

# Impact of AMOC on Climate

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What are the dominant timescales of Atlantic variability of SST?

What is the regional and global impact?

What are the mechanisms governing that variability, specifically AMOC?

Are they predictable?

- What are the dominant timescales of AMOC variability?
- On what scales does AMOC have impact on other climate variables?
- What is its relationship to global warming?
- How predictable is AMOC and its impacts?

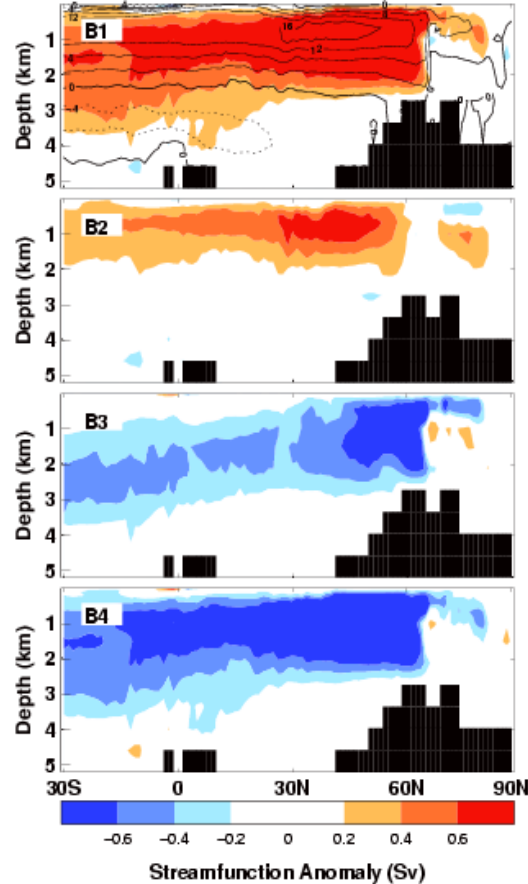
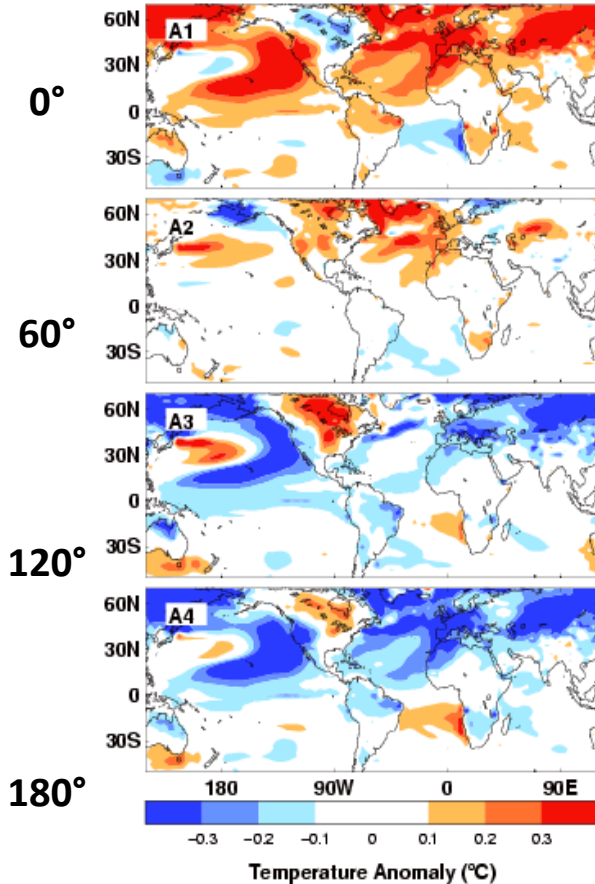
# Prioritize Key Scientific Issues

- Focus on decadal prediction:
  - Predictive information at decadal time scale has more societal relevance: An example is water management in western states
  - AMOC provides an internal source for decadal predictability
  - It provides a framework to study both internal and anthropogenic effects
  - "Abrupt climate change" should be embedded within the framework of decadal prediction
- Impact of AMOC:
  - AMO-AMOC relationship: Some modeling evidence, but not all; but observational evidence is more fragile. Need to improve observational analysis
  - Atlantic Hurricane, North American Drought, Storm Track, European Climate, Monsoon system?
  - Gulf Stream shift and storm tracks
- Characterize AMOC: A broad view of AMOC.
  - What are the key variables? Heat Transport index? Heat content? Sea level? SSS? Atmospheric variables?
  - need to have a long term climate index to characterize AMOC variability
- How to identify AMOC-induced climate signal in observations? How to distinguish it from anthropogenic climate change
  - AMOC finger print approach, vertical structure and subsurface change
  - SST approach

# Control Simulation

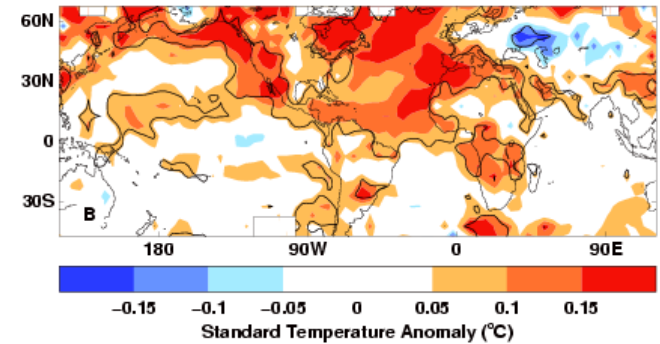
## 1400 Year Coupled Model Representation of the AMO

### 70-180 Year band



(Knight et al. 2005)

### Observed AMO Pattern



Similar pattern and time scale to observed AMO fluctuations.

Similar magnitude - North Atlantic low frequency (>45 year) standard deviation is 0.10K, 0.14K in observations.

Observed AMO likely to be long-lived climate mode related to modern-day THC variability.

(Courtesy of Knight et al)

# Areas of Coordination

- Integrated Observational data sets for AMOC
  - 1000 year integrated observation including land surface data and high resolution paleo records (Kurshiner)
- Model-data comparison:
  - USCLIVAR has a working group on decadal climate prediction which is meeting at the CCSM meeting in July at Breckenridge. This would be a natural group for us to coordinate with.
  - The modeling centers are gearing up to produce simulations for AR5. We may want to encourage/coordinate analysis of these.
- Novel diagnostic techniques: