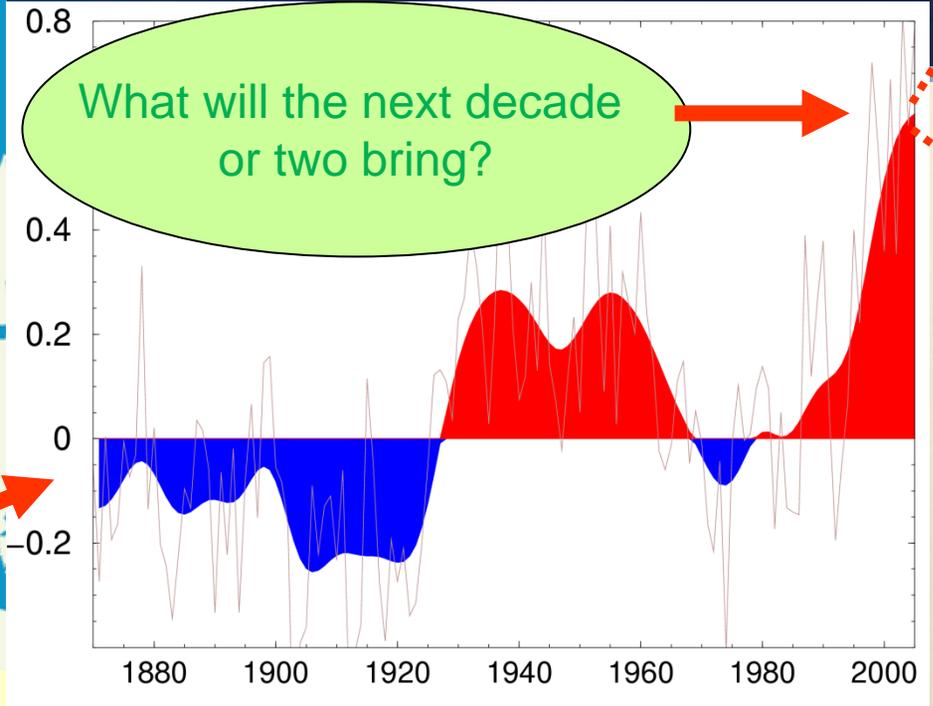
