



UNIVERSITY
OF MIAMI

ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



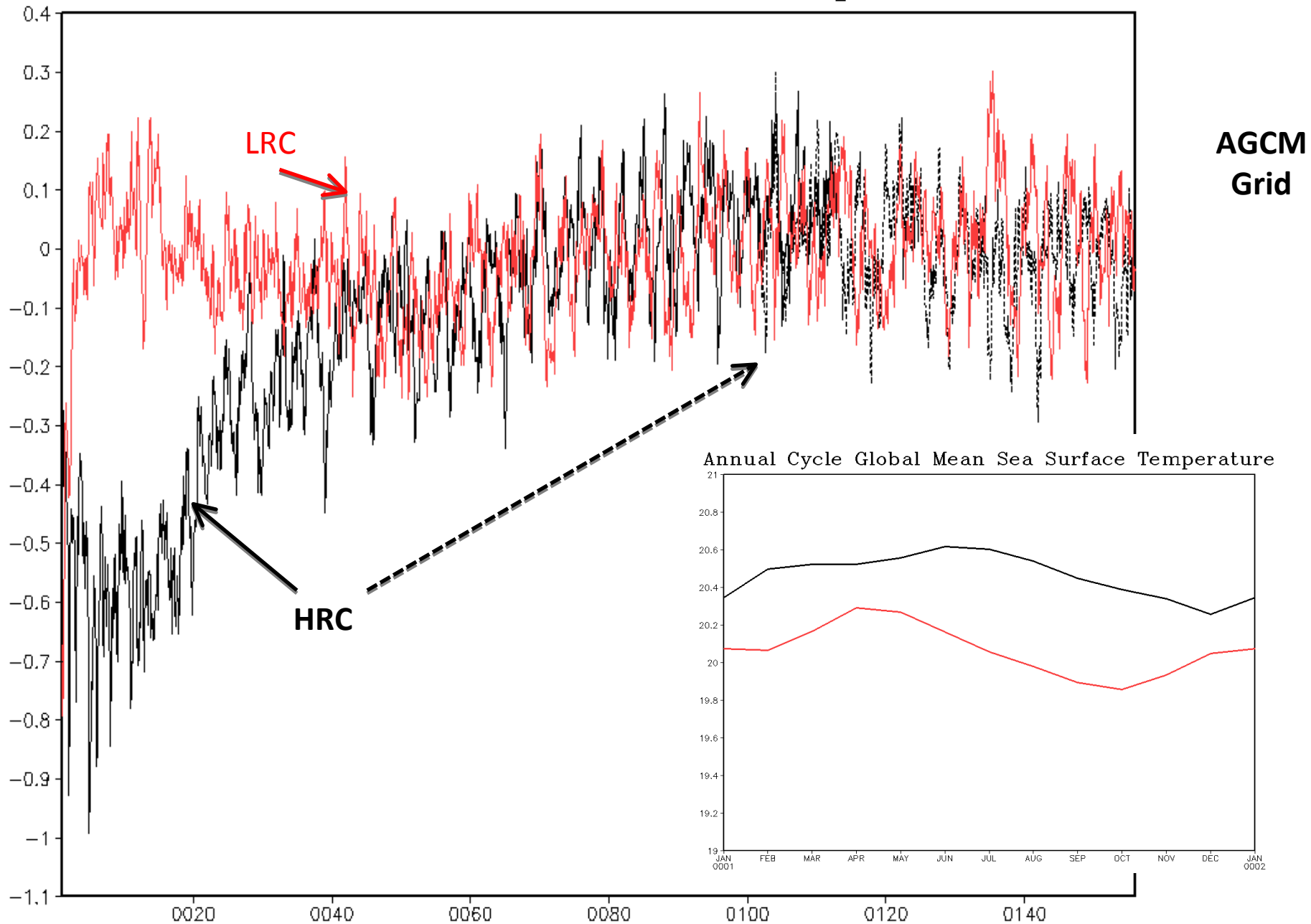
Impact of Ocean Model Resolution on CCSM4* Simulations

Ben Kirtman, Cecilia Bitz, Frank Bryan,
William Collins, John Dennis, Nathan Hearn,
James L. Kinter III, Richard Loft, Ben Shaw,
Leo Siqueira, Cristiana Stan, Mariana
Vertenstein, and Kathy Yelick

