

Climate Change 2013: The Physical Science Basis

Working Group I contribution to the IPCC Fifth Assessment Report

Regional climate change: Findings of IPCC AR5 WGI

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Outline

- Observed Changes
- Regional Projections

Chapters of Relevance

Chapter 2 Observations: Atmosphere and Surface

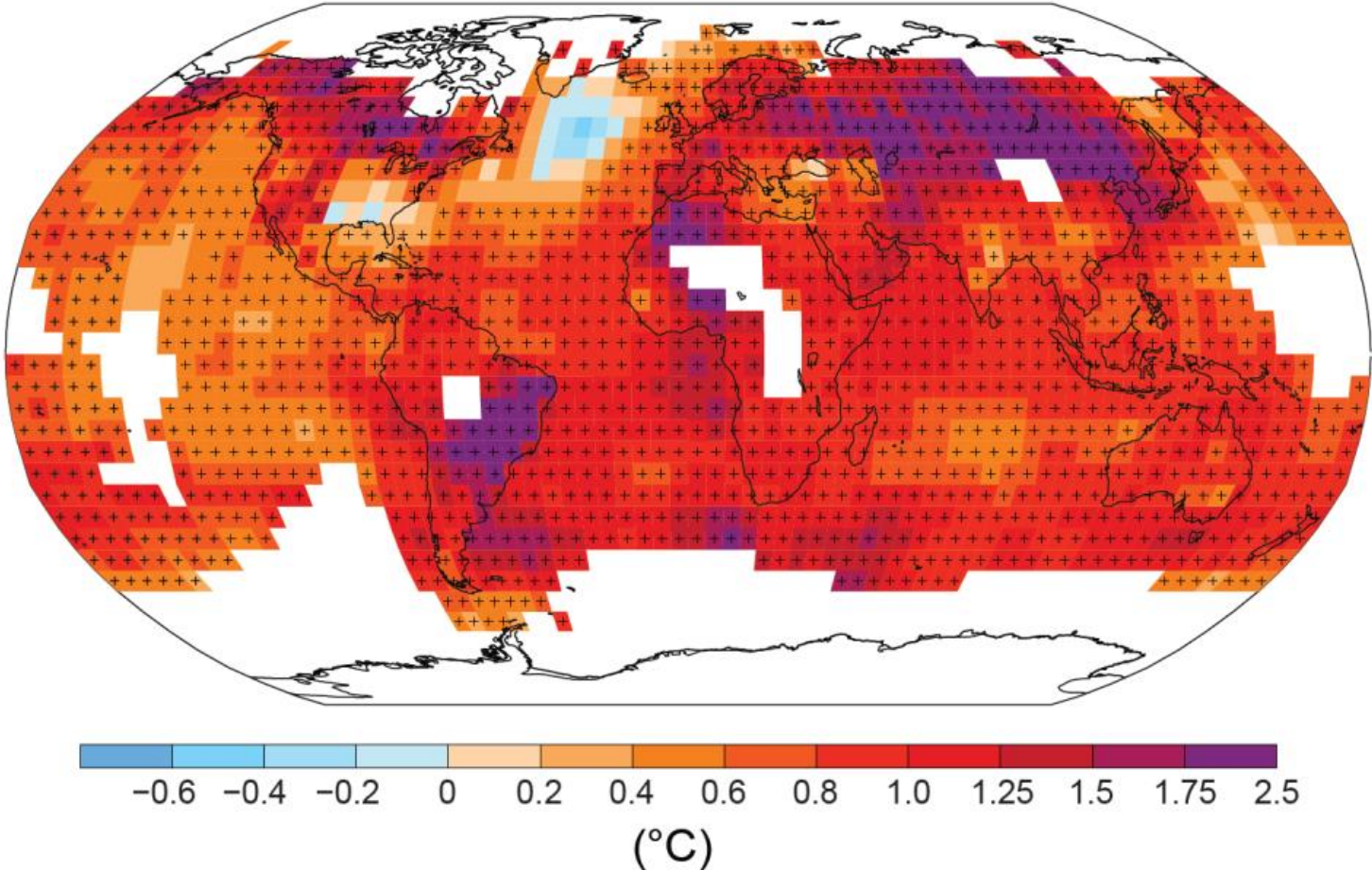
Chapter 12 Long-term Climate Change: Projections, Commitments and Irreversibility

Chapter 14 Climate Phenomena and their Relevance for Future Regional Climate Change

Annex I Atlas of Global and Regional Climate Projections

Temperature

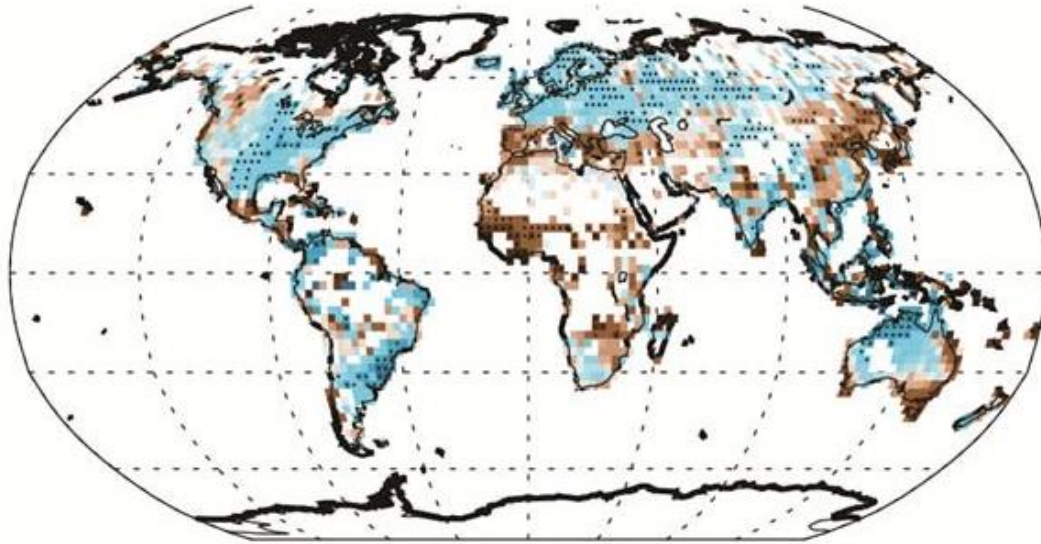
Observed change in surface temperature 1901–2012



Observed changes in Precipitation – AR4 vs. AR5

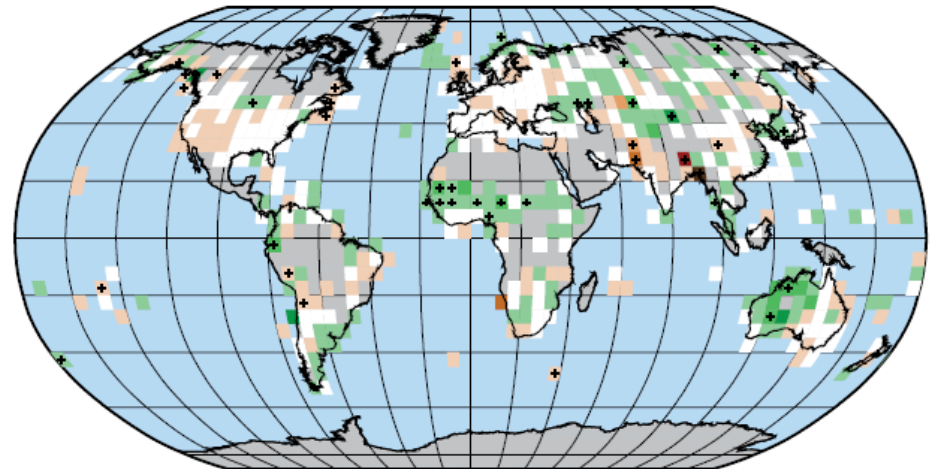
Observed Changes

1951– 2010



← AR5

Trend in Annual Precipitation, 1979 to 2005



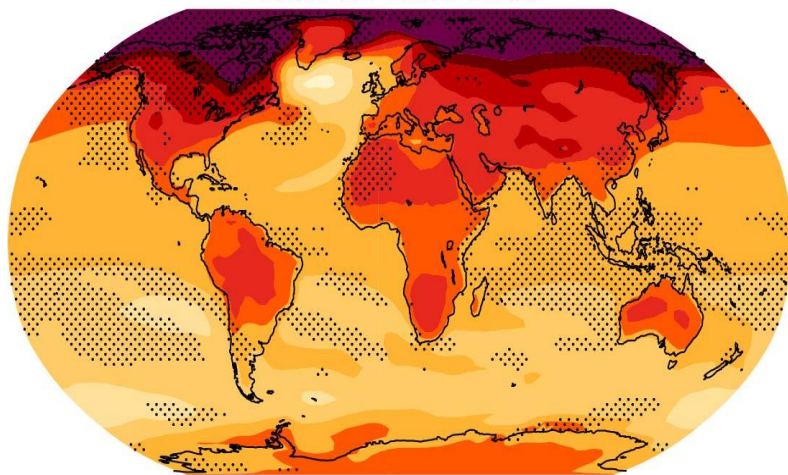
AR4 →

Projected Changes in Temperature and Precipitation

Projected Changes

temperature scaled by global T ($^{\circ}\text{C}$ per $^{\circ}\text{C}$)

CMIP5 : 2081-2100

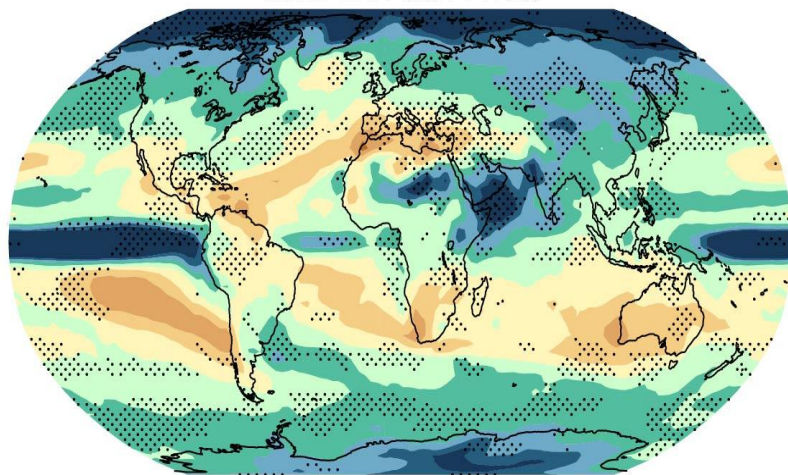


($^{\circ}\text{C}$ per $^{\circ}\text{C}$ global mean change)

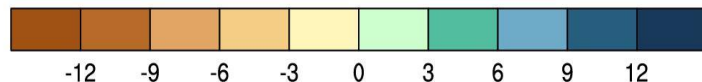


precipitation scaled by global T (% per $^{\circ}\text{C}$)

CMIP5 : 2081-2100



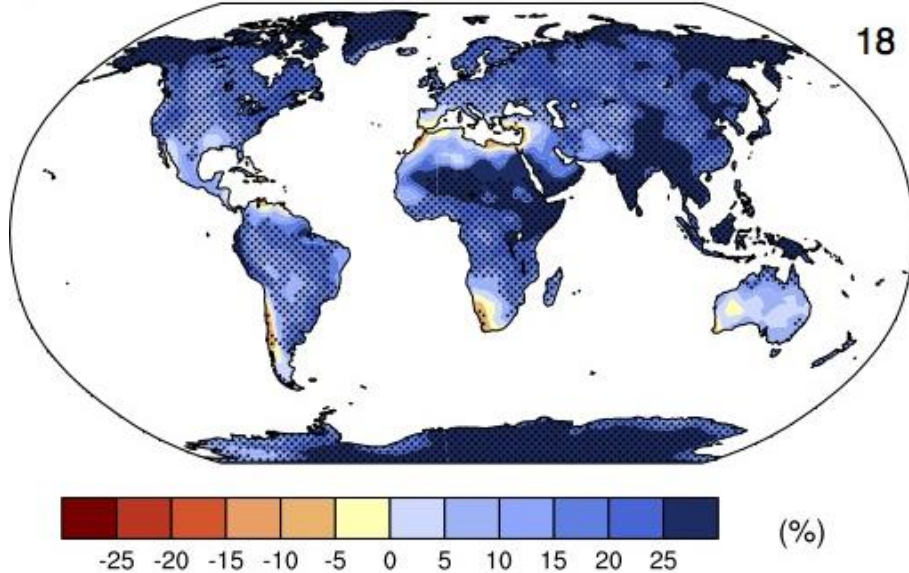
(% per $^{\circ}\text{C}$ global mean change)