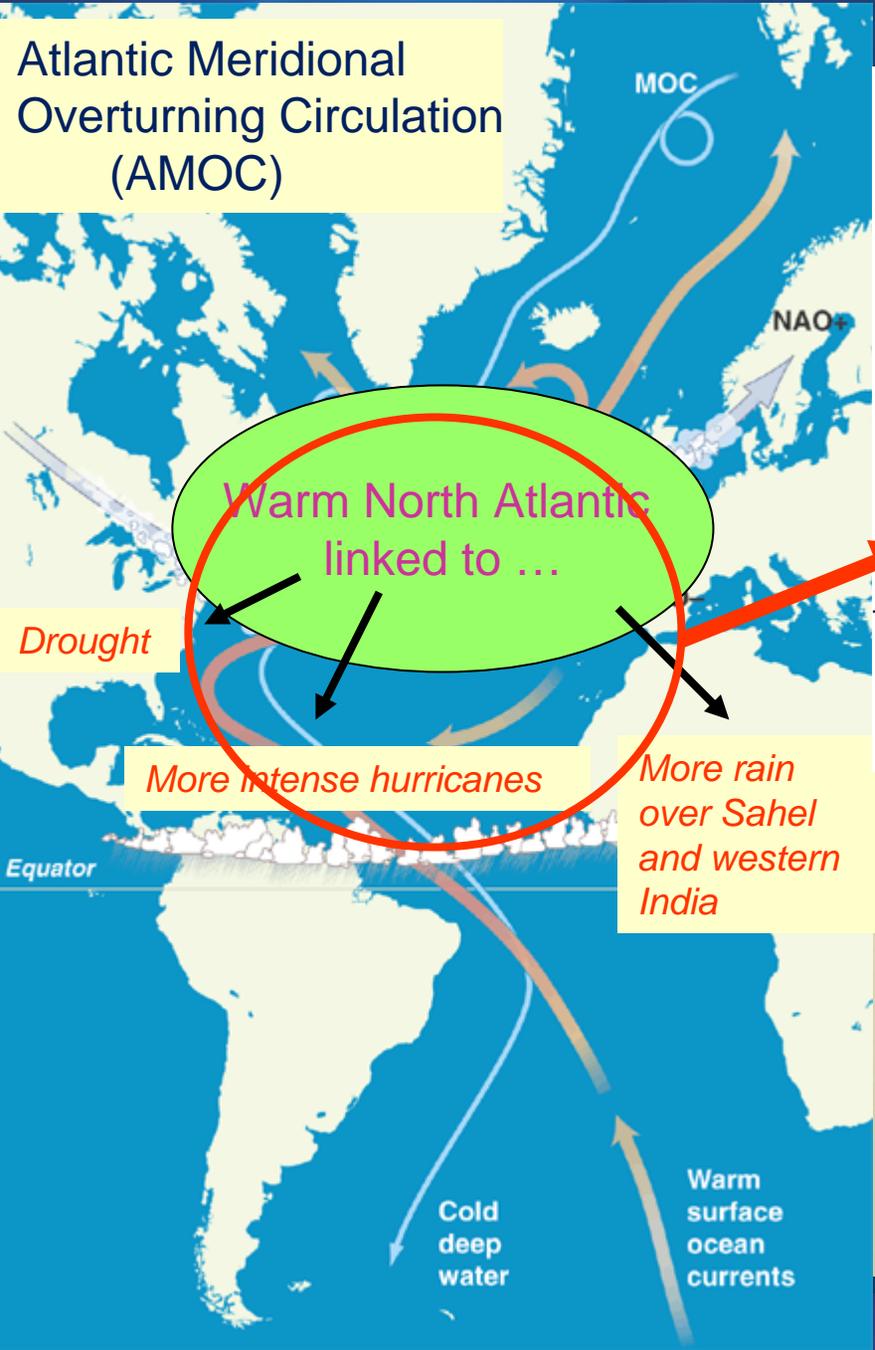


# Decadal Predictability Research at NOAA/ OAR/ GFDL

V. Ramaswamy

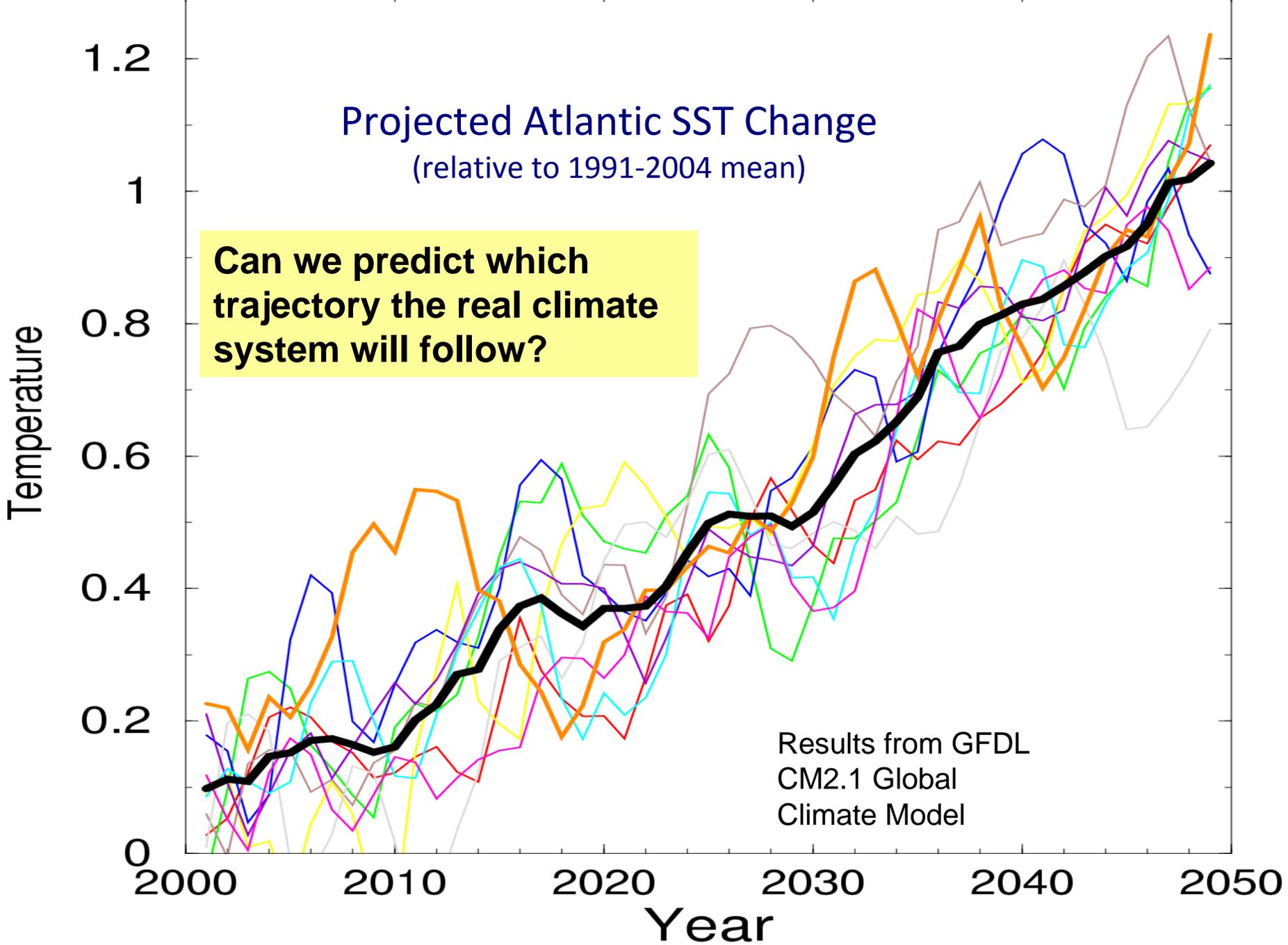
*Presentation at the OAR-NWS Retreat  
Chicago (October 14, 2009)*

# North Atlantic Temperature



Two important aspects:

- a. Decadal-multidecadal fluctuations
- b. Long-term trend



# Decadal Variability and Predictability

- **Ongoing studies with CM2.1 climate model to improve understanding of**
  - a) Mechanisms of simulated decadal variability**
  - b) Decadal scale predictability arising from internal variability**
  - c) Detection and attribution of observed change**
- **Higher resolution coupled models. (GFDL/DOE)**
- **Coupled assimilation system for analysis and initialization**
- **Assessment of observation systems for decadal predictability**
- **Collaboration with efforts at NCAR and MIT**
- **Prototype decadal predictions planned for 2009 (IPCC AR5)**

