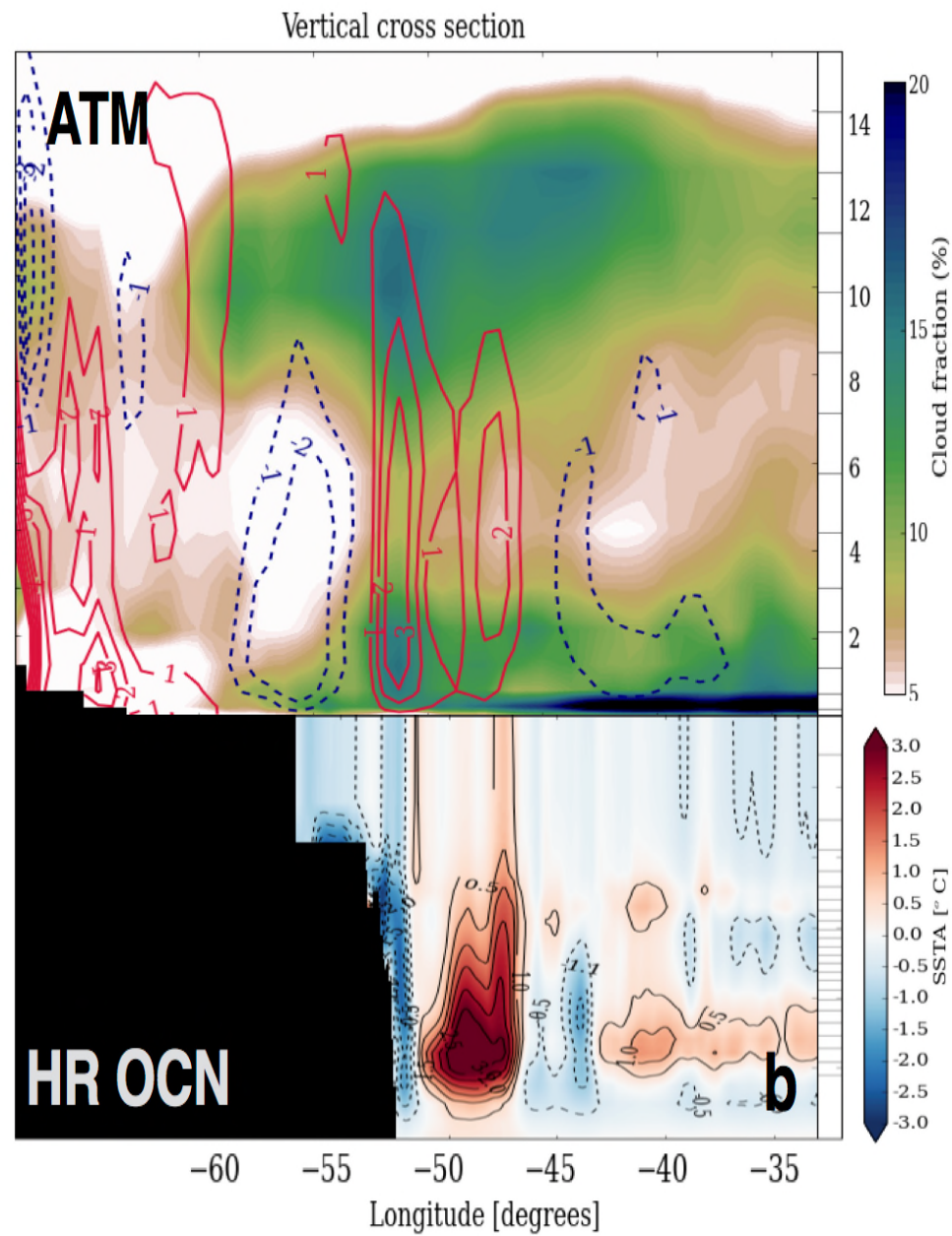
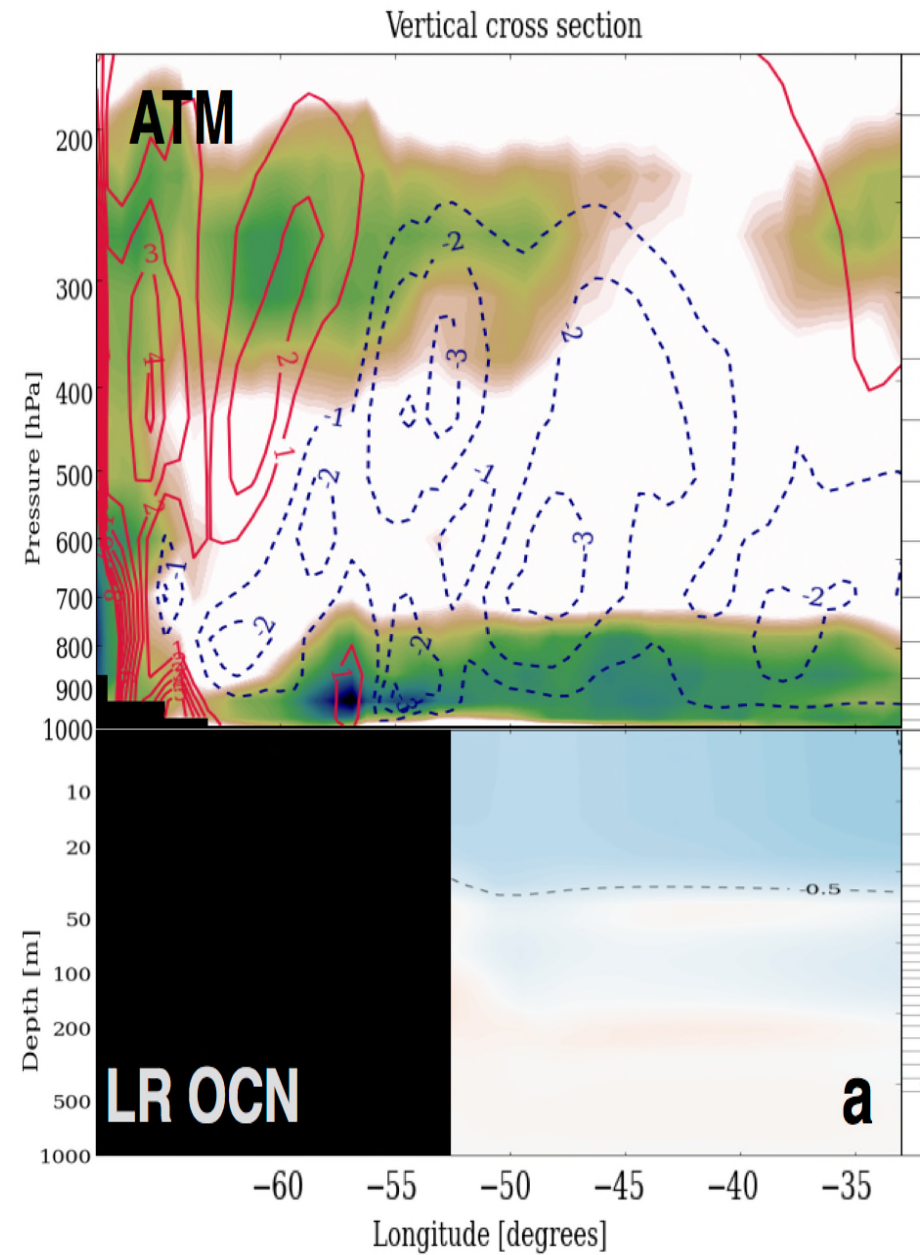