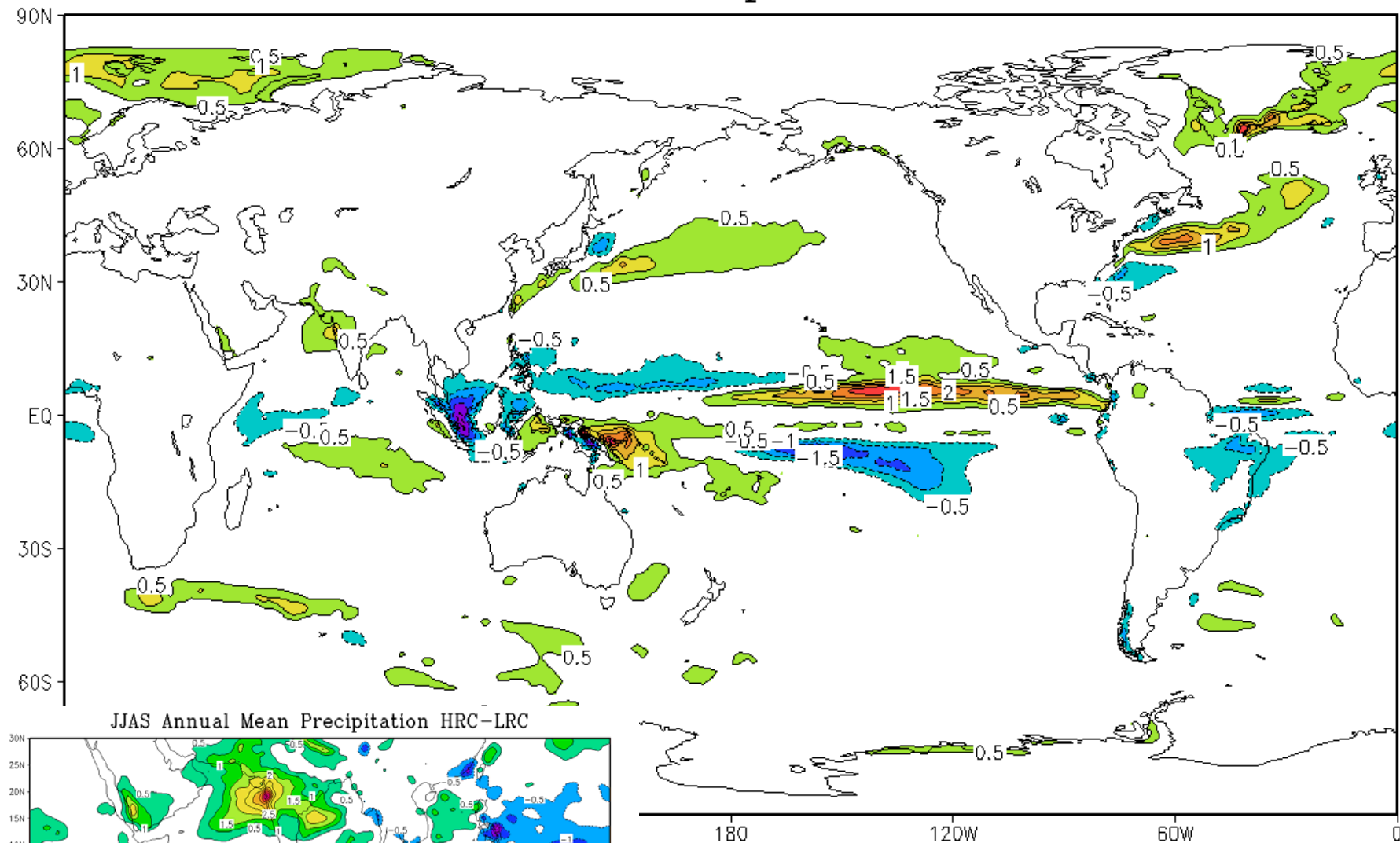
Outline

- **Motivation:**
 - Scale Interactions – How Do Ocean Eddies Impact the Large Scale Climate?
 - Number of Previous Studies Focused on Atmospheric Resolution
- **CCSM4***
 - Atmosphere: 0.5x0.5
 - Two Versions: 1x1 [**LRC**] and 0.1x0.1 [**HRC***]
 - Initialization: Spun-Up Ocean, Interpolation
- **Large Computational and Data Management Issues**
- **Analysis To Date Largely Focused on Global Climate and Air-Sea Feedback**
- **Future Work**

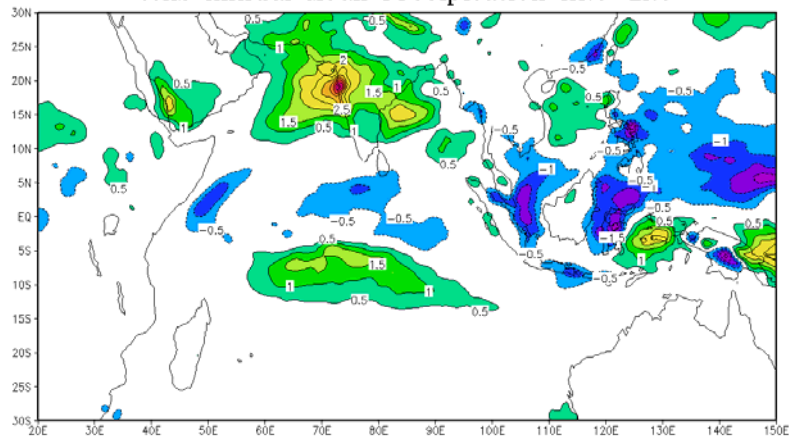
Global Mean Sea Surface Temperature



Annual Mean Precipitation HRC-LRC



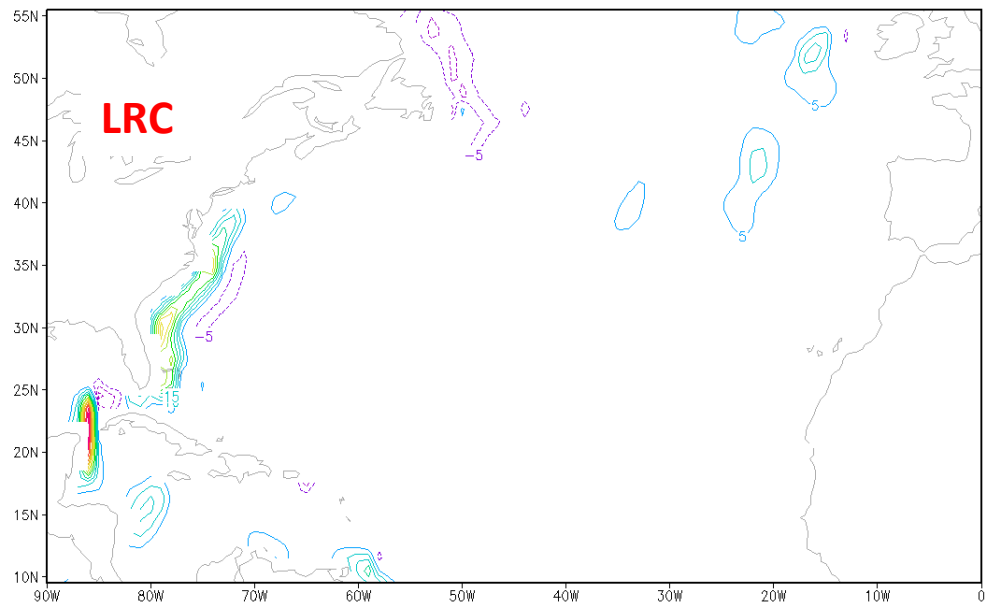
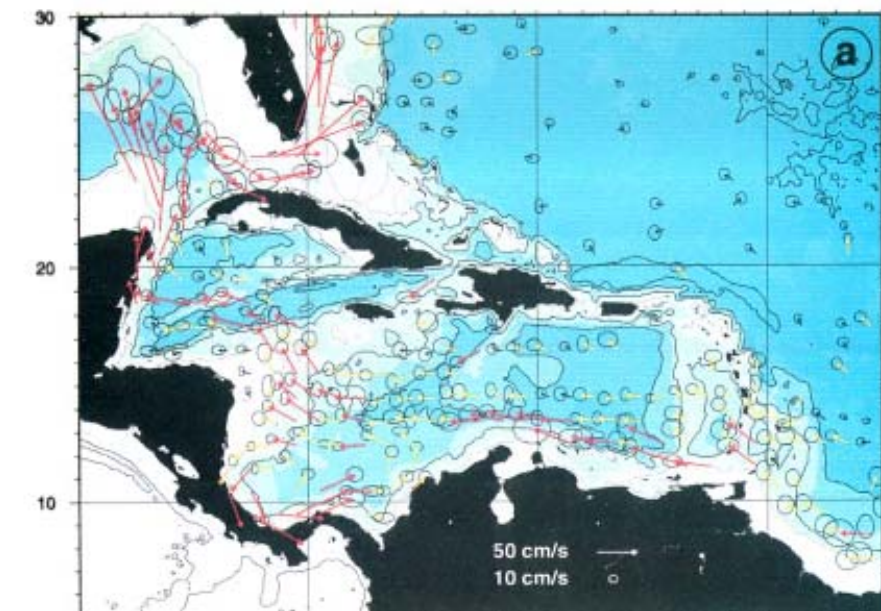
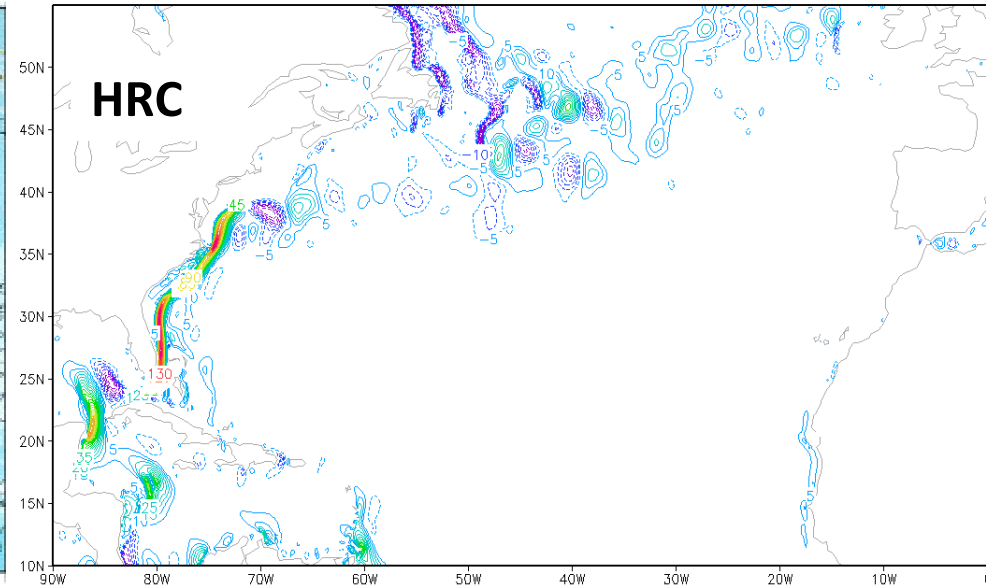
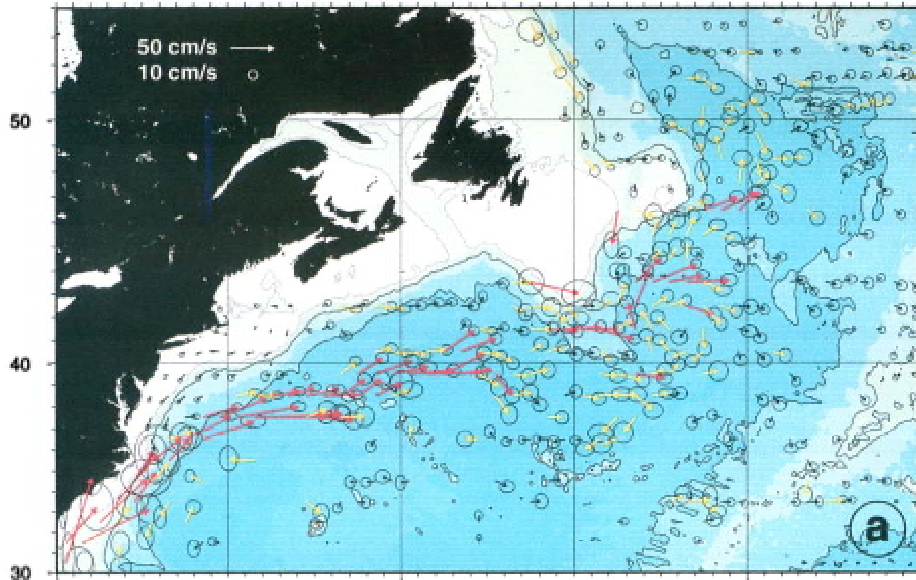
JJAS Annual Mean Precipitation HRC-LRC



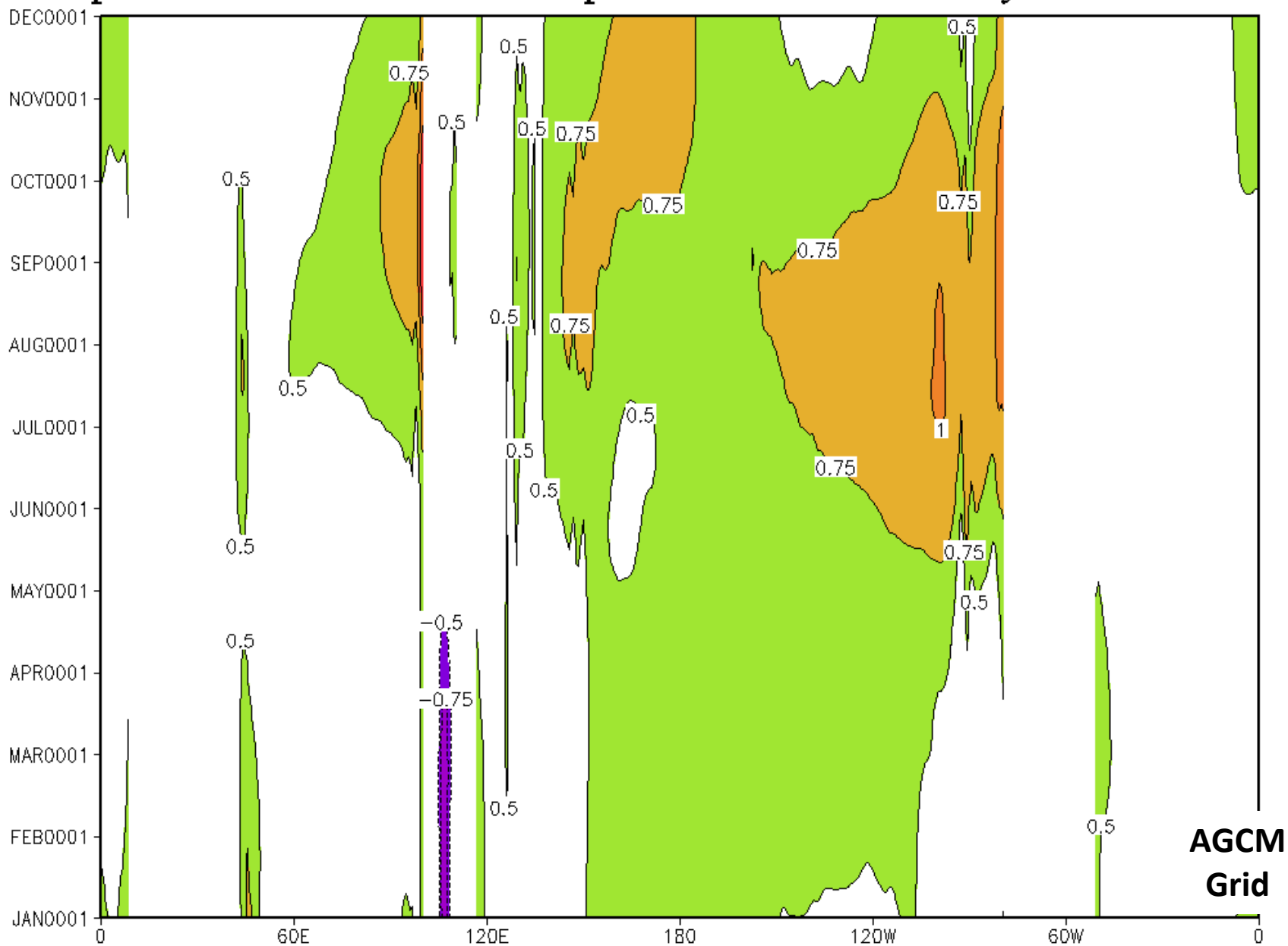
**AGCM
Grid**

Fratantoni 2001

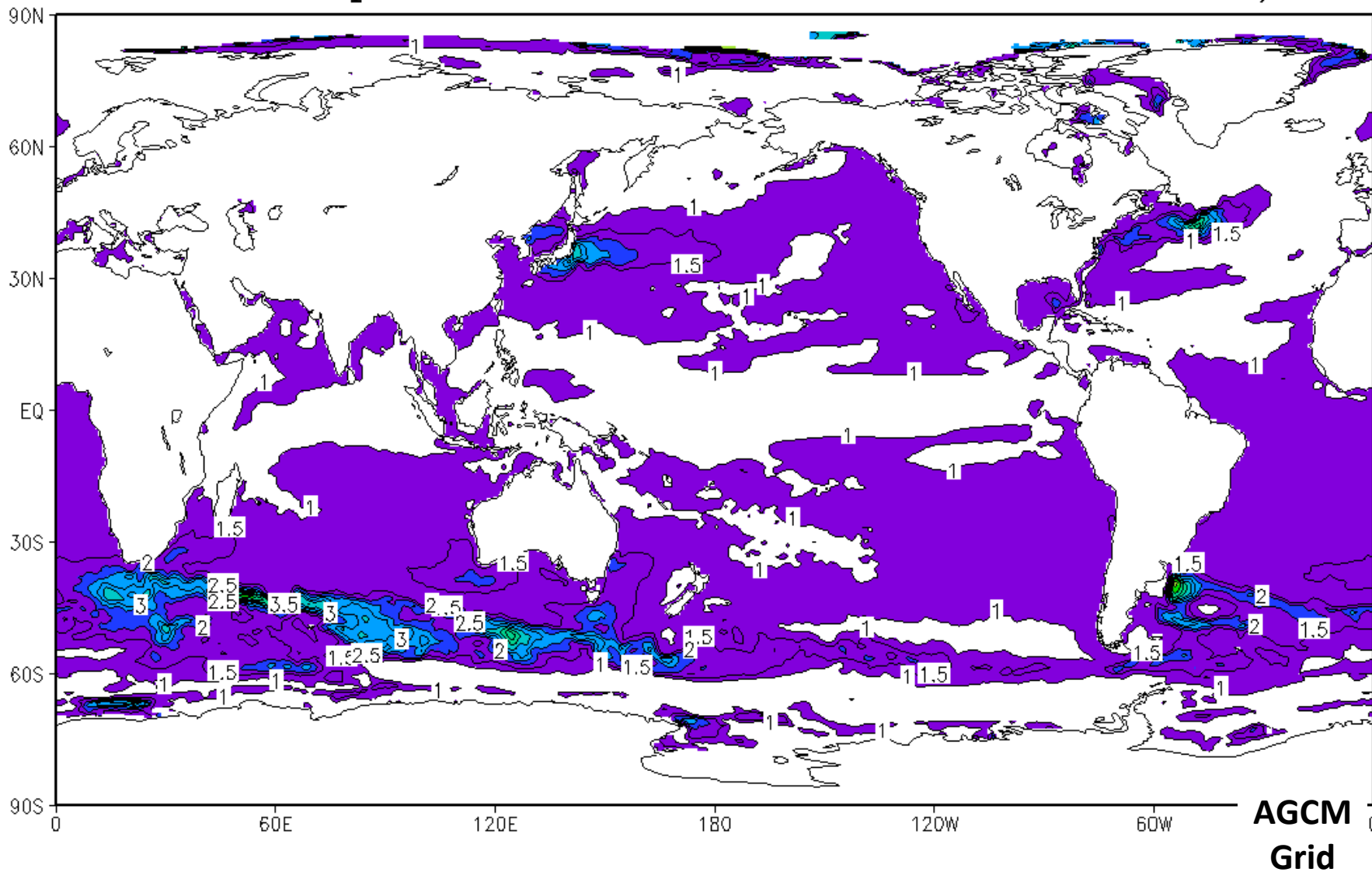
Upper 100 m Meridional Current



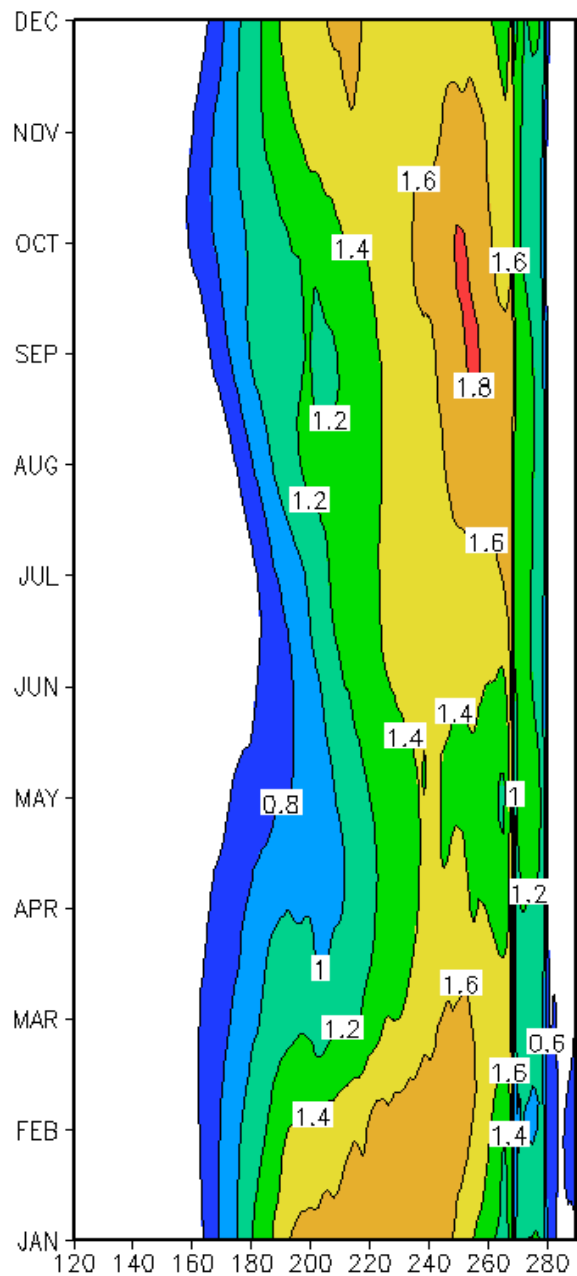
Equatorial Surface Temperature Annual Cycle HRC-LRC



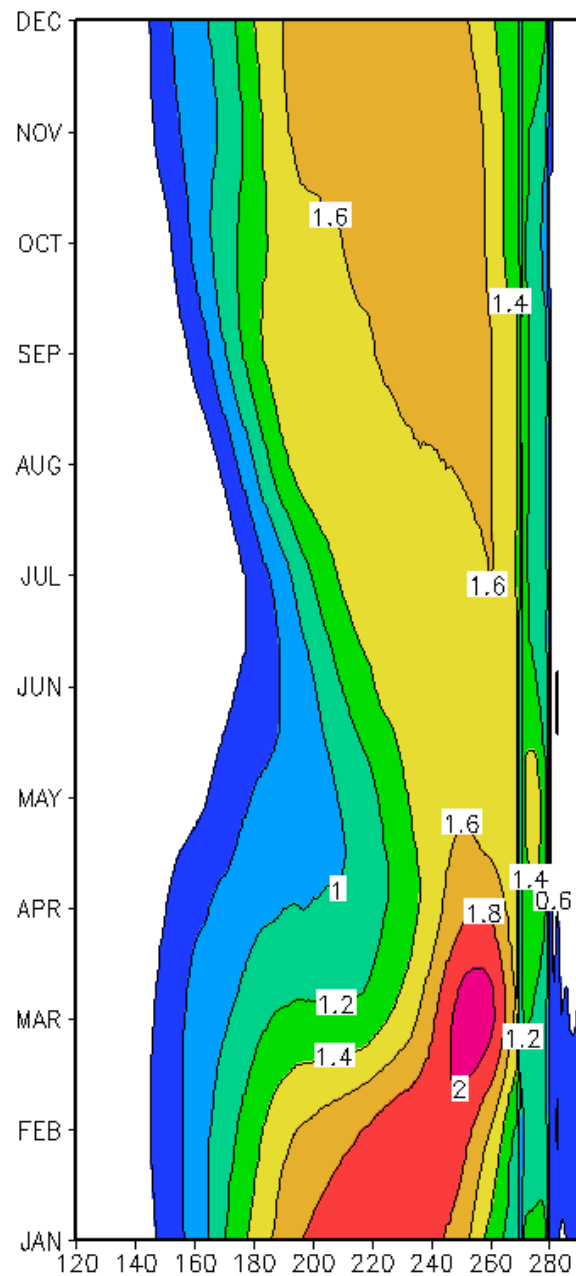
Surface Temperature Standard Deviation Ratio HRC/LRC



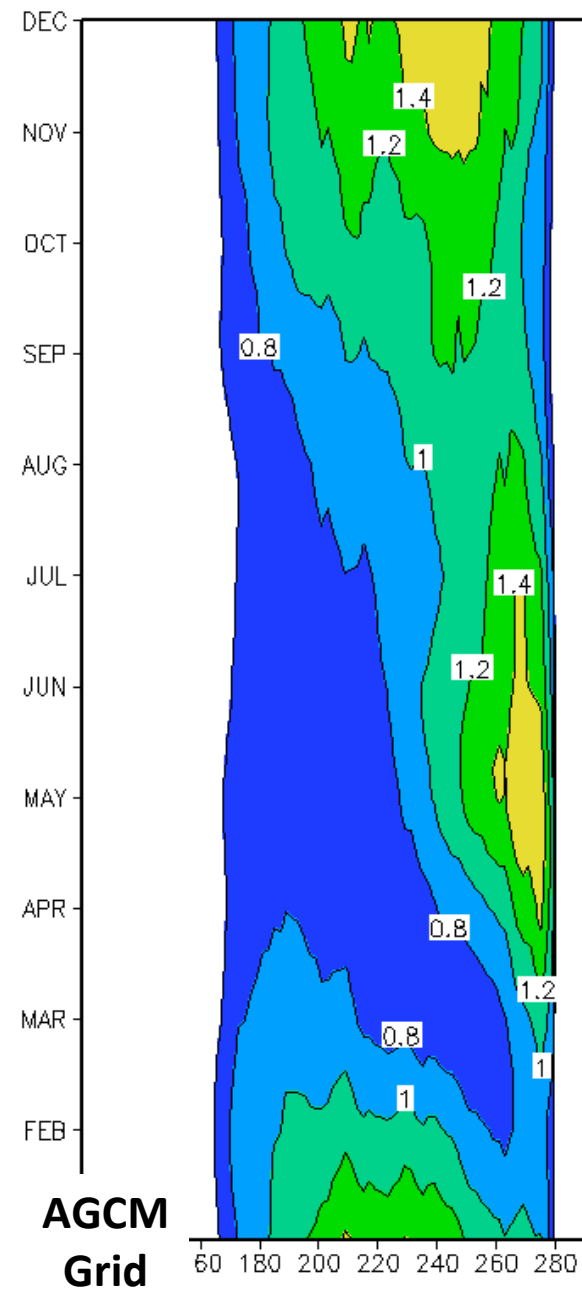
HRC



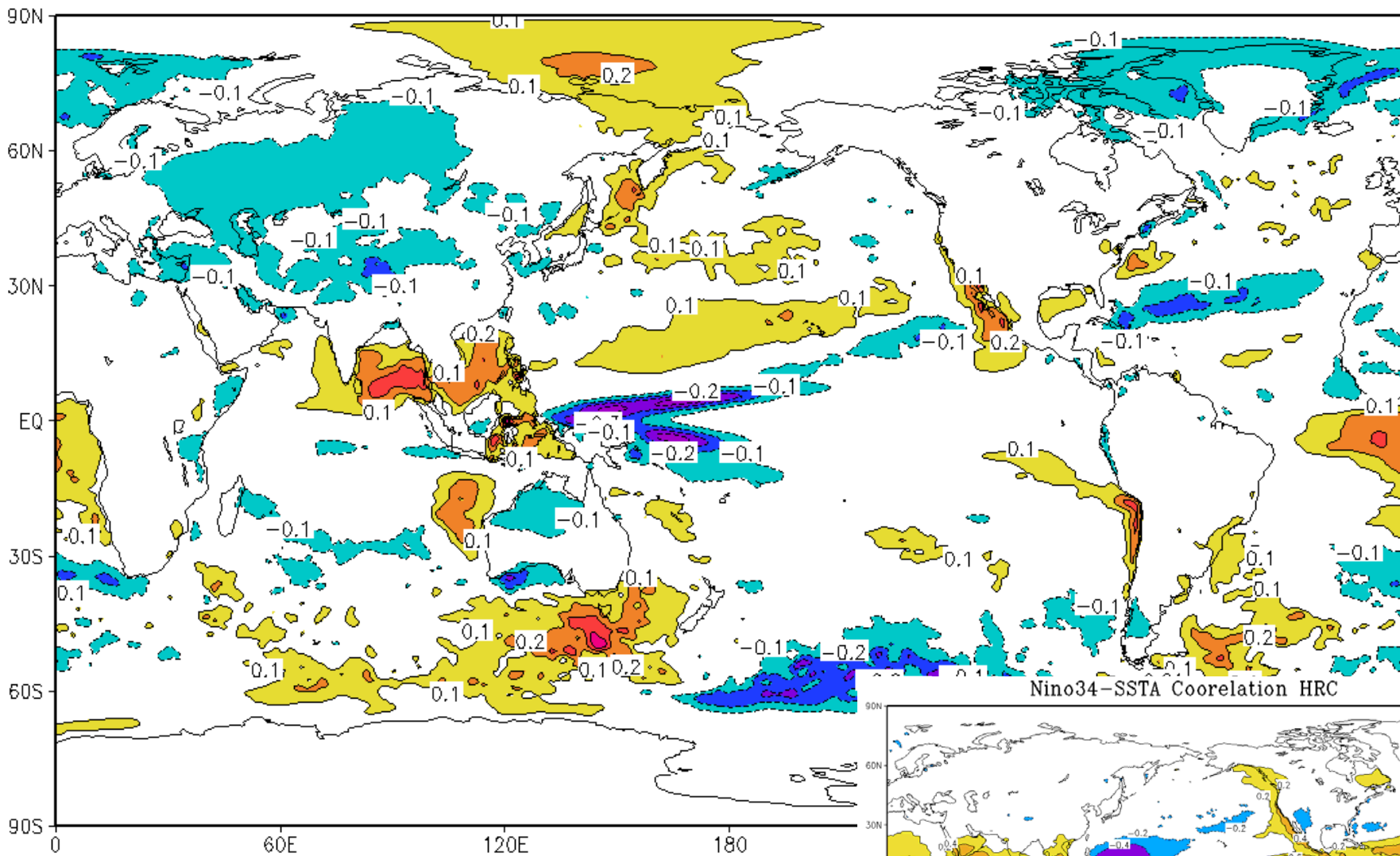
LRC



RSST

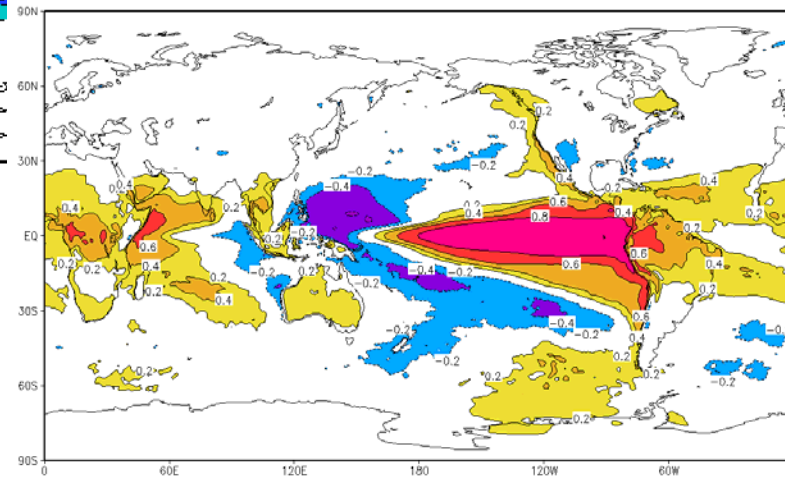


Nino34-SSTA Coorelation HRC-LRC

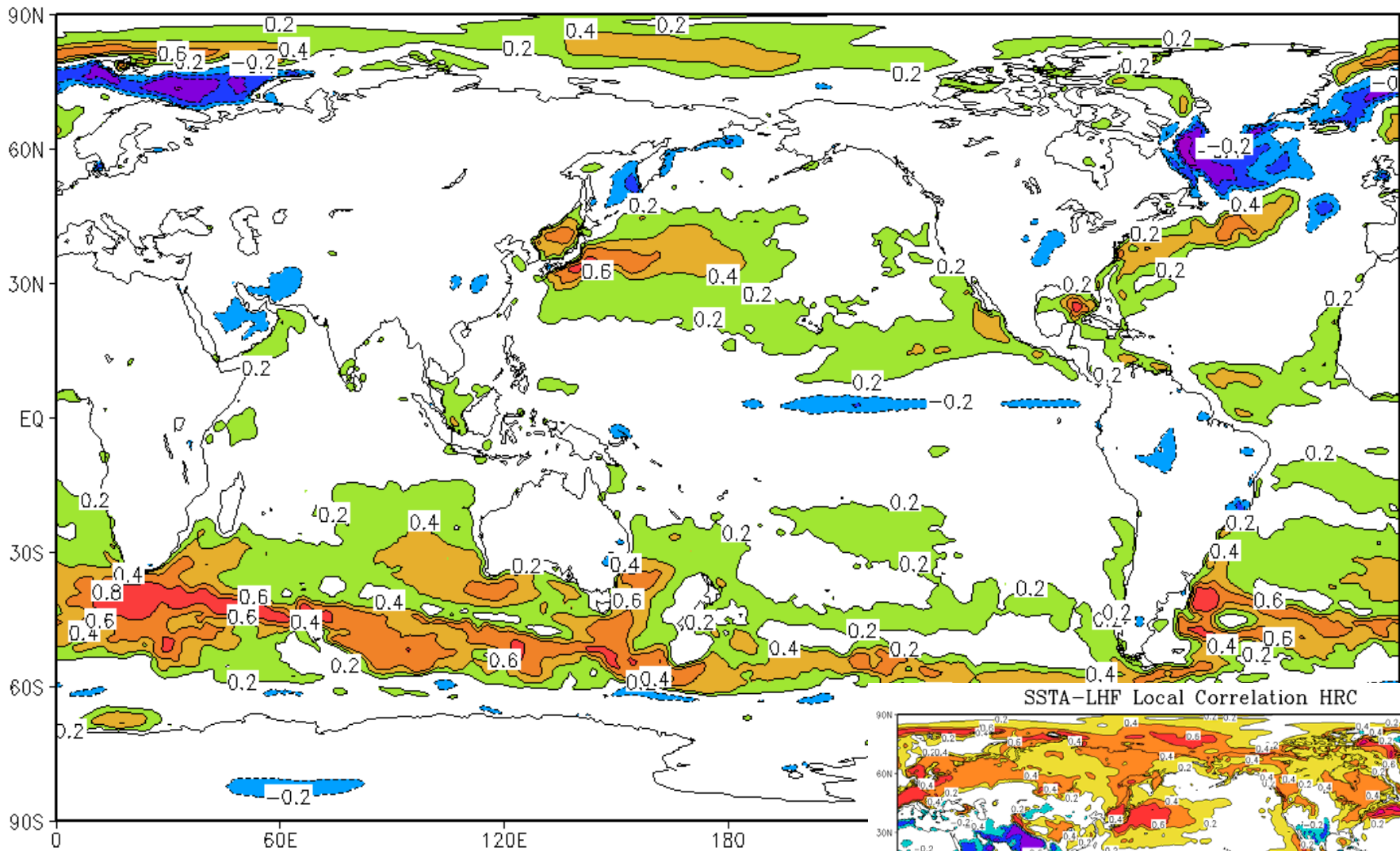


**AGCM
Grid**

Nino34-SSTA Coorelation HRC

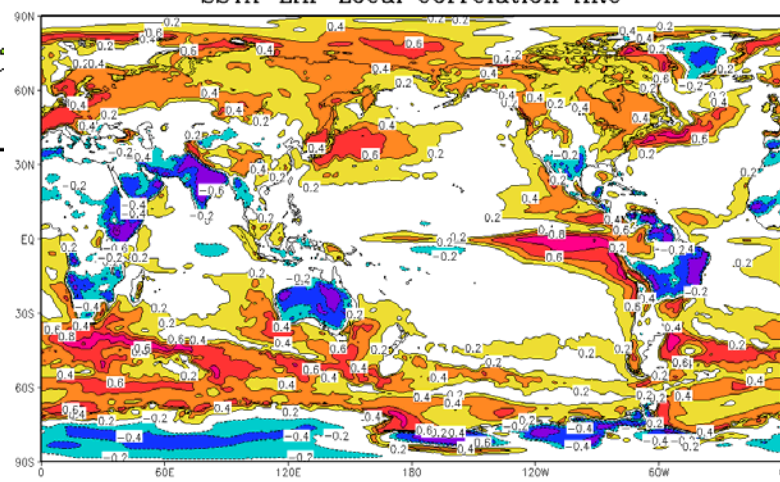


SSTA-LHF Local Correlation HRC-LRC

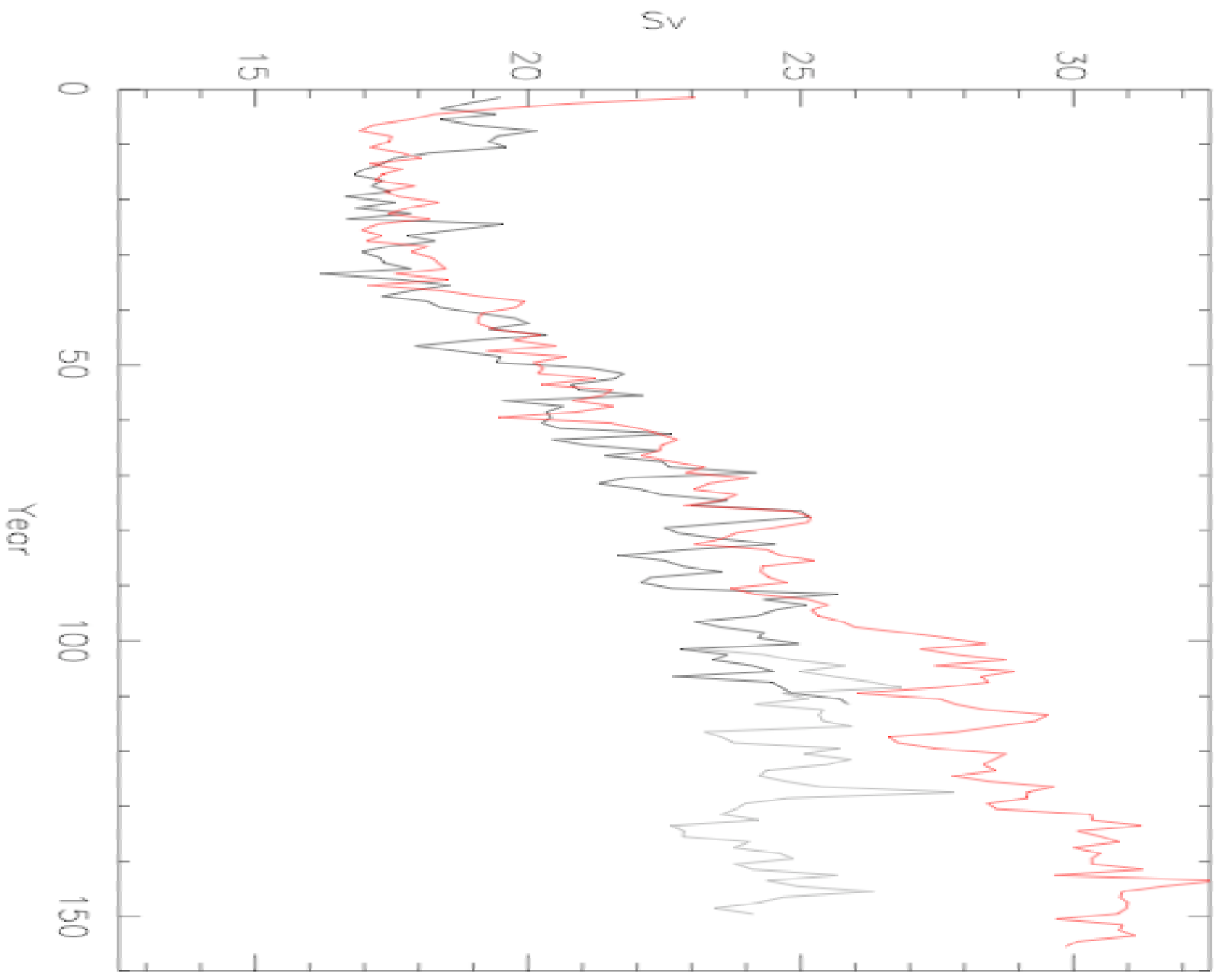


SSTA-LHF Local Correlation HRC

**AGCM
Grid**

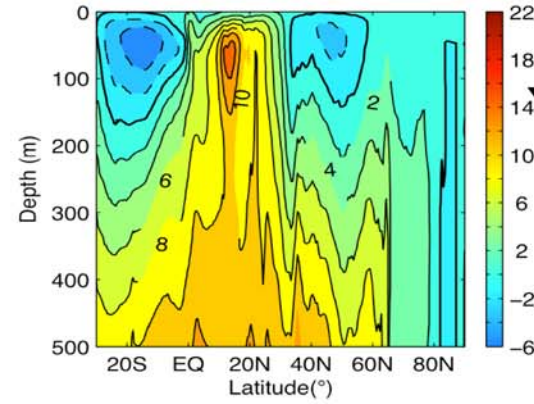
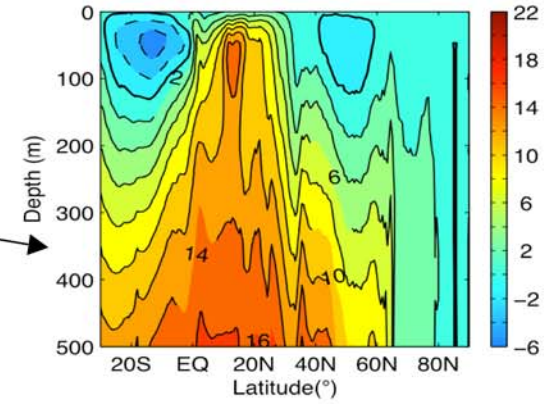


Max. NH Atlantic Overturning



Future Work – Mechanism for AMOC

CCSM3.0



**Interactive
Ensemble
CCSM3.0**

