

# Regional climate change projections: Lessons from the AR4

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ESSP    DIVERSITAS    IGBP    IHDP    WCRP

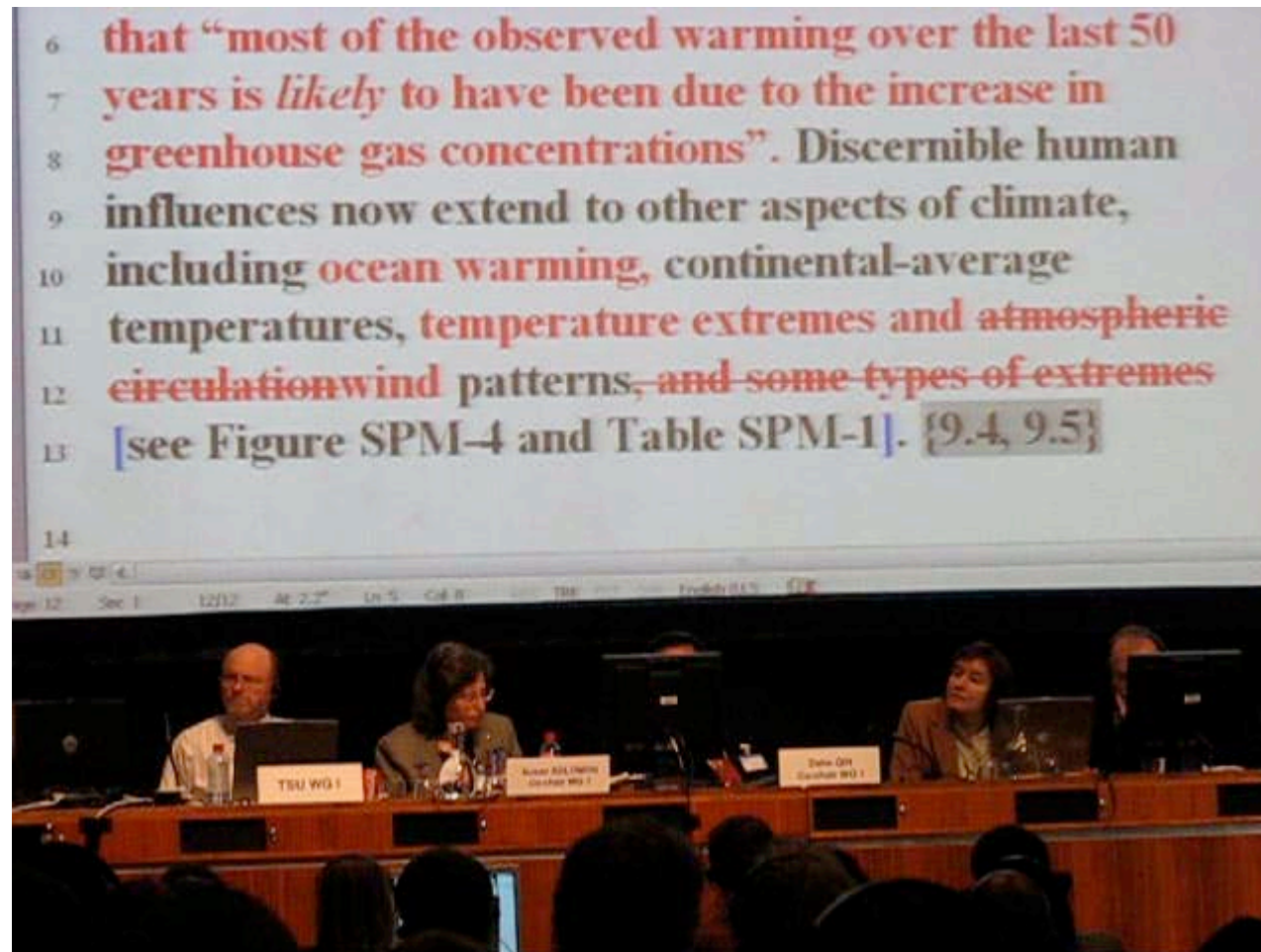
**WCRP**  
World Climate Research Programme

**Workshop on Evaluating and  
Improving Regional Climate Projections**  
**Toulouse (France), 11-13 February 2009**

# Overview

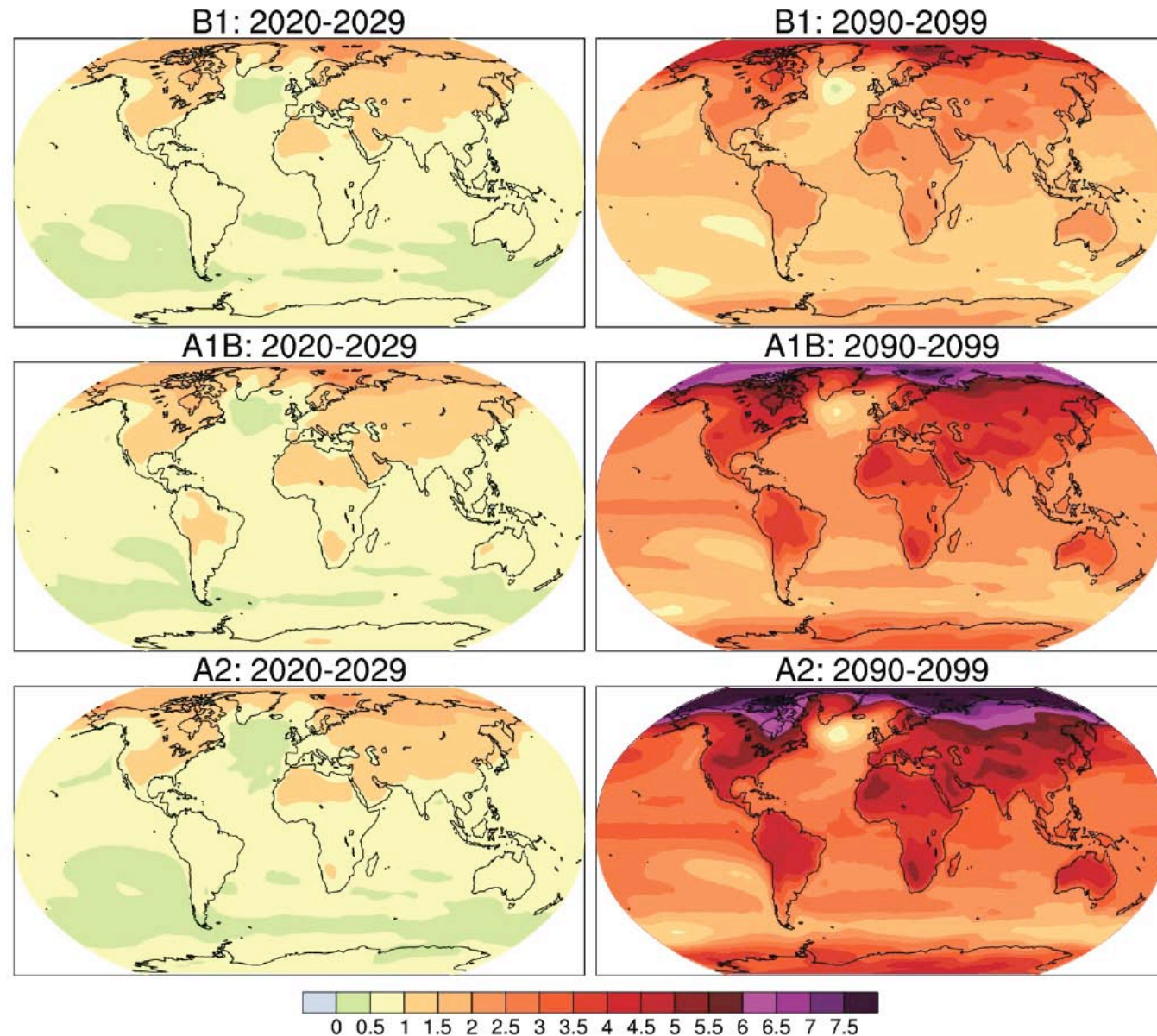
- IPCC Summary for Policy Makers (SPM)
  - Adoption procedure
- Feeding information from the underlying chapters
- Reporting information based on down scaling in chapter 11 on regional climate projections
- Way forward?

# Approval 'line by line'

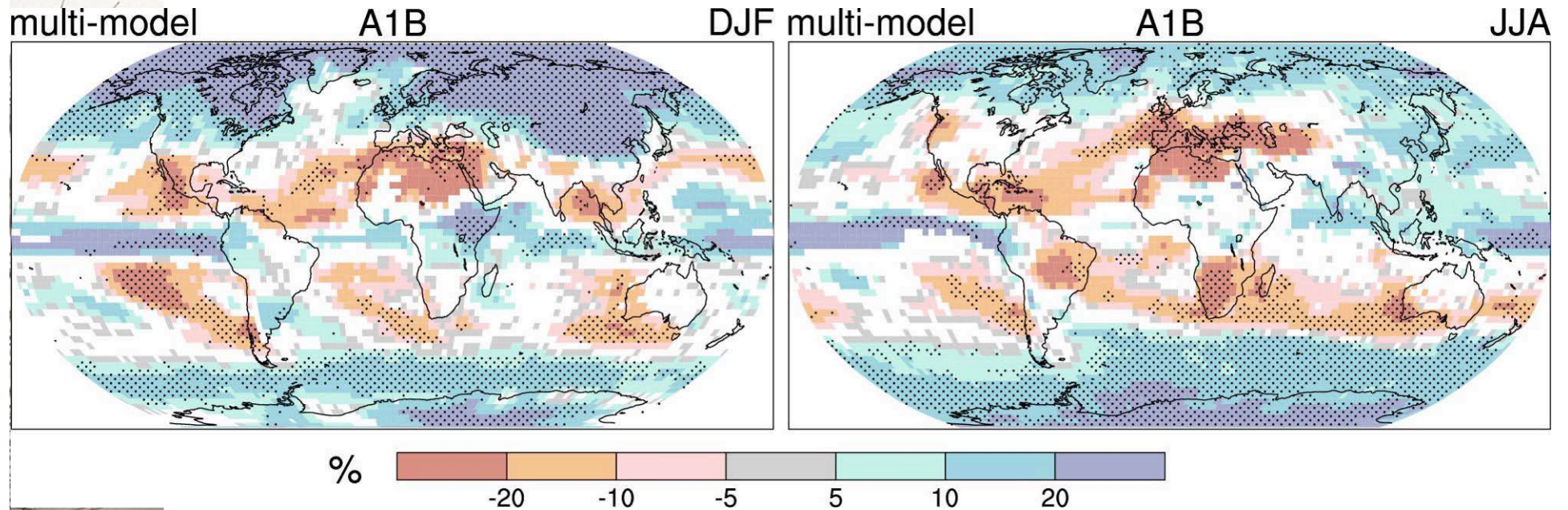




# Future temperature changes



©IPCC 2007: WG1-AR4



Stippled areas are where more than 90% of the models agree in the sign of the change

Precipitation increases very likely in high latitudes

Decreases likely in most subtropical land regions

This continues the observed patterns in recent trends



# Outline of report

(scoping meeting early 2004)

- **Chapter 1:** Historical Overview of Climate Change Science
- **Chapter 2:** Changes in Atmospheric Constituents and in Radiative Forcing
- **Chapter 3:** Observations: Surface and Atmospheric Climate Change
- **Chapter 4:** Observations: Changes in Snow, Ice and Frozen Ground
- **Chapter 5:** Observations: Oceanic Climate Change and Sea Level
- **Chapter 6:** Paleoclimate