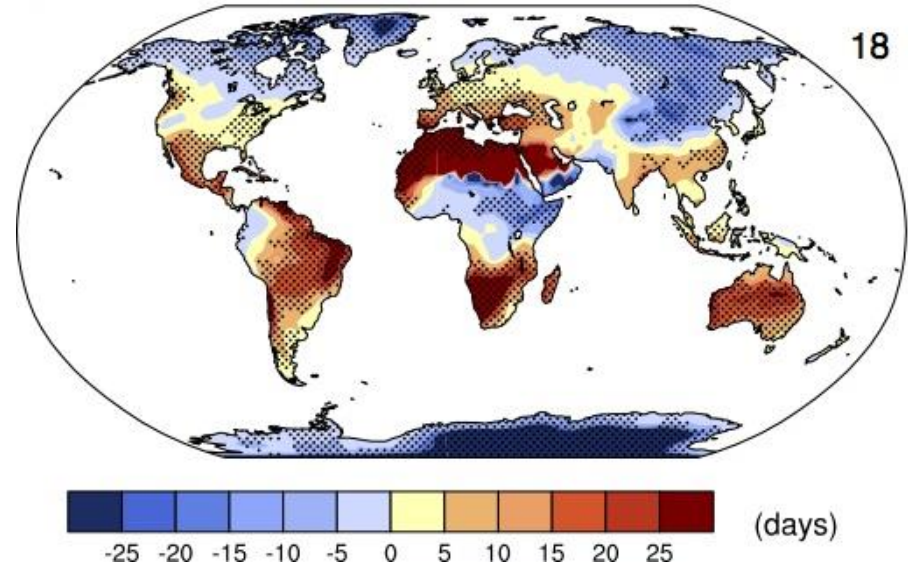
Changes in Extremes

Projected Changes

b) max. 5 day precip RCP8.5: 2081-2100



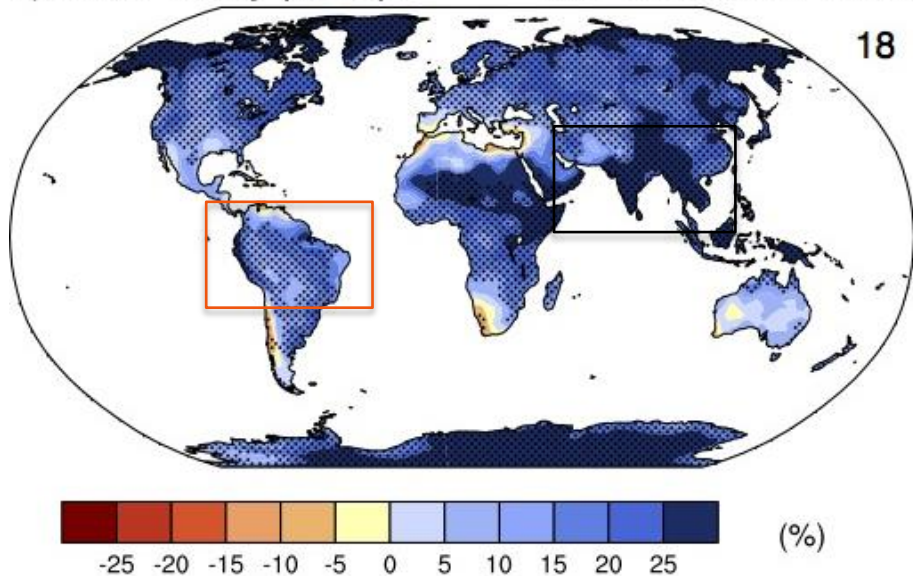
c) Consecutive Dry Days RCP8.5: 2081-2100