# New for AR5/CMIP5: Near Term Experiments

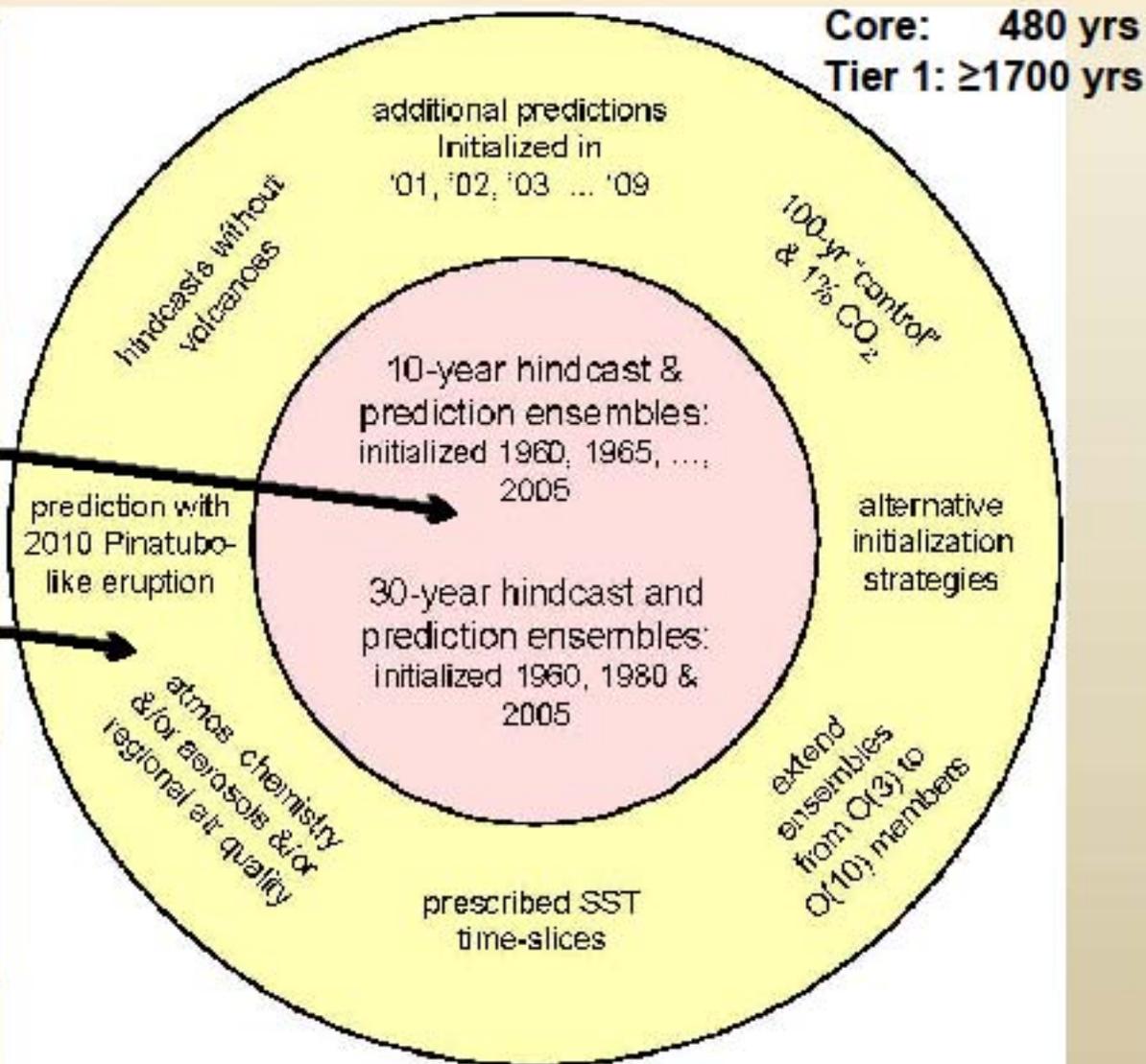
## Foci

- Regional information
- Short lived species
- Decadal Prediction

**Core**

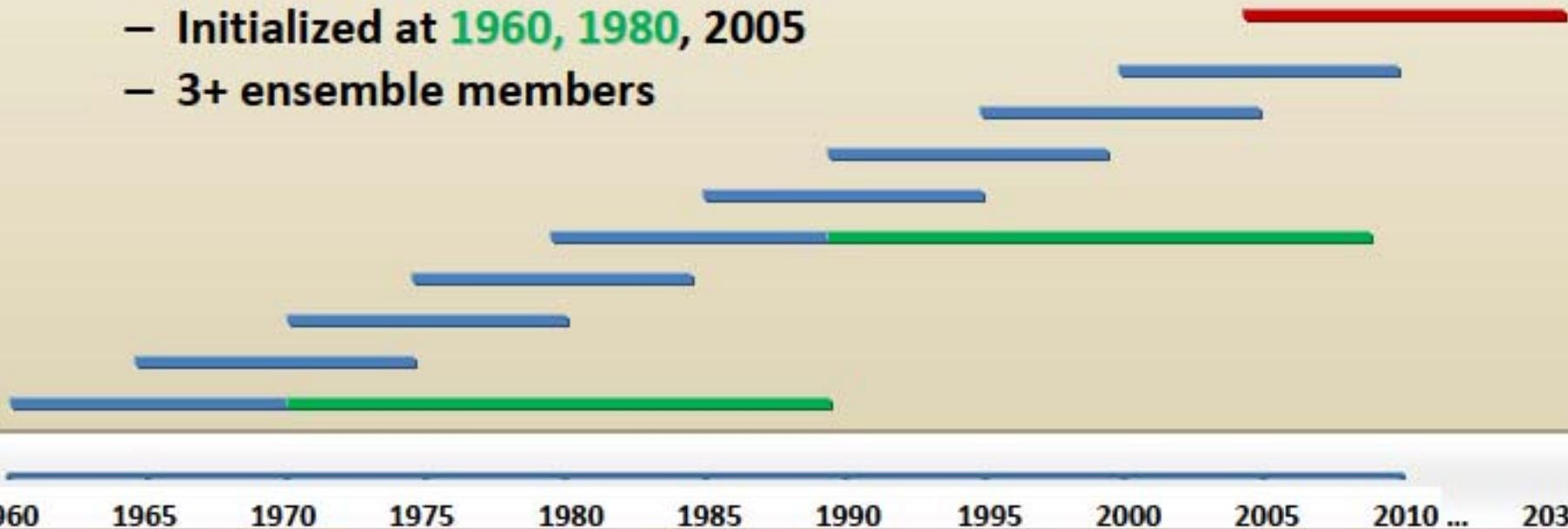
**Tier 1**

*Key Question:*  
**Are decadal  
predictions skillful?**



# Near Term Experiments - Core

- **10 year hindcasts**
  - Initialized at 1960, 1965, 1970 ...
  - 3+ ensemble members
- **30 year forecasts**
  - Initialized at 1960, 1980, 2005
  - 3+ ensemble members



# GFDL Decadal Prediction Research in support of IPCC AR5

**Key goal: assess whether climate projections for the next several decades can be enhanced when the models are started from observed state of the climate system. Is there a predictable component of decadal variability that could be realized?**

## **(a) Use “workhorse” CM2.1 model from IPCC AR4 [2009-2010]**

Decadal hindcasts from 1980 onwards (10 member ensembles). **COMPLETED**

Decadal predictions starting from 2001 to 2017 (10 member ensembles) **UNDERWAY**

Additional decadal hindcasts and predictions using alternate initialization techniques

## **(b) Use experimental high resolution model [2010-2011]**

Long control simulation and examination of predictability **UNDERWAY**

Decadal predictions starting from 2001 onwards (10 member ensembles)

## **(c) Use CM3 [2010-2011, tentative; if scientifically warranted and resources permit]**

Decadal predictions starting from 2001 onwards (10 member ensemble)

# KEY ISSUES

- Working definitions and functionality of “Operational” “Decadal” “Climate” “Prediction”
- What is the predictability in the climate system?
- “Unforced” and “Forced” (natural and anthropogenic) aspects of predictability. Initial+Boundary value problem.
- IPCC AR5 experiments → Predictive understanding
- GFDL research efforts into predictability and Linkages with NCEP (MME approaches)
- Experimental decadal predictions
- Use (‘service’) of the predictions for the various applications and sectors?