# Outline of report (cont.)

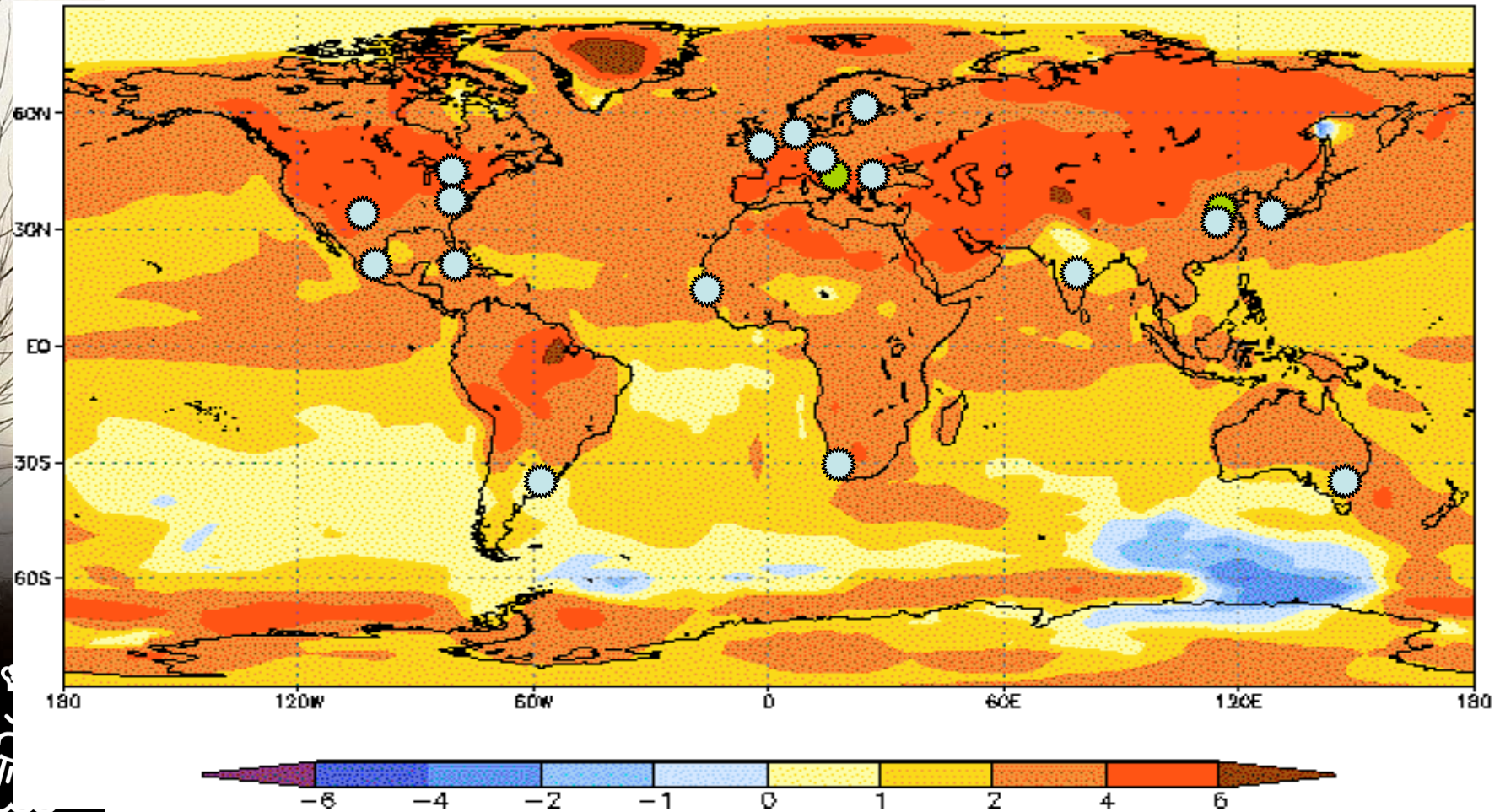
- **Chapter 7:** Couplings Between Changes in the Climate System and Biogeochemistry
- **Chapter 8:** Climate Models and Their Evaluation
- **Chapter 9:** Understanding and Attributing Climate Change
- **Chapter 10:** Global Climate Projections
- **Chapter 11: Regional Climate Projections**

# From scoping meeting

- **11.3 Regional Projections**
  - **11.3.1 Introduction to regions and relationship to WGII regions**
  - **11.3.2 Africa**
  - **11.3.3 Mediterranean and Europe**
  - **11.3.4 Asia**
  - **11.3.5 North America**
  - **11.3.6 Latin America**
  - **11.3.7 Australia and New Zealand**
  - **11.3.8 Polar**
  - **11.3.9 Small Islands**



# Some challenges



Dmi





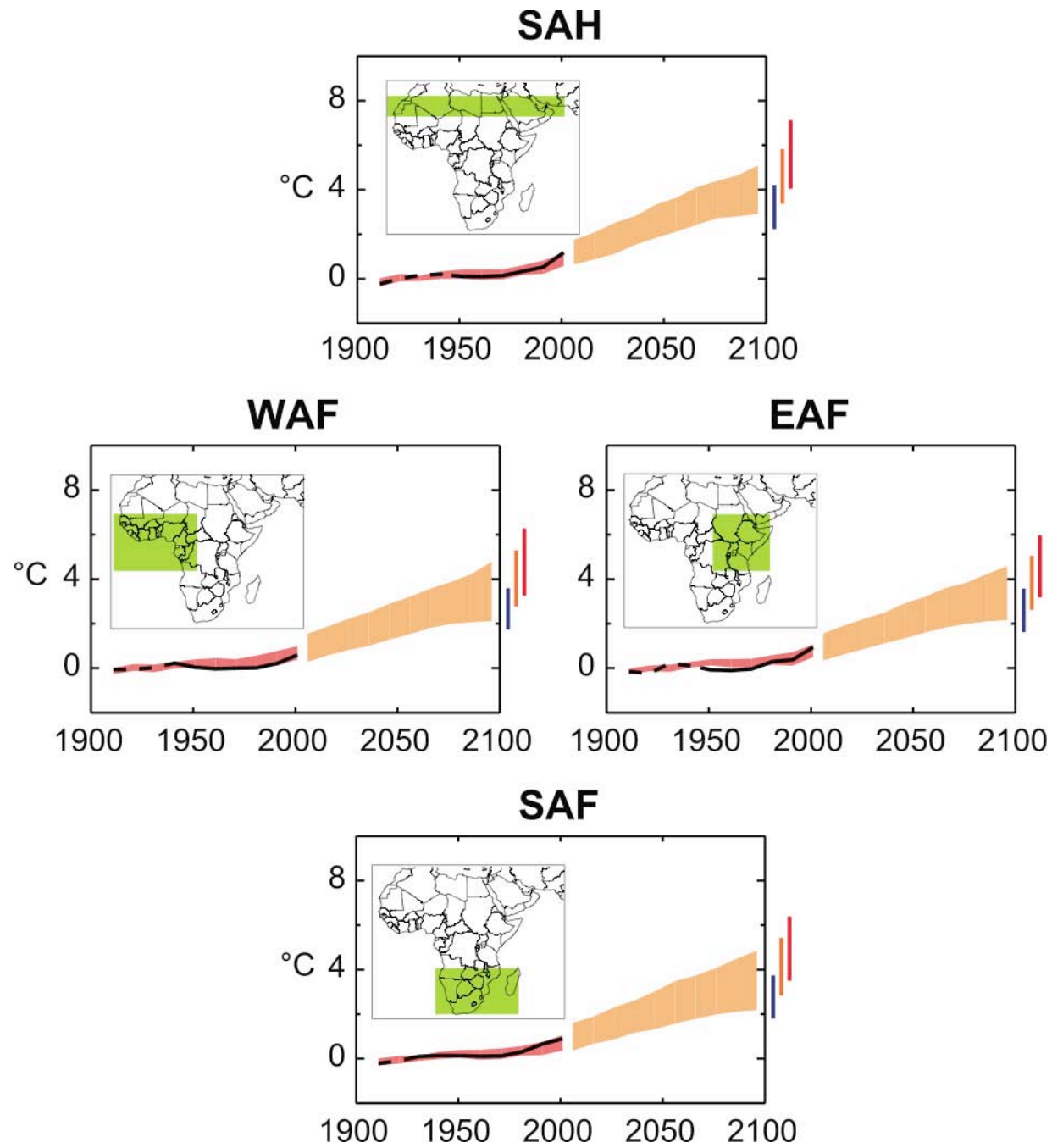
Establishing  
a team

Trieste Sept. '04

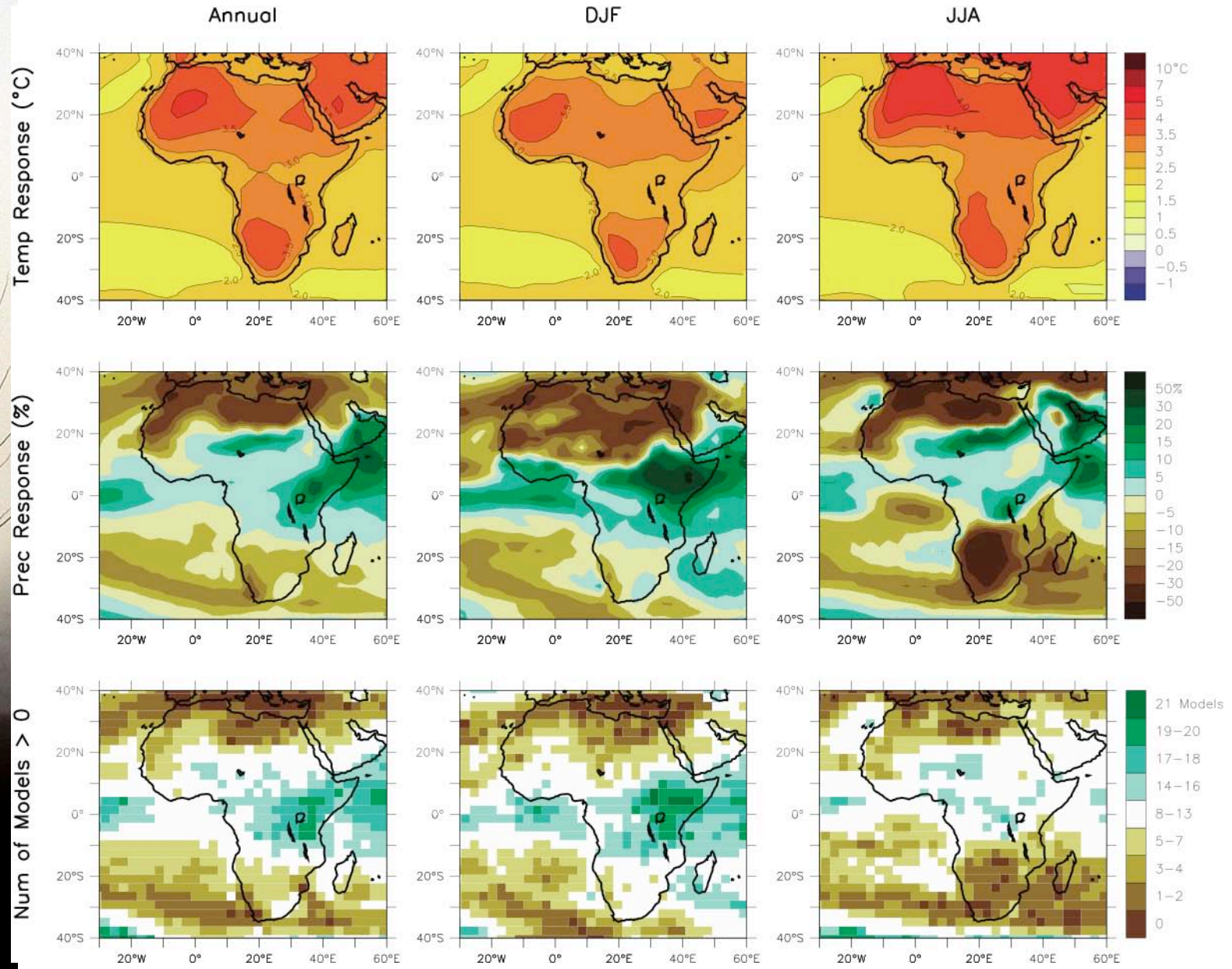
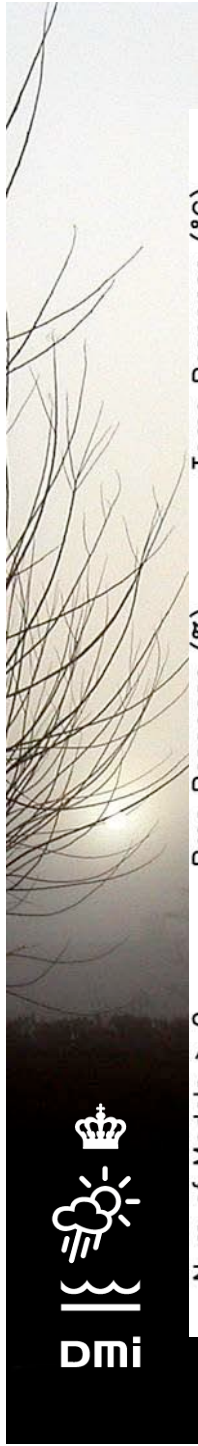


Feeling like a team

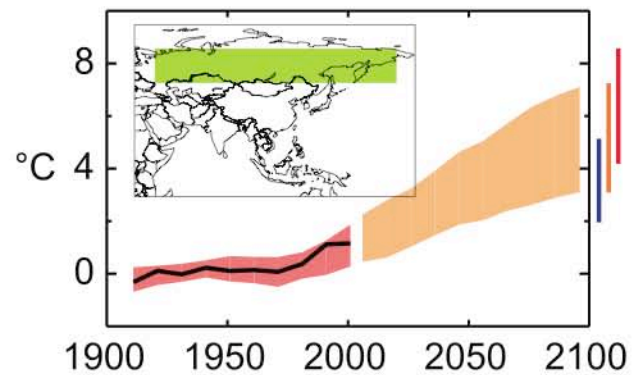
Bergen June '06



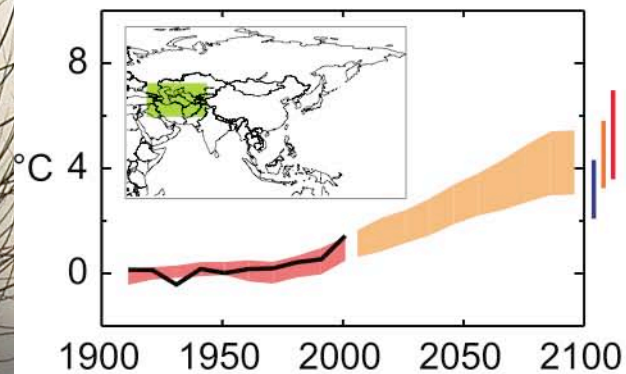




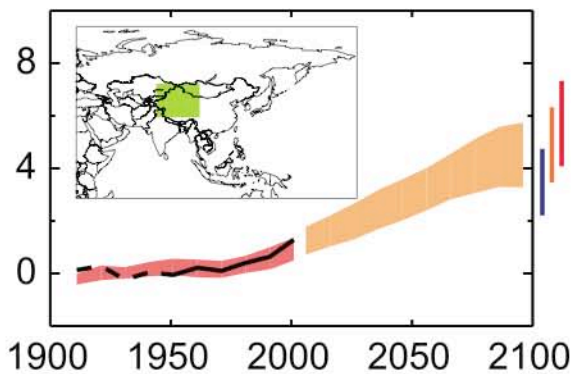
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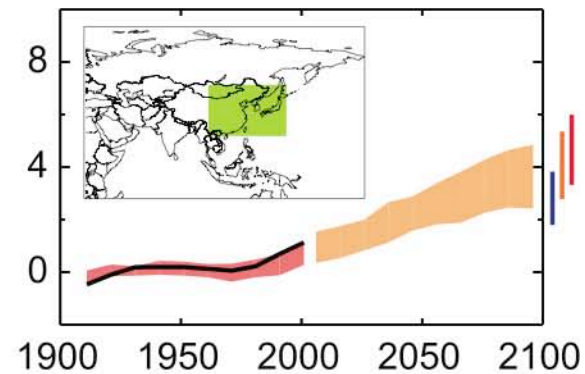
**CAS**



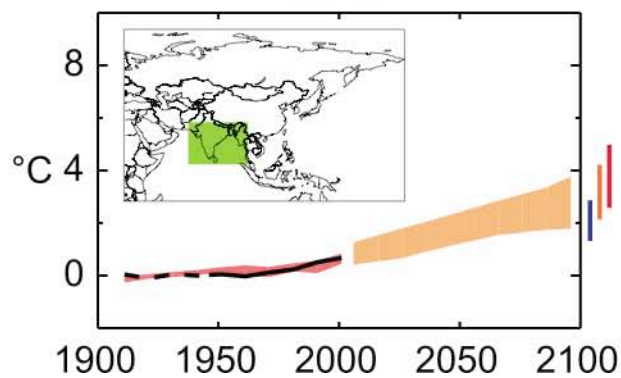
**TIB**



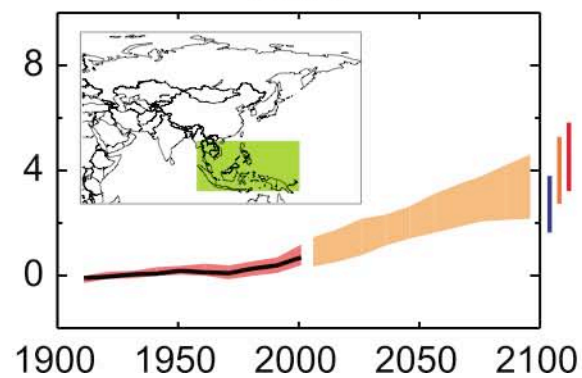
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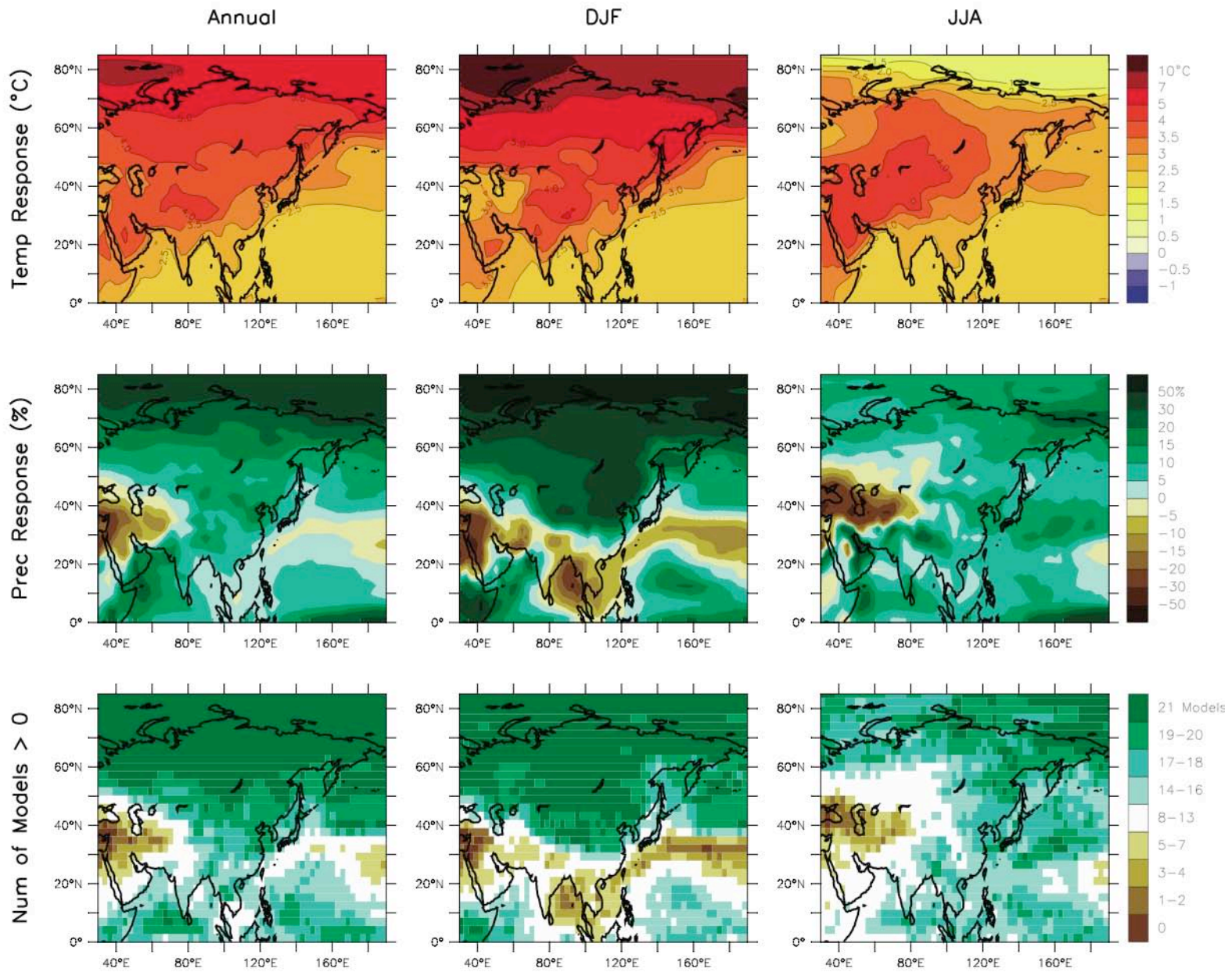
**SAS**



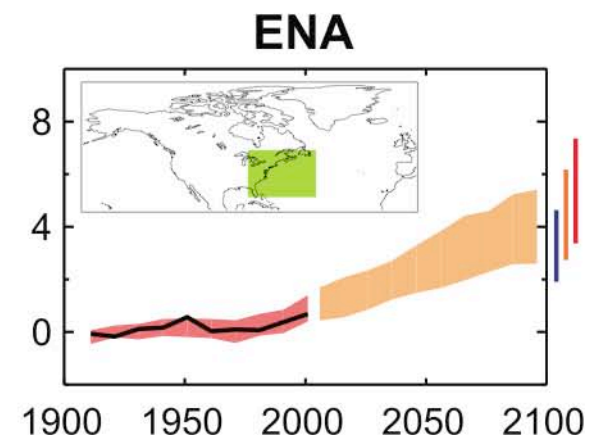
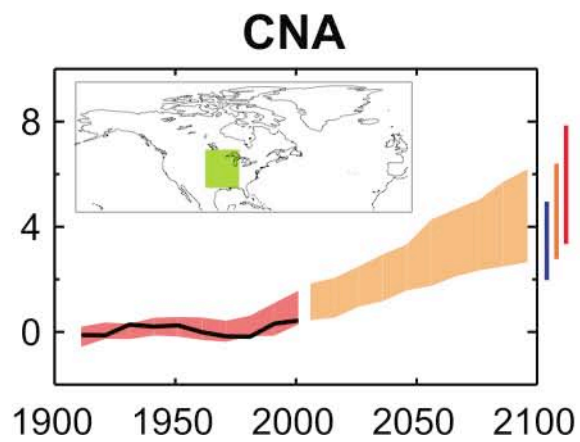
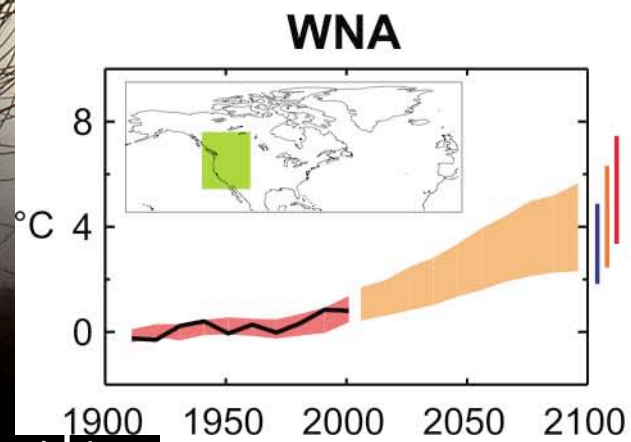
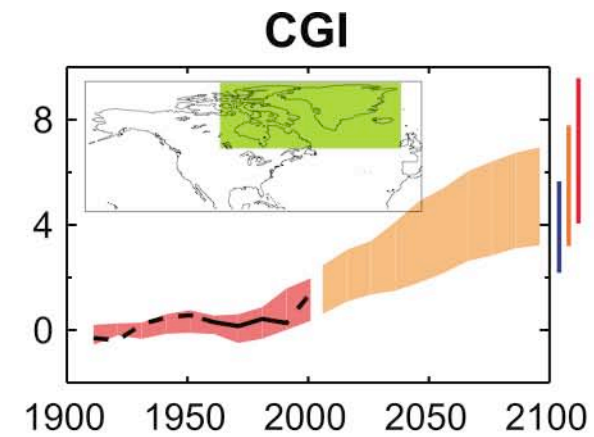
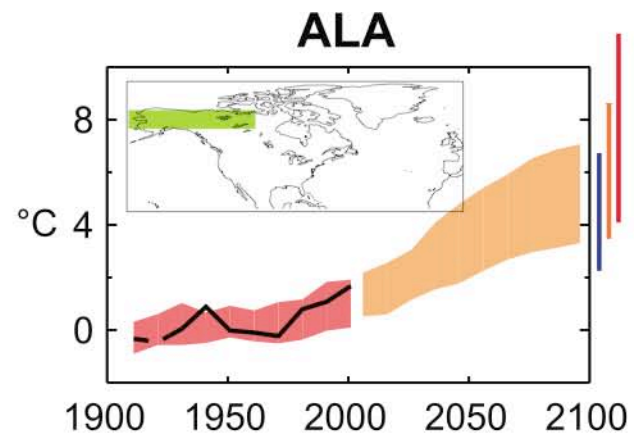
**SEA**

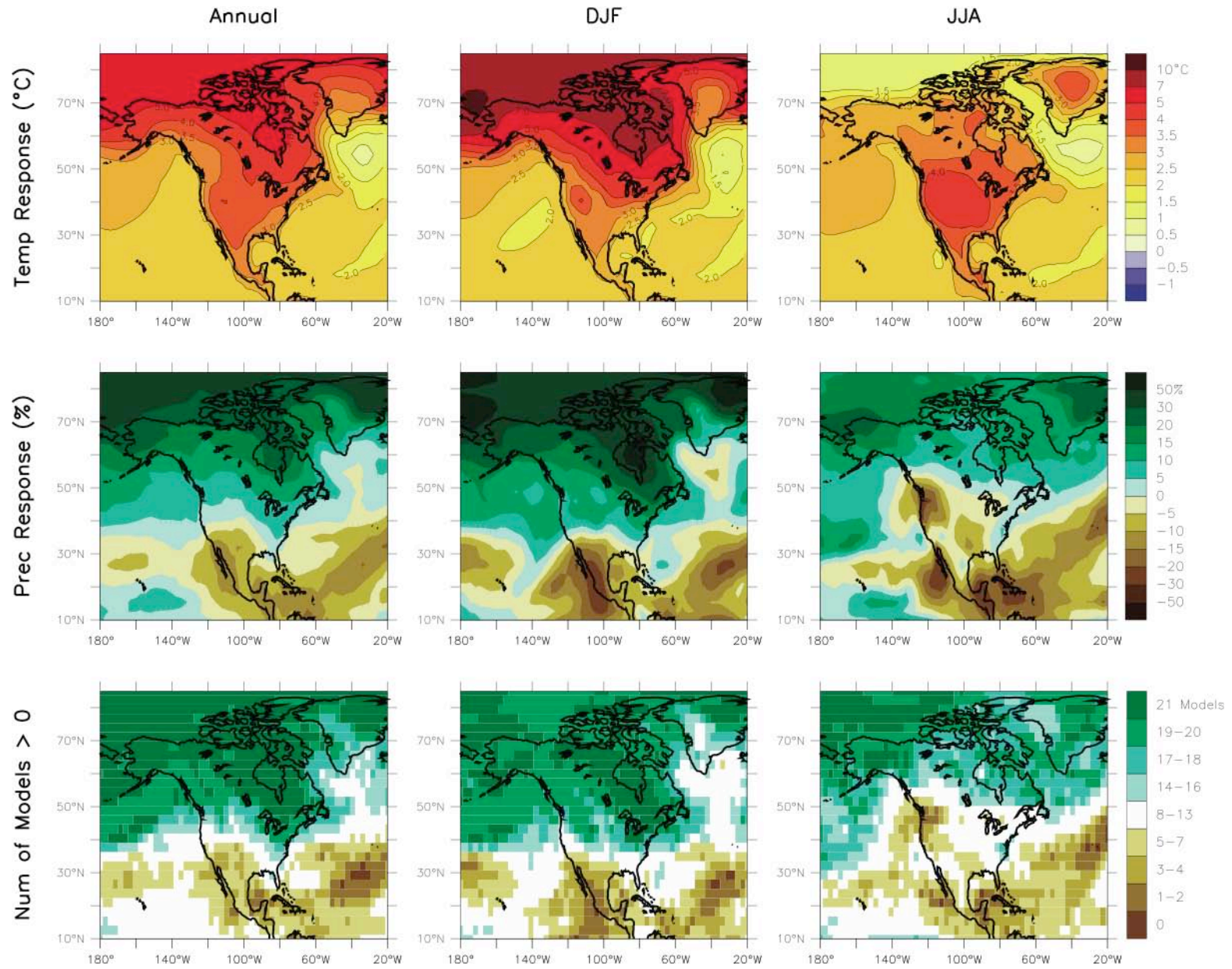






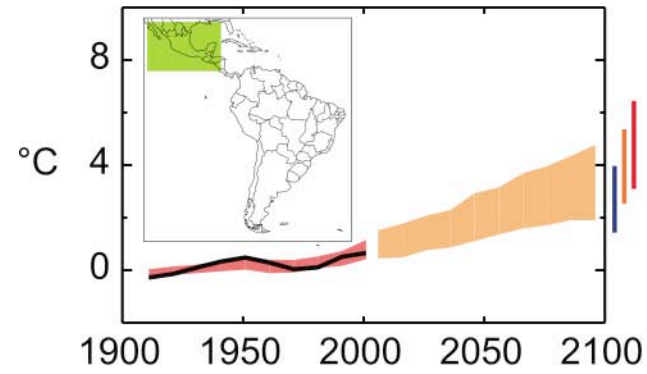




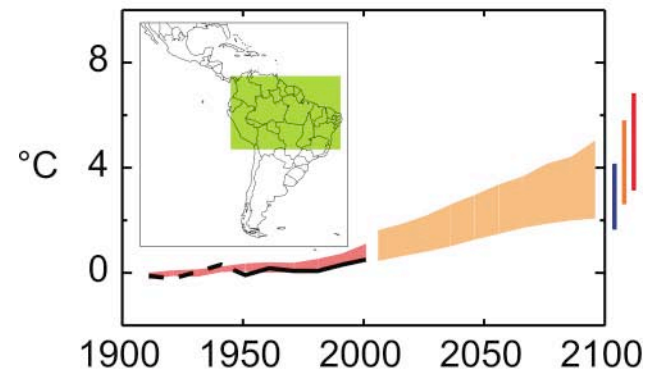




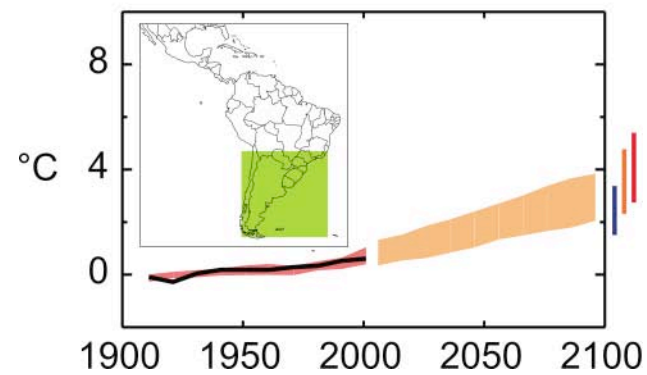
**CAM**



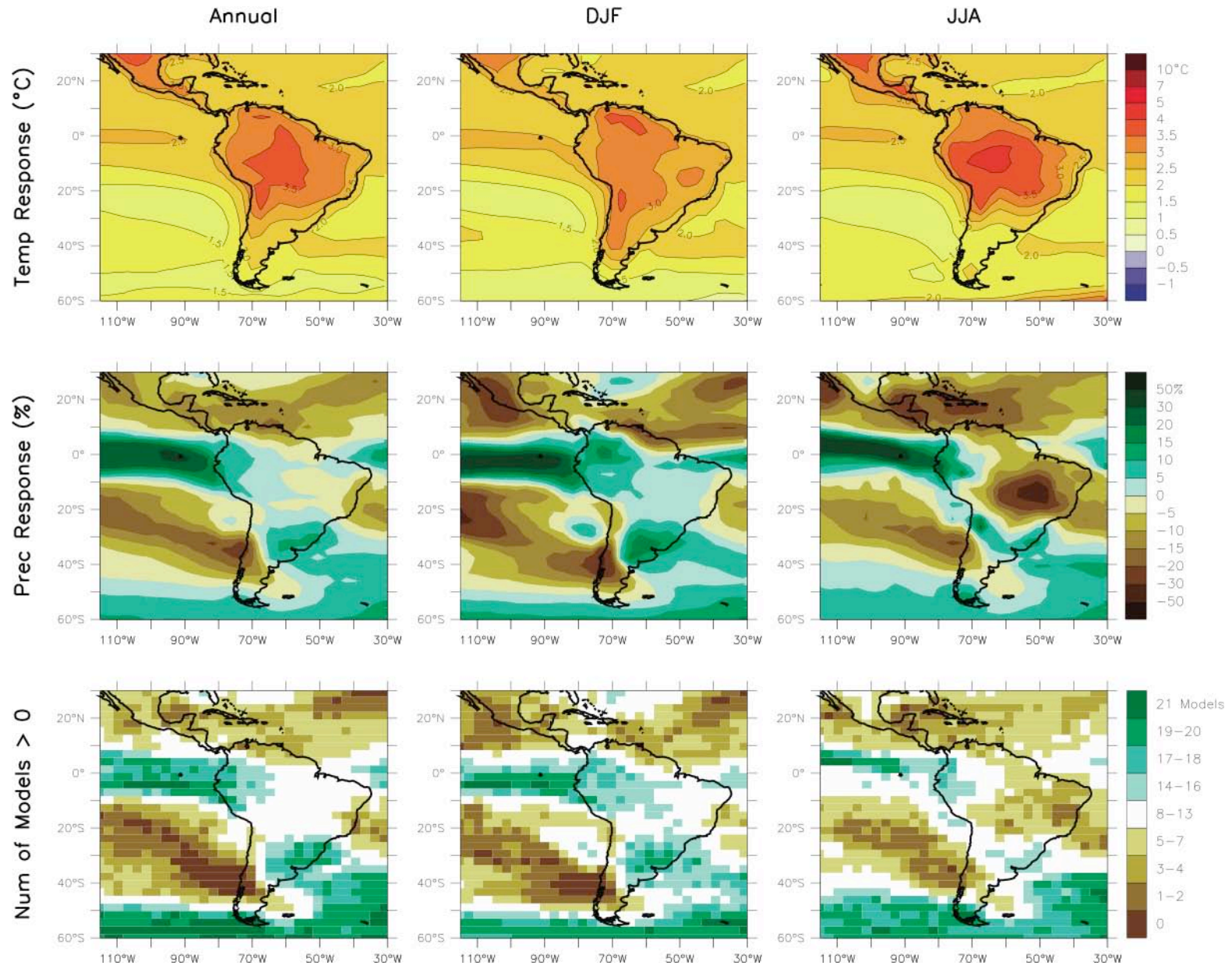
**AMZ**

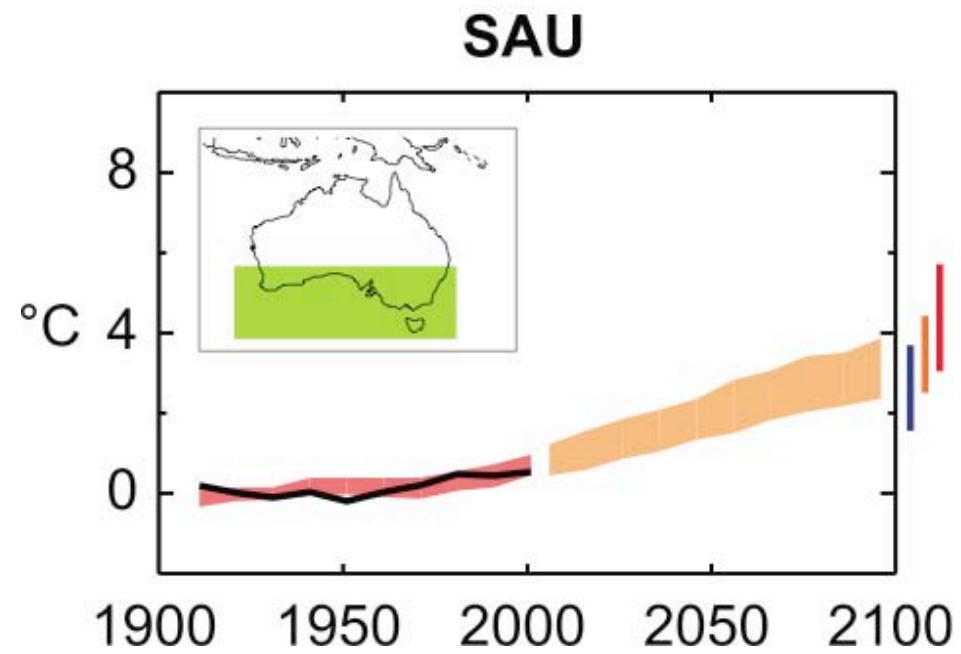
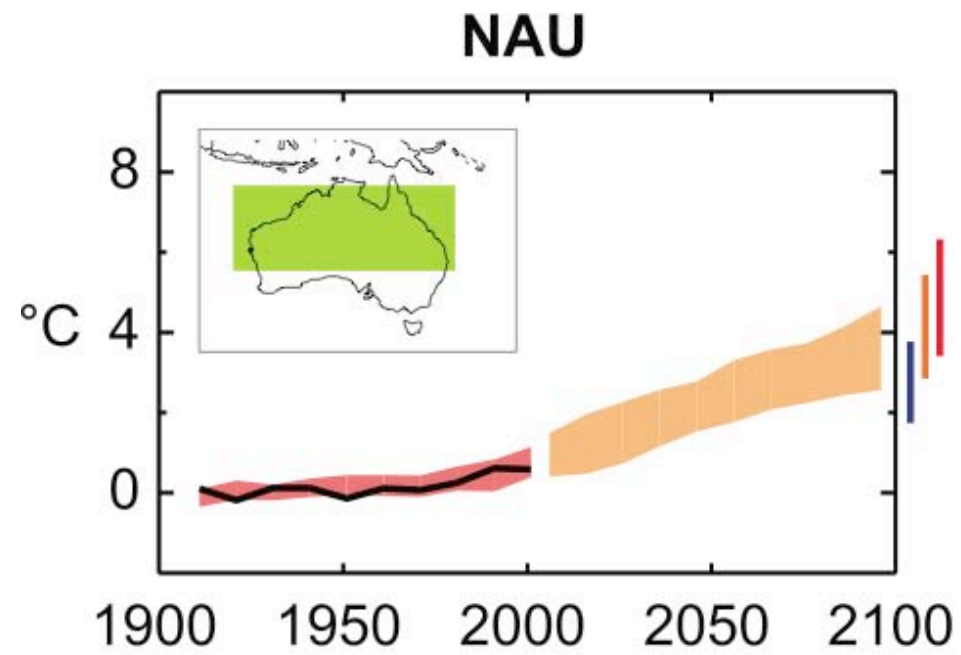


**SSA**

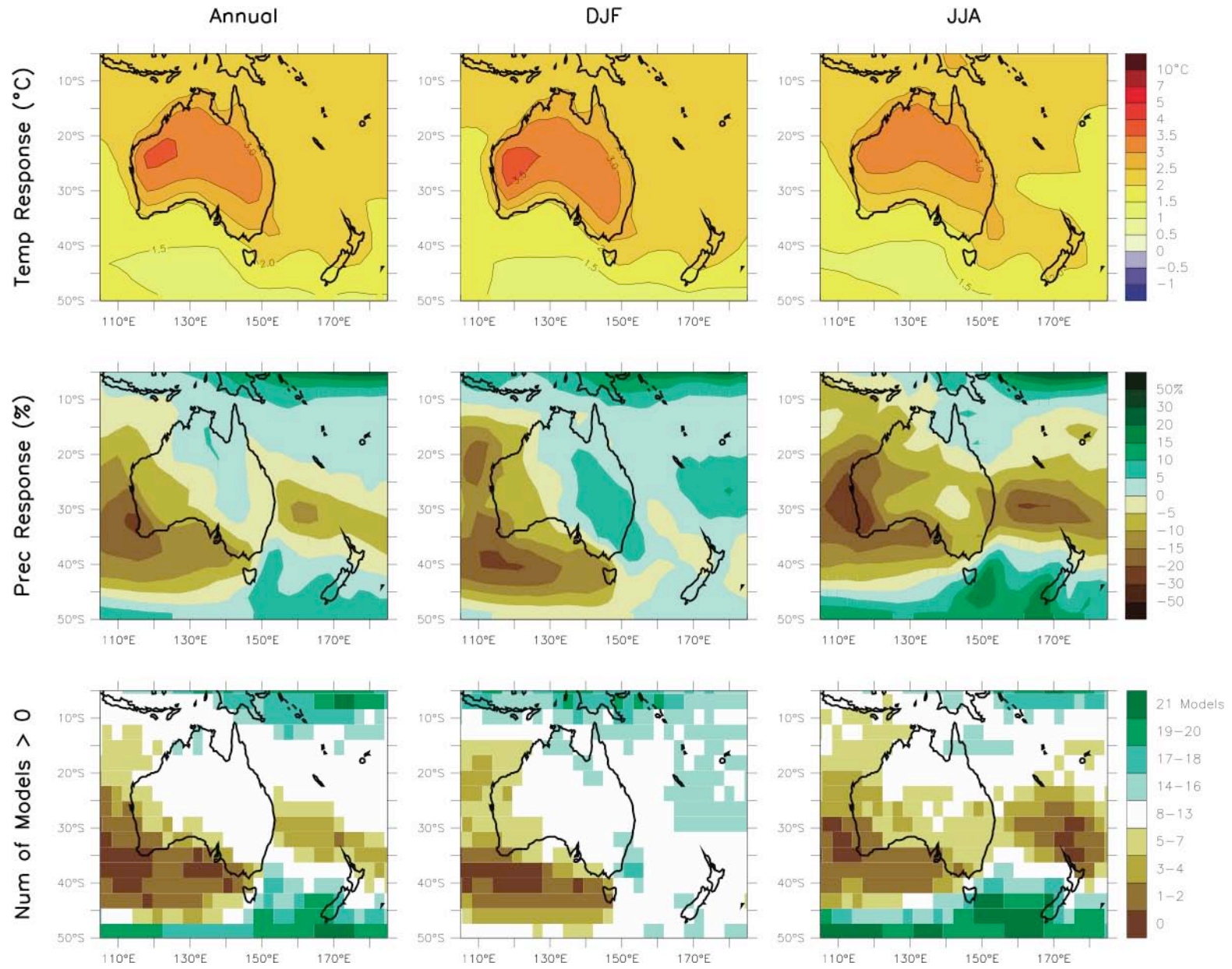




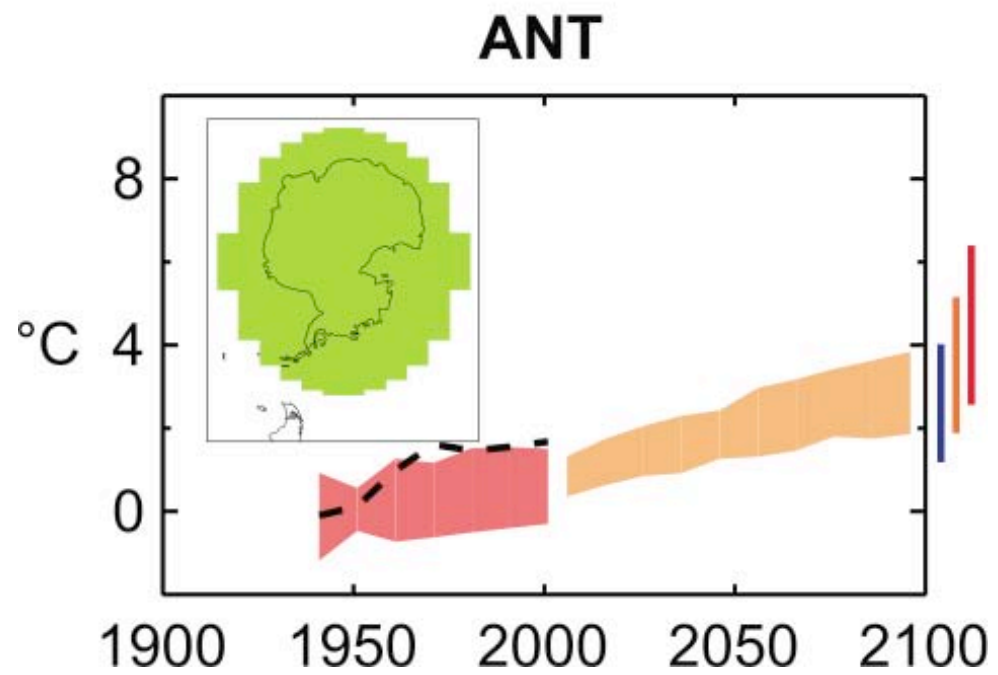
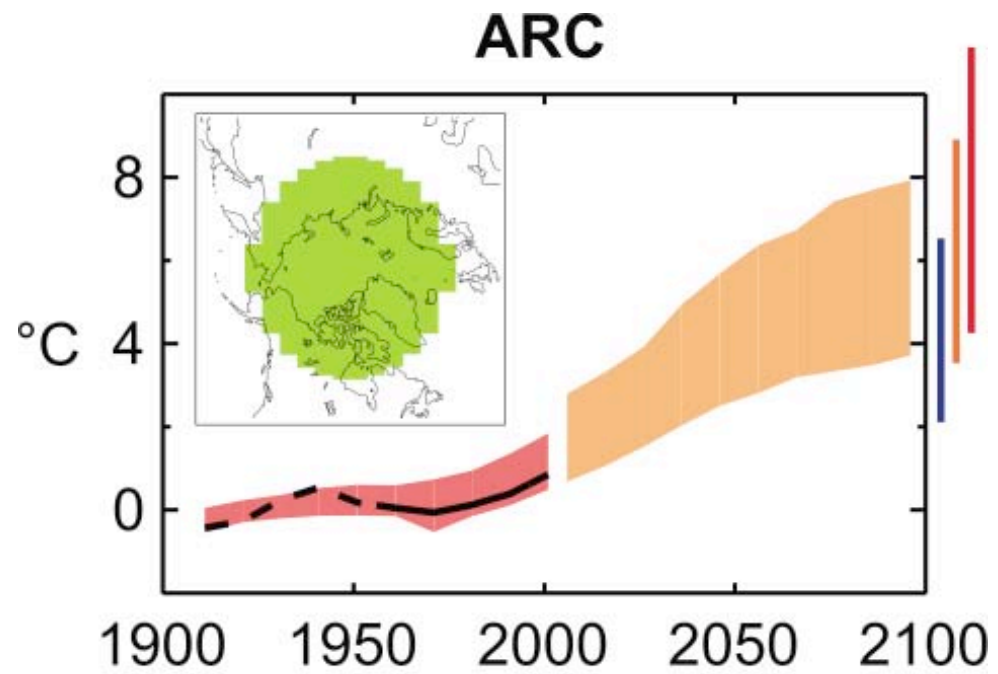




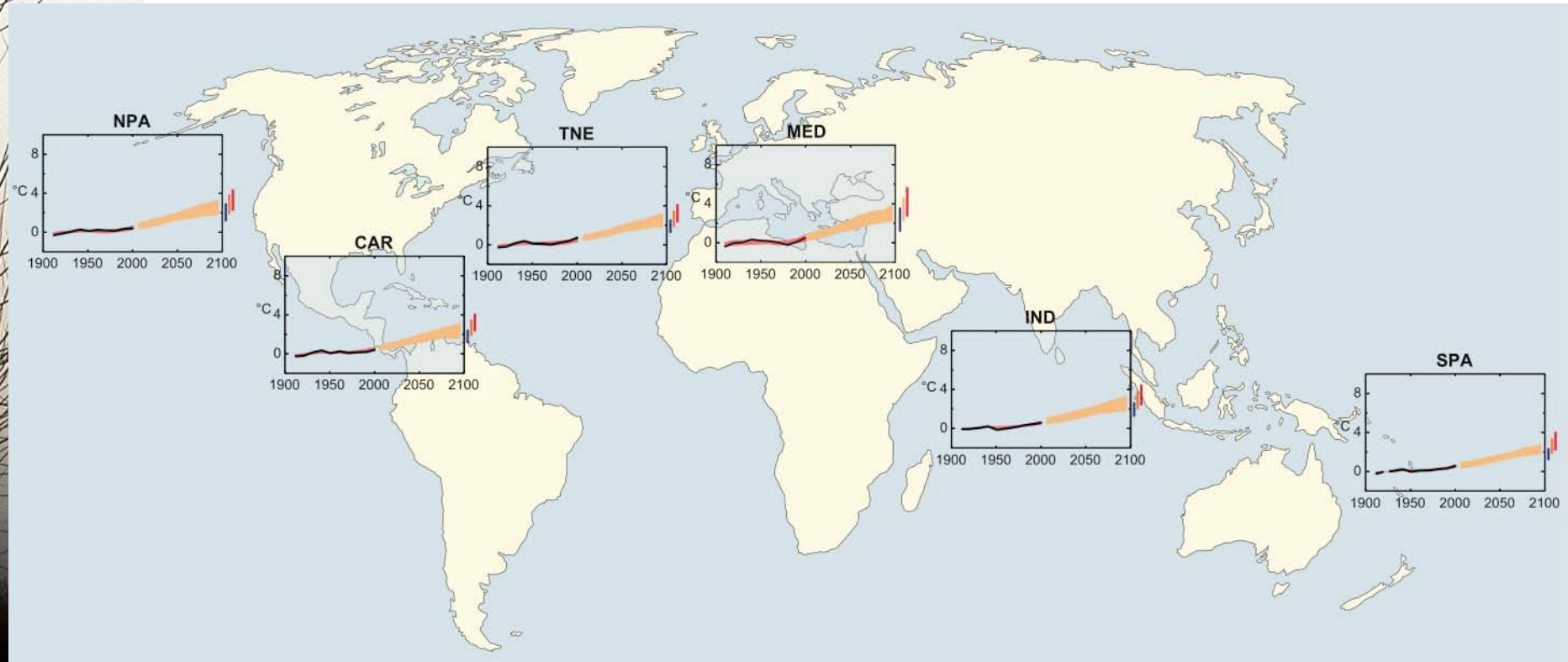








# Figure 11.22



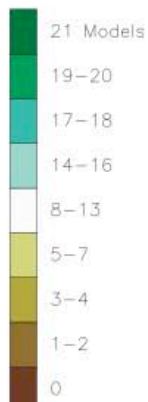
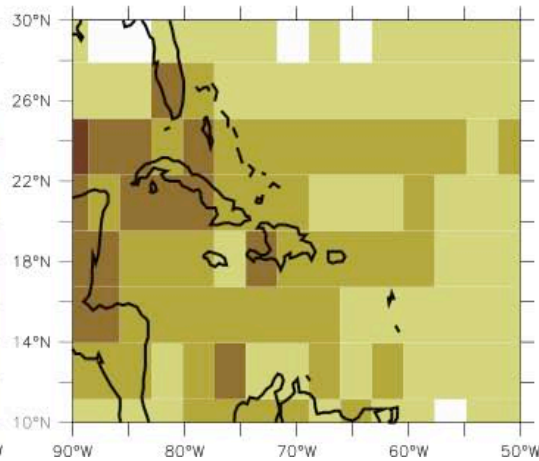
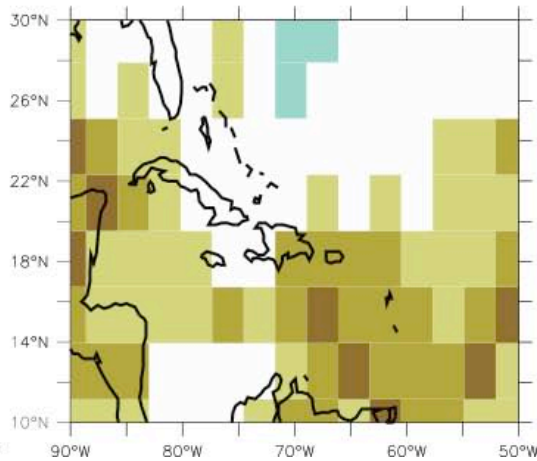
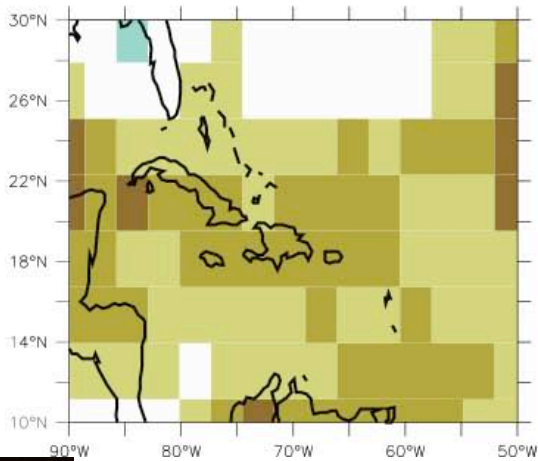
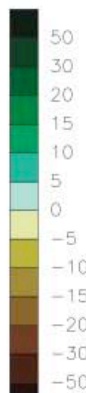
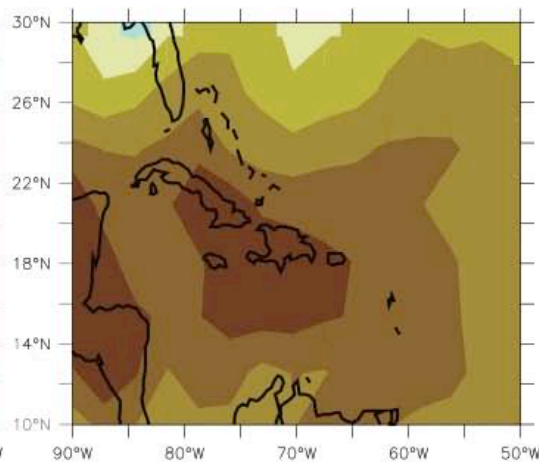
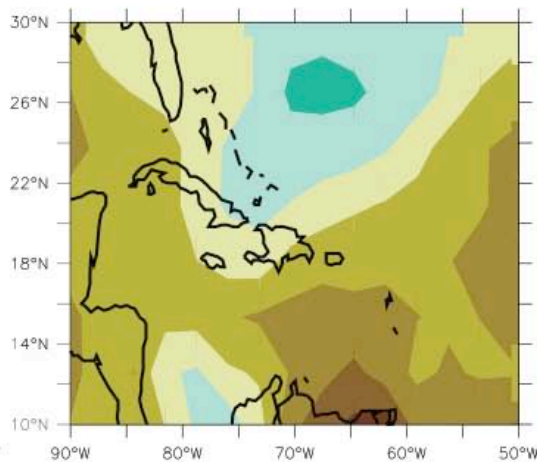
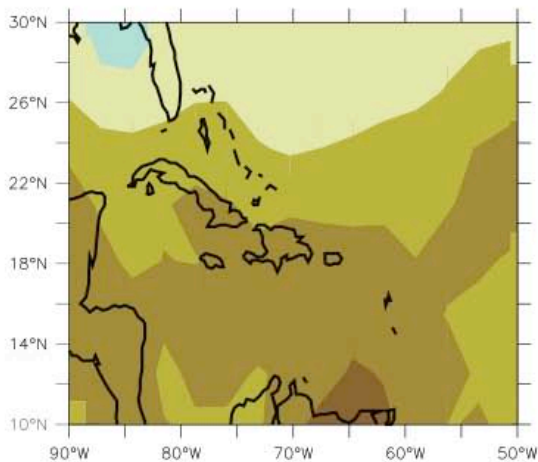
Precip Response (%)

Number of Models > 0

Annual

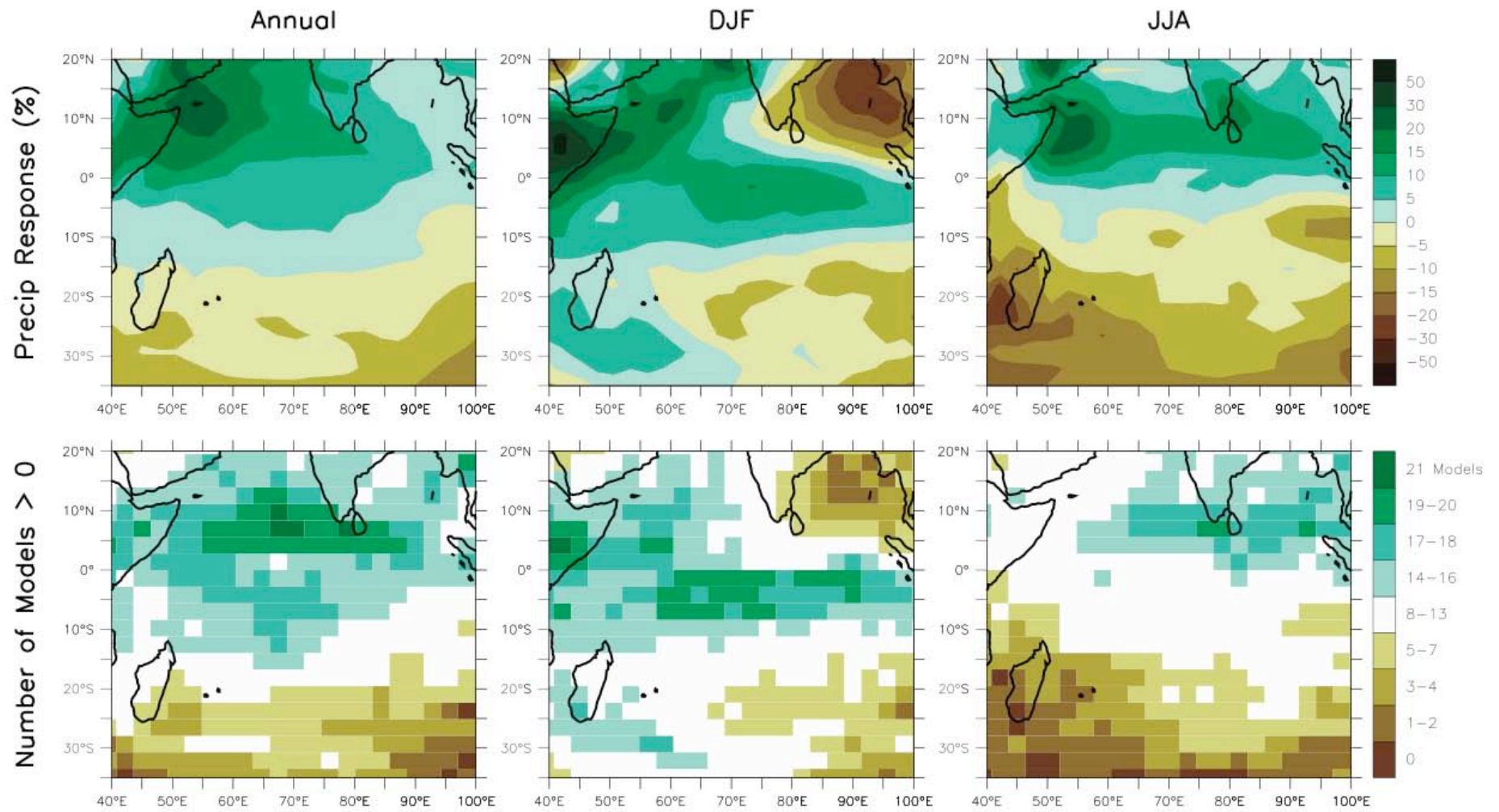
DJF

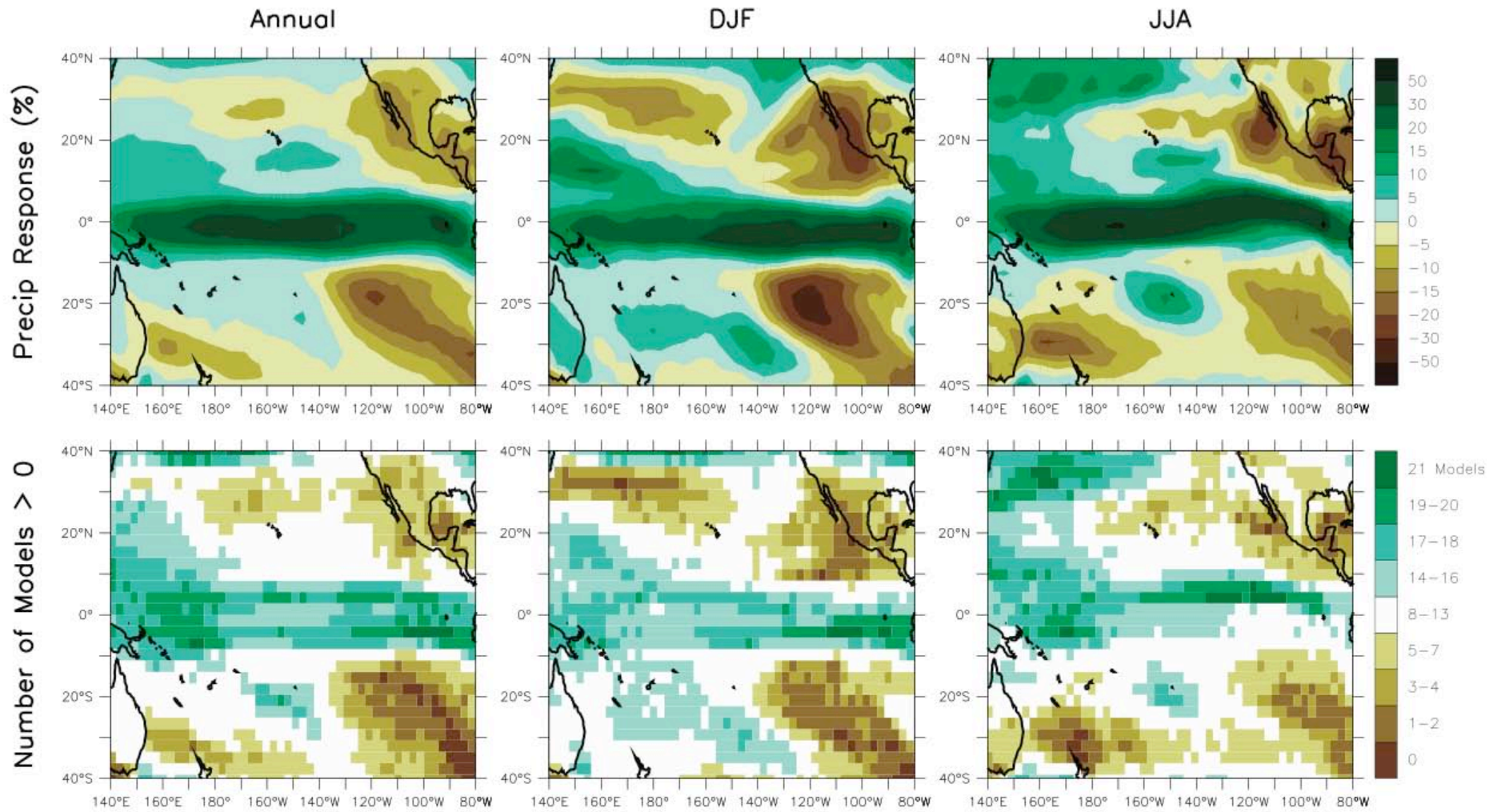
JJA



DMI

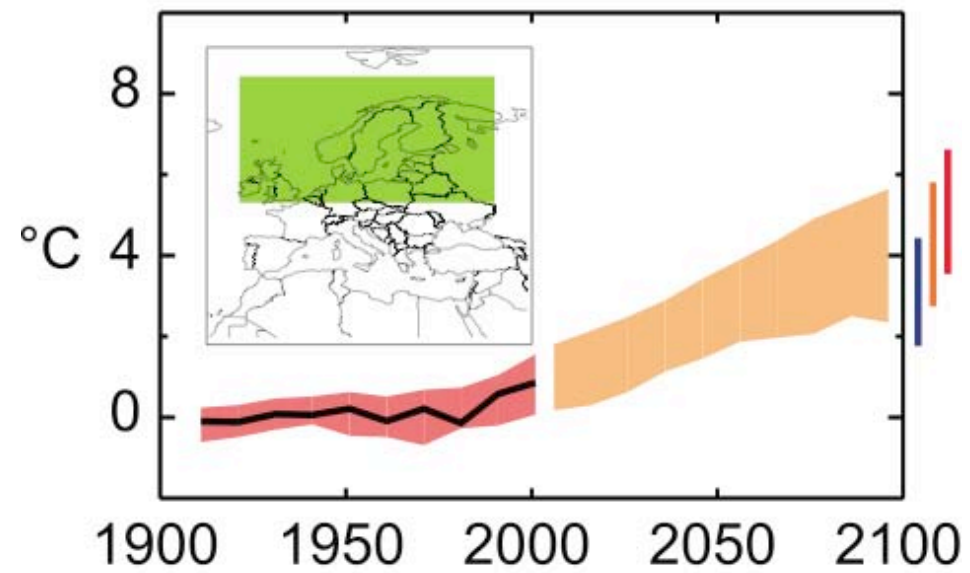




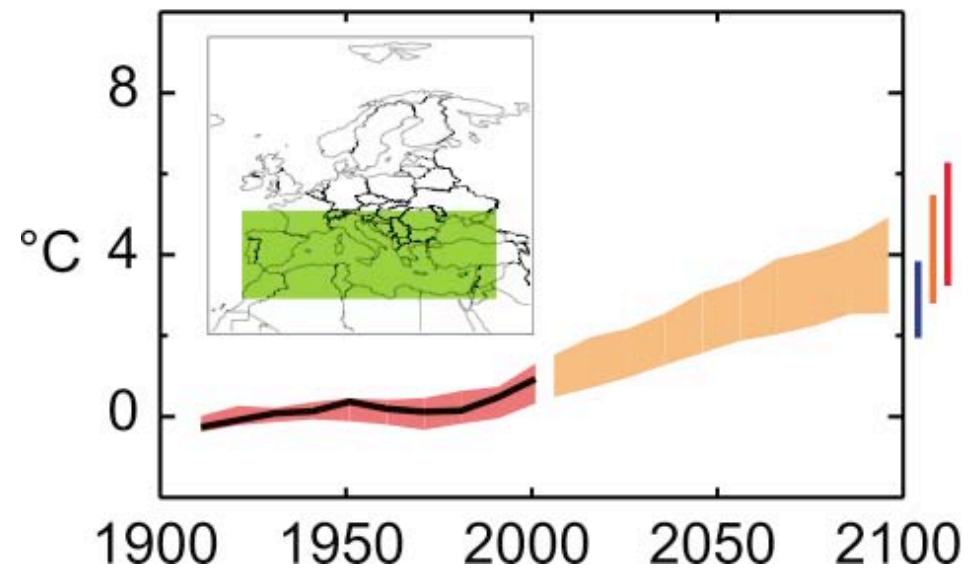




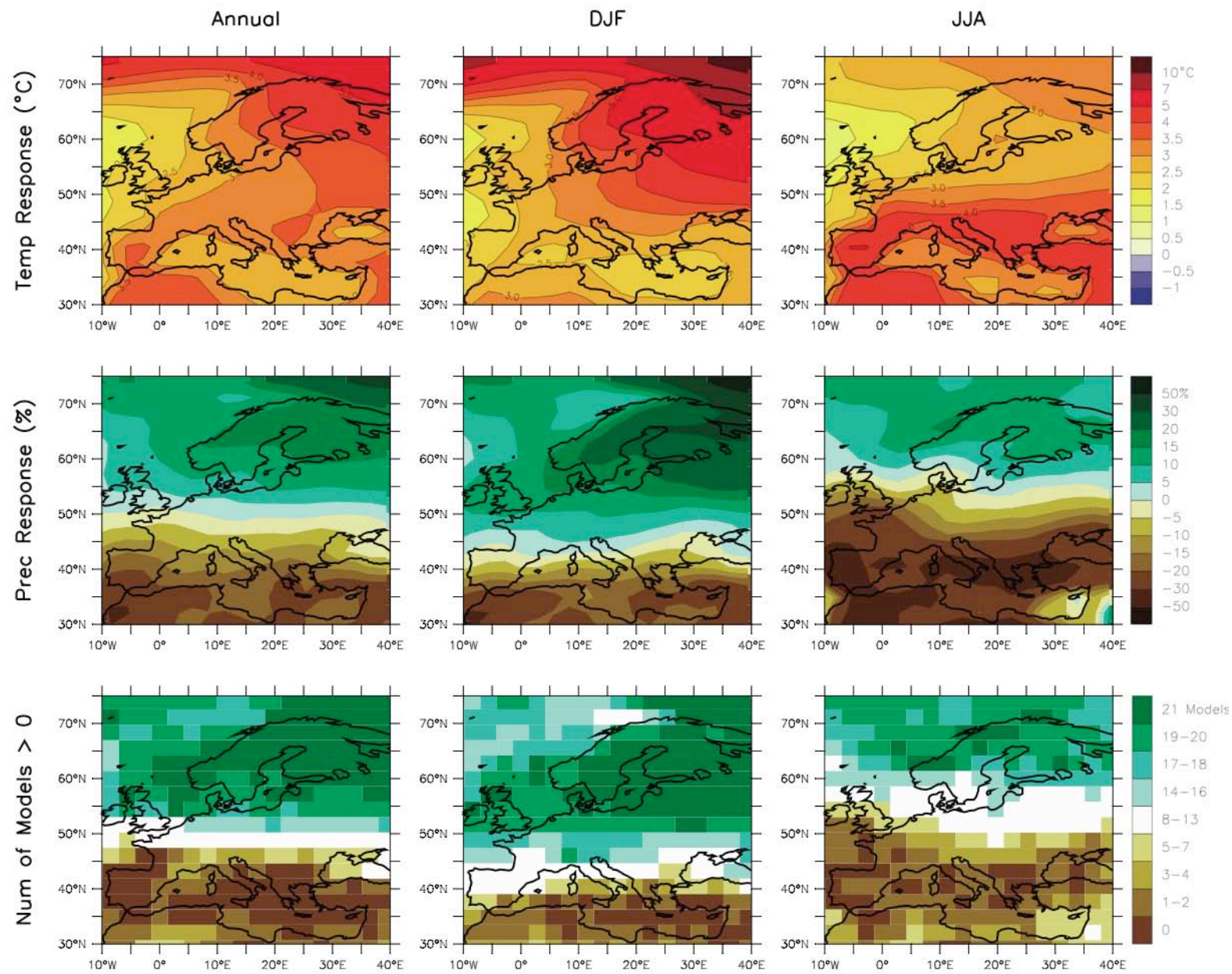
## NEU



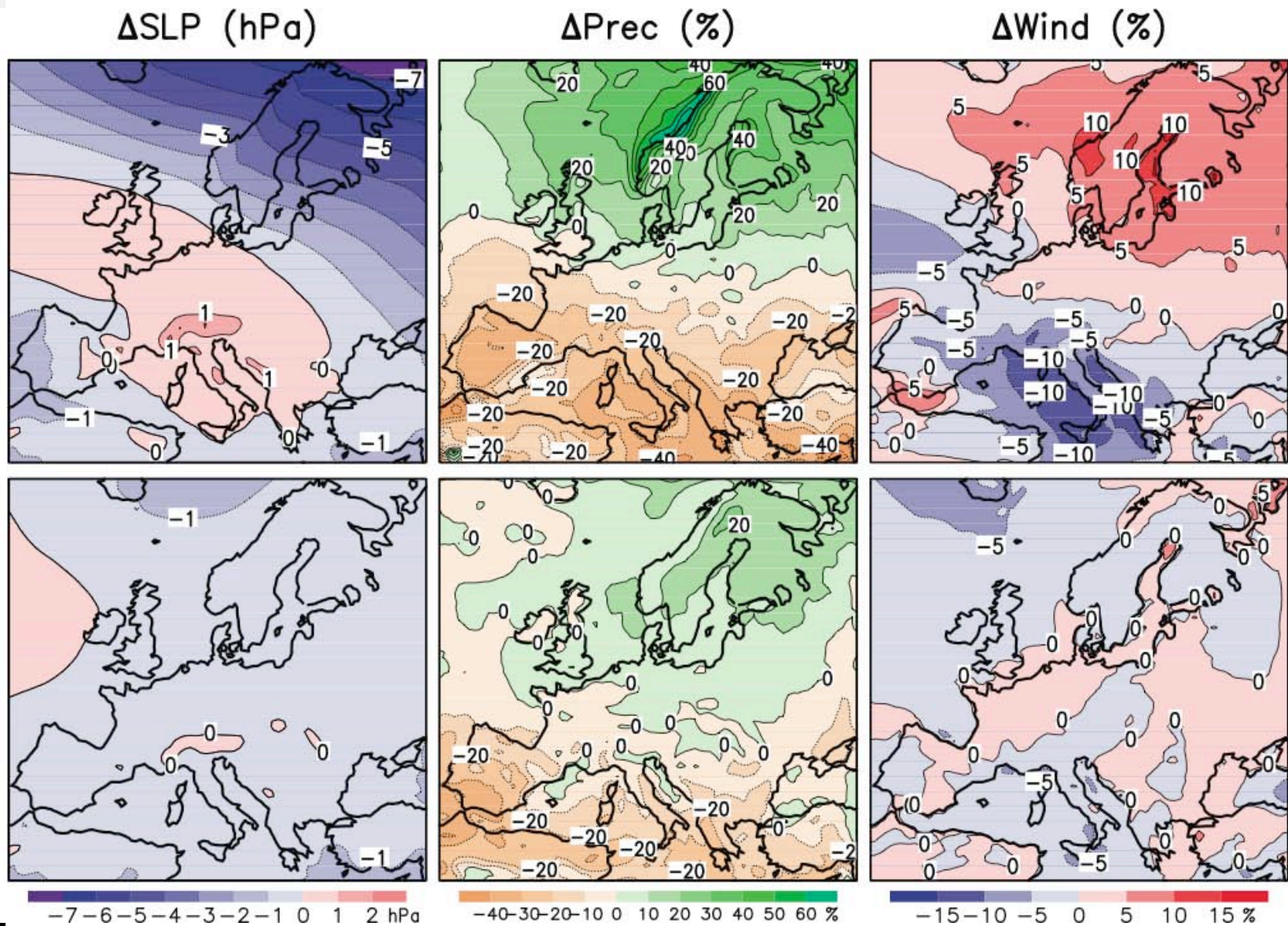
## SEM







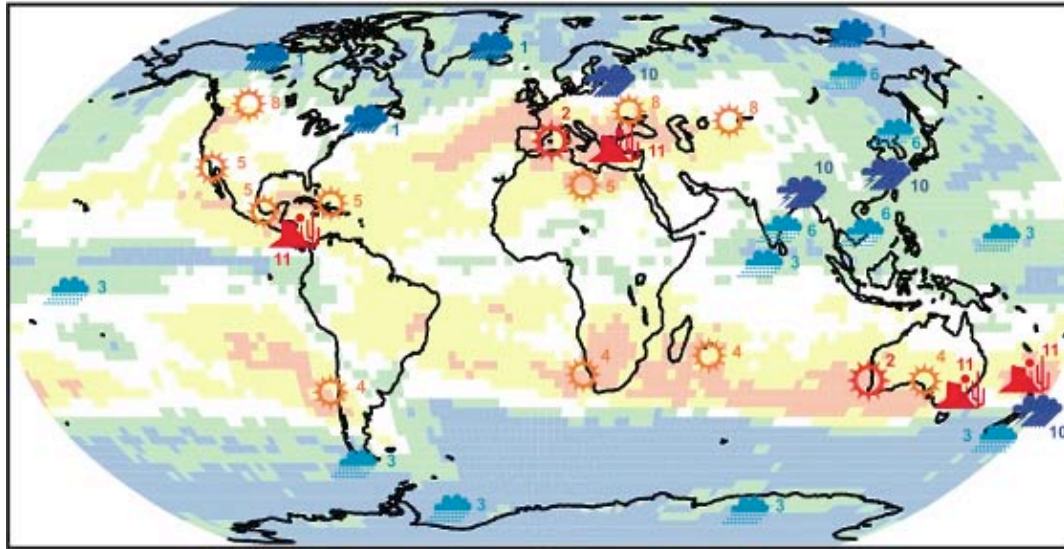




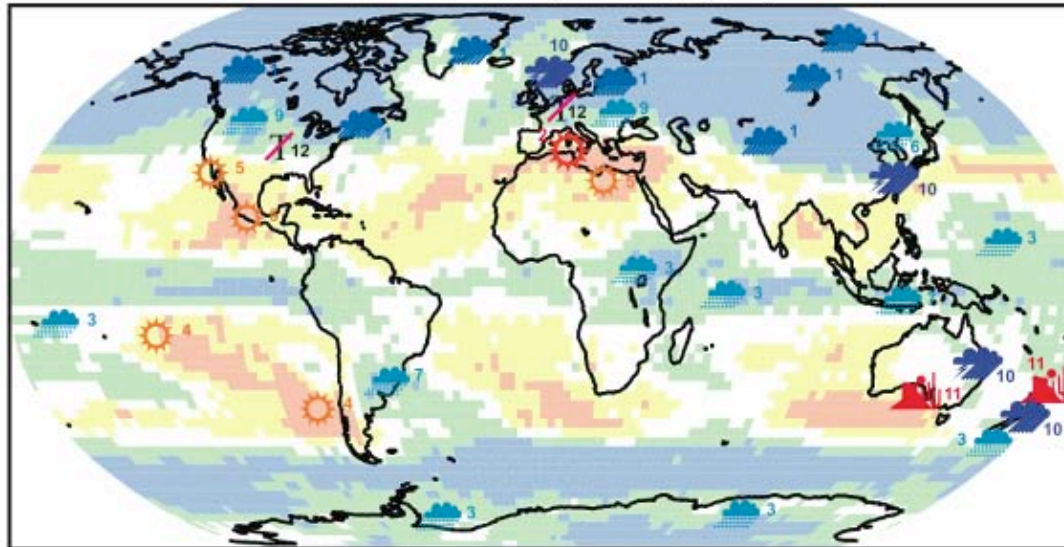




June–July–August (JJA)



December–January–February (DJF)



Based on regional studies assessed in chapter 11:

- |  |                                      |   |
|--|--------------------------------------|---|
| Precipitation increase in $\geq 90\%$ of simulations | Precipitation decrease – very likely | Precipitation extreme increase – likely |
| Precipitation increase in $\geq 66\%$ of simulations | Precipitation decrease – likely      | Increased drought – likely              |
| Precipitation decrease in $\geq 66\%$ of simulations | Precipitation increase – very likely | Less snow – very likely                 |
| Precipitation decrease in $\geq 90\%$ of simulations | Precipitation increase – likely      |   |



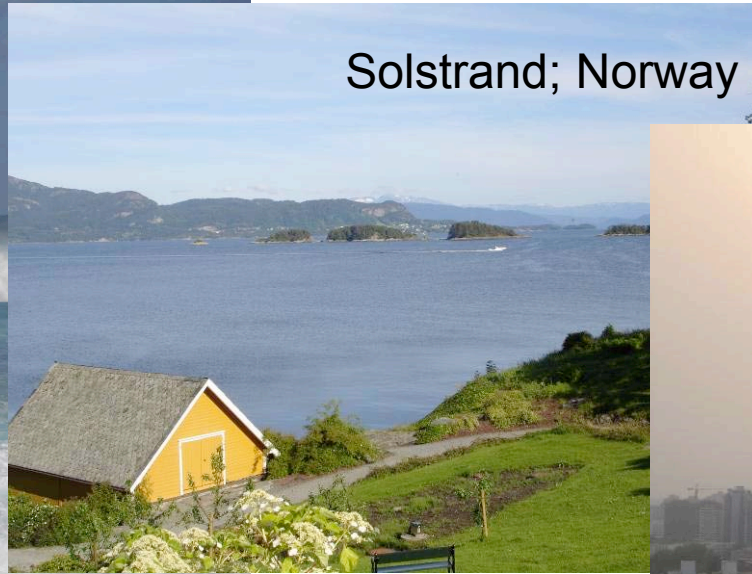
# Way forward?

- Up-to-date downs scaling scenarios
  - Material building on AR4 or even TAR GCMs will be obsolete
- A much better geographical representation to meet requirement of policy relevance in an IPCC context
- Liaison with GCM community to define what is meant by regional

North shore; Hawaii



Solstrand; Norway



Beijing; China



Trieste; Italy



Southern Alps; New Zealand



Seoul; South Korea