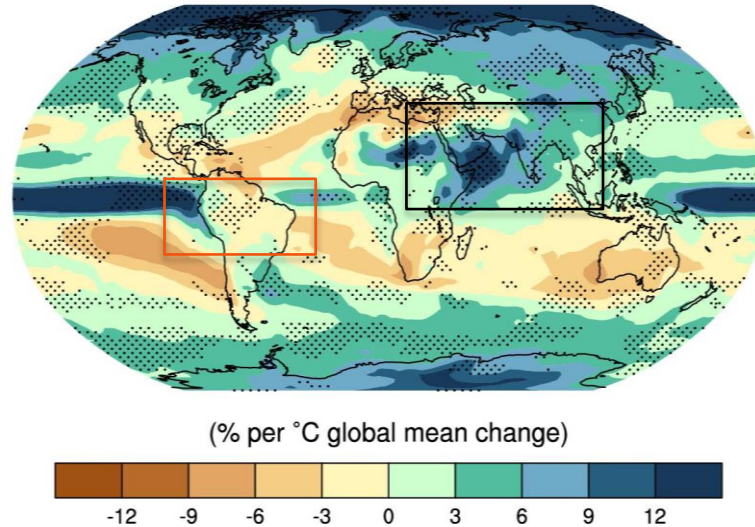
Changes in Extremes

Projected Changes

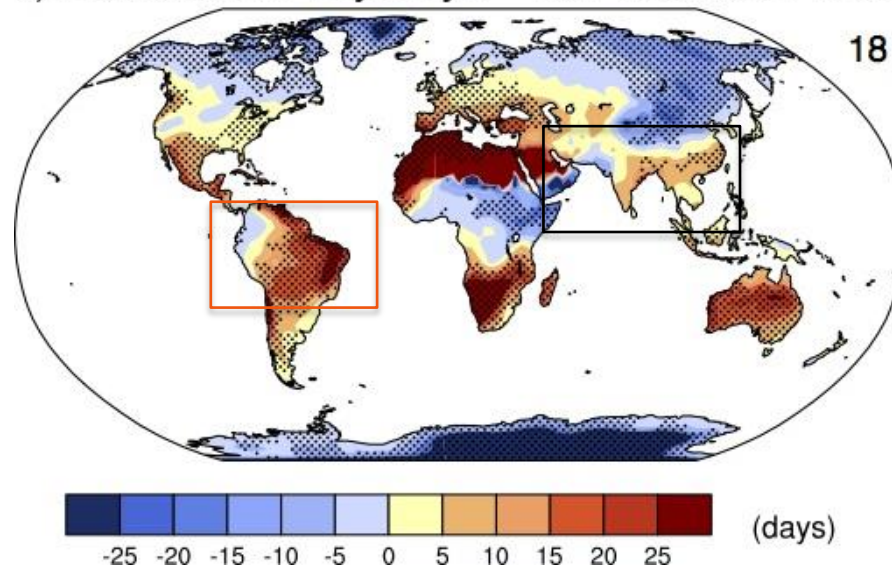
b) max. 5 day precip RCP8.5: 2081-2100



Annual Precipitation
CMIP5 : 2081-2100



c) Consecutive Dry Days RCP8.5: 2081-2100



Regional examples

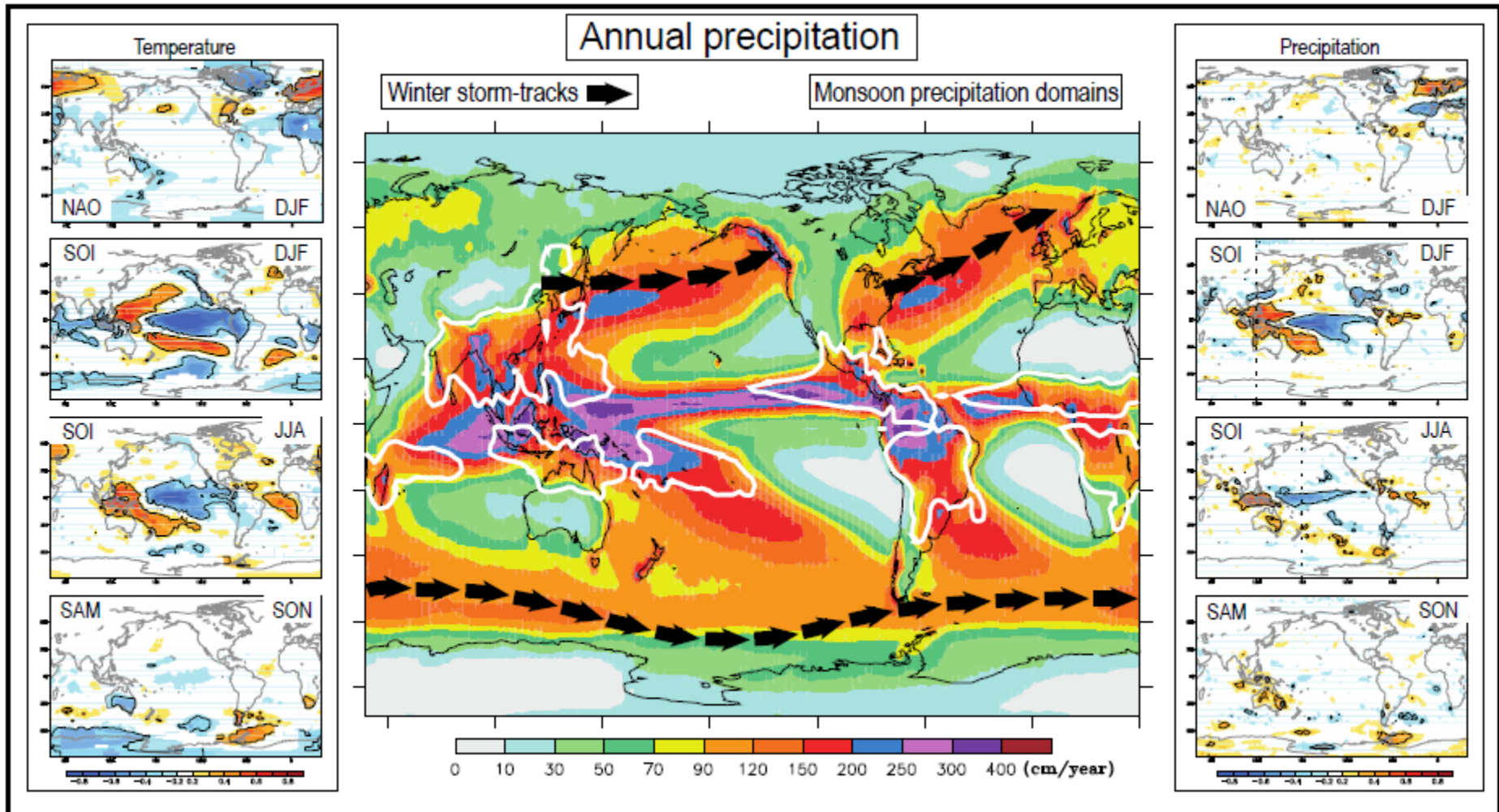
Monsoons

ENSO

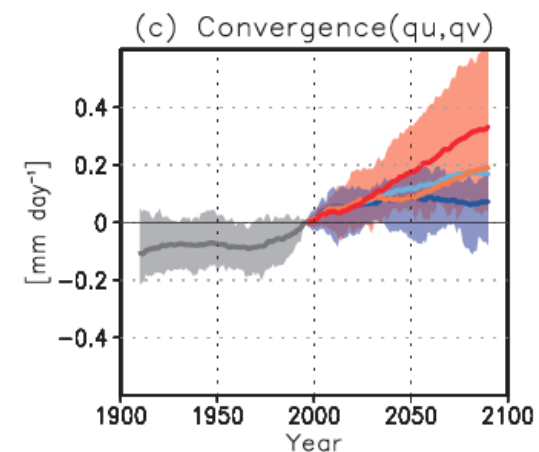
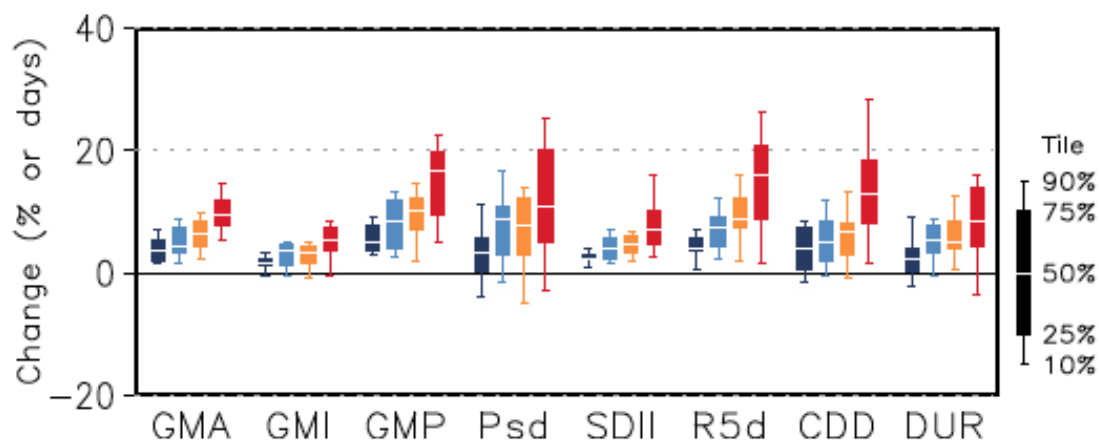
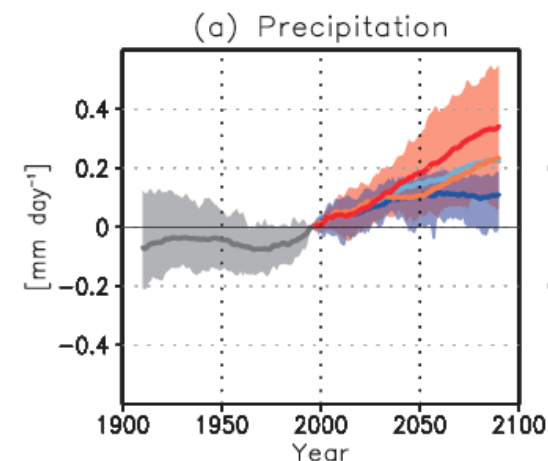
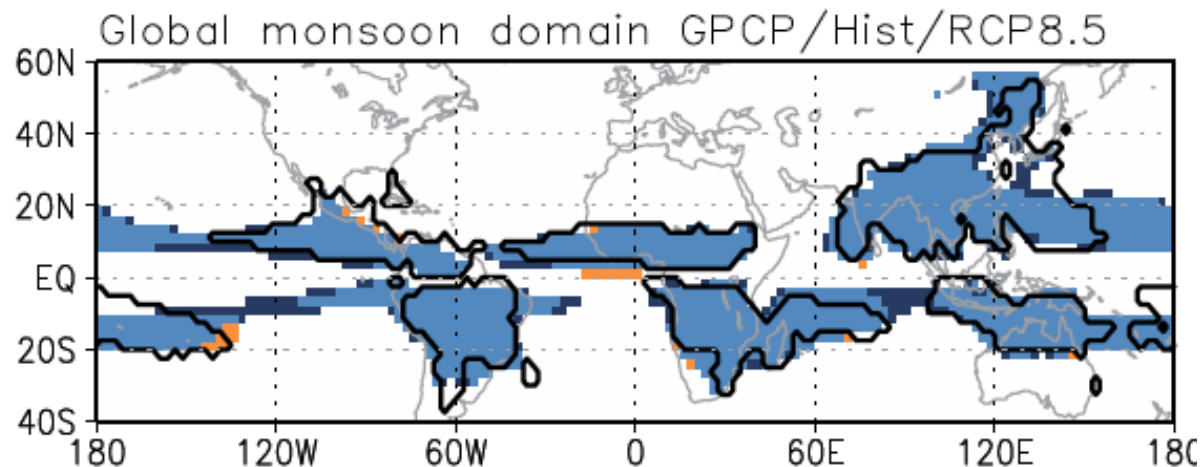
Tropical Cyclones

ATLAS

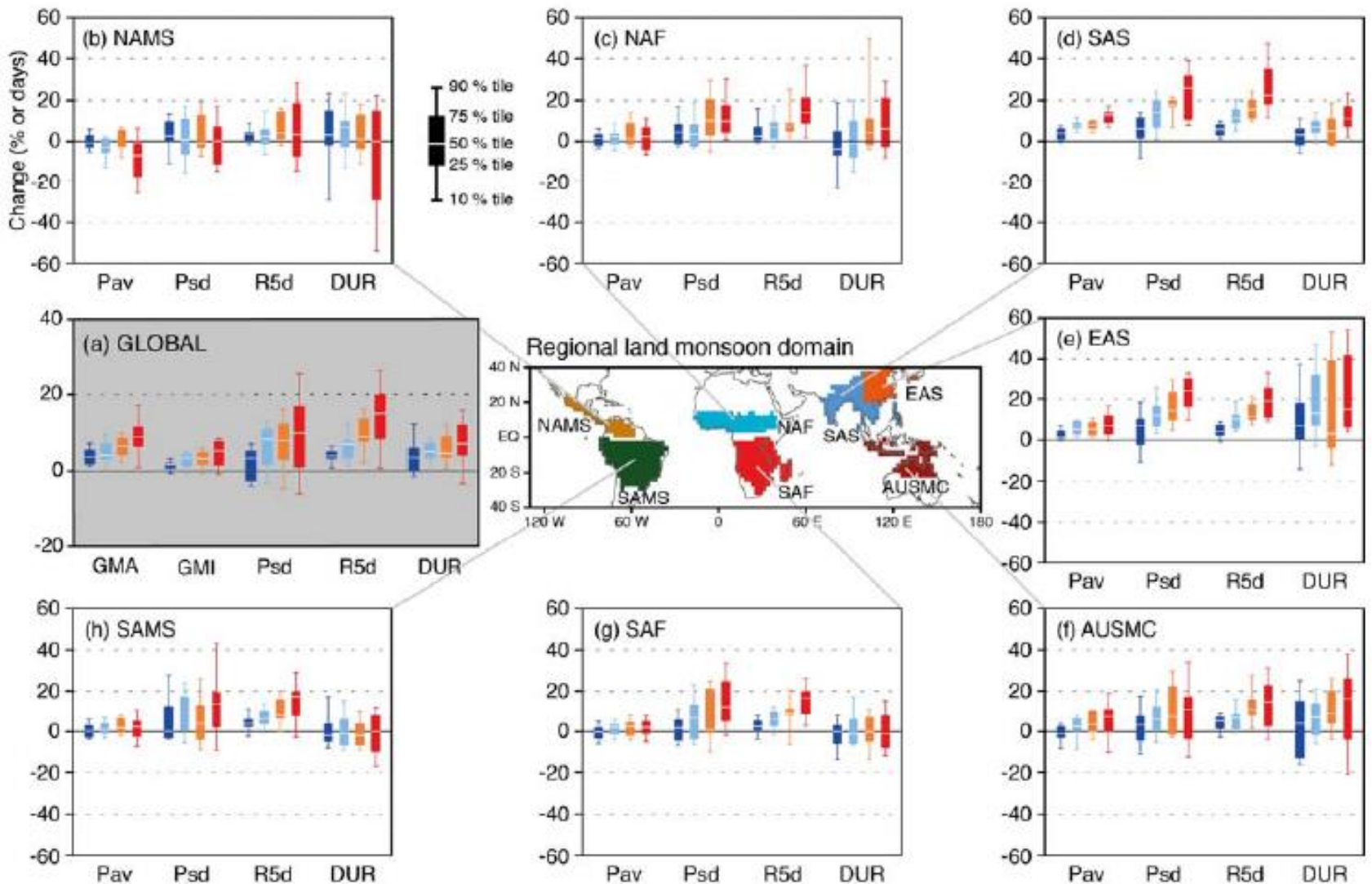
Portraying regional climate change in WGI – *through important climate phenomena*



Global Monsoon



Monsoon systems

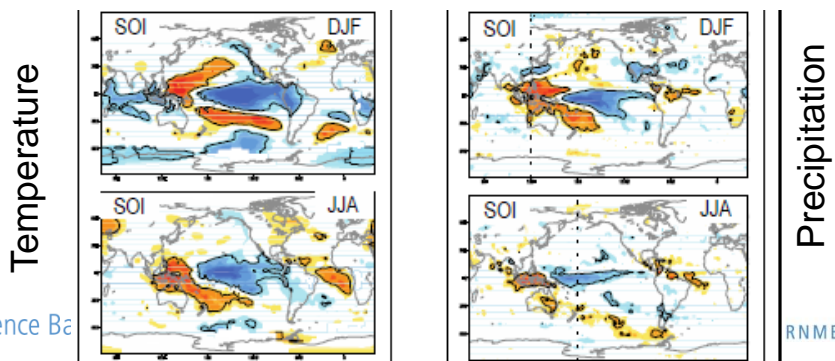
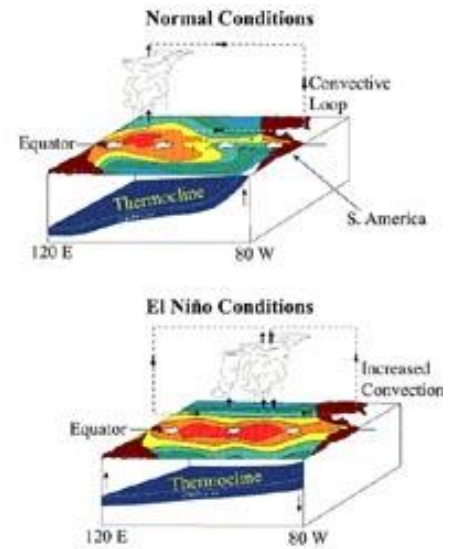
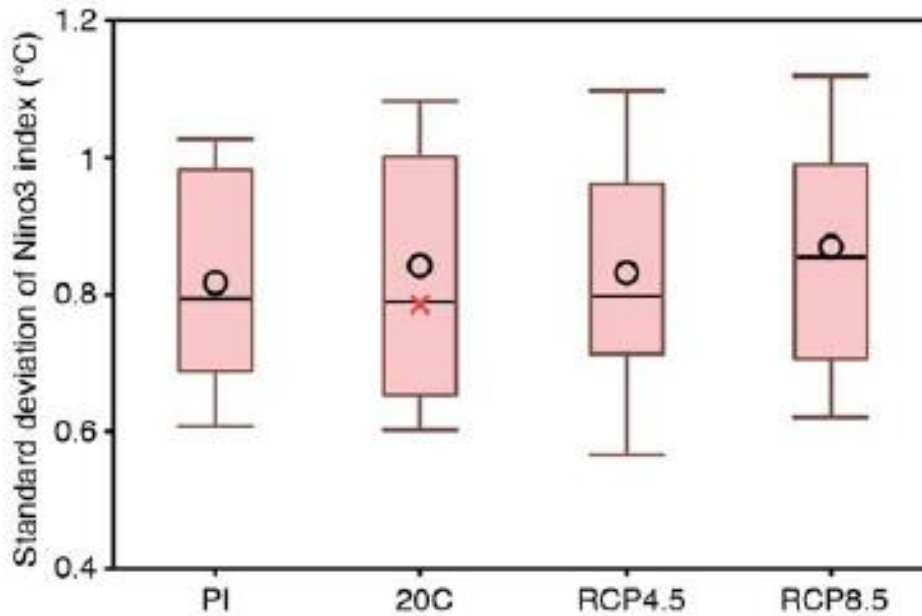


Regional Changes