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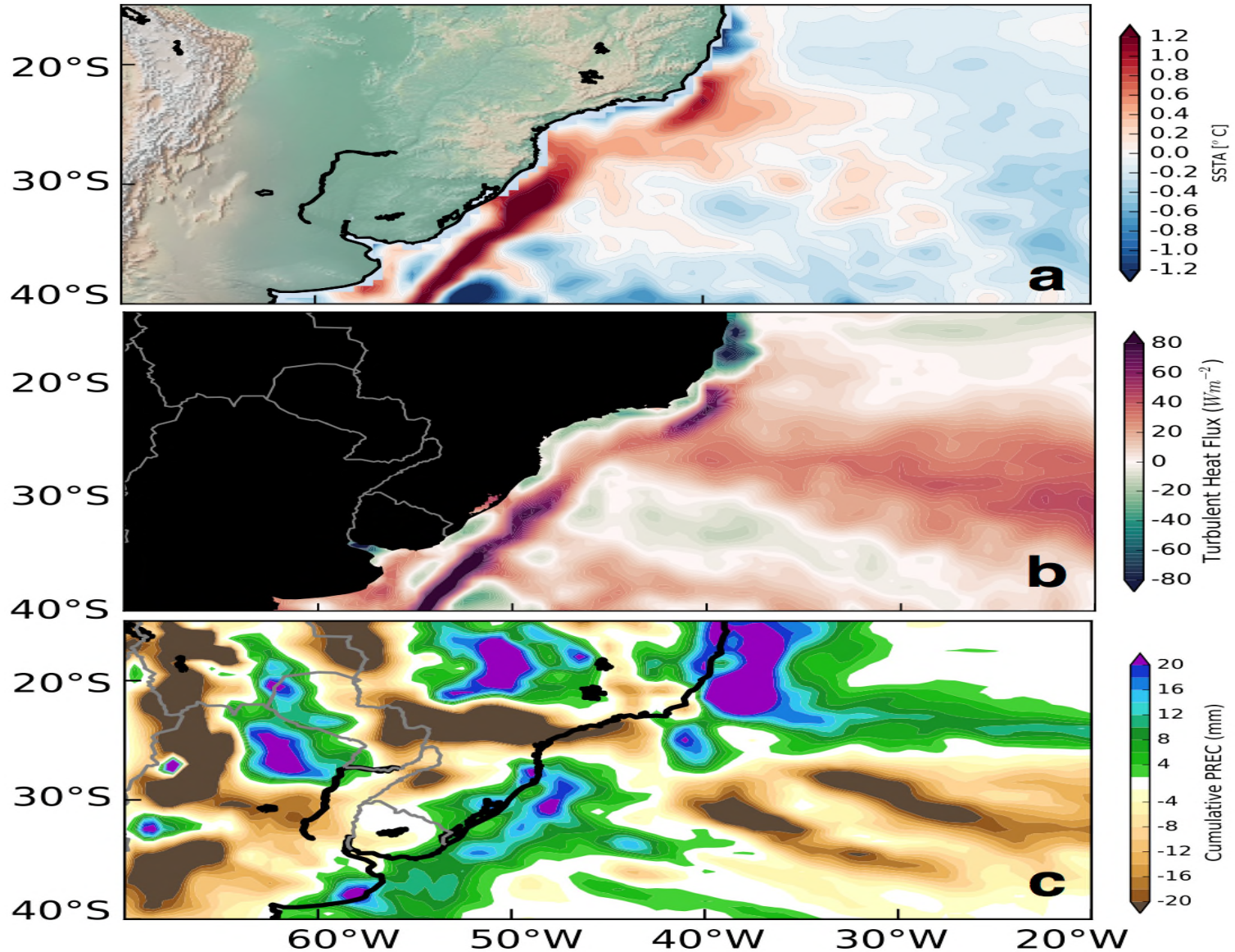




# LR and HR Simulated COLD WSSA Events



# Composite HR-LR Retrospective Forecasts Days 15-25



lcs: 1 Jan 1985, 99, 00

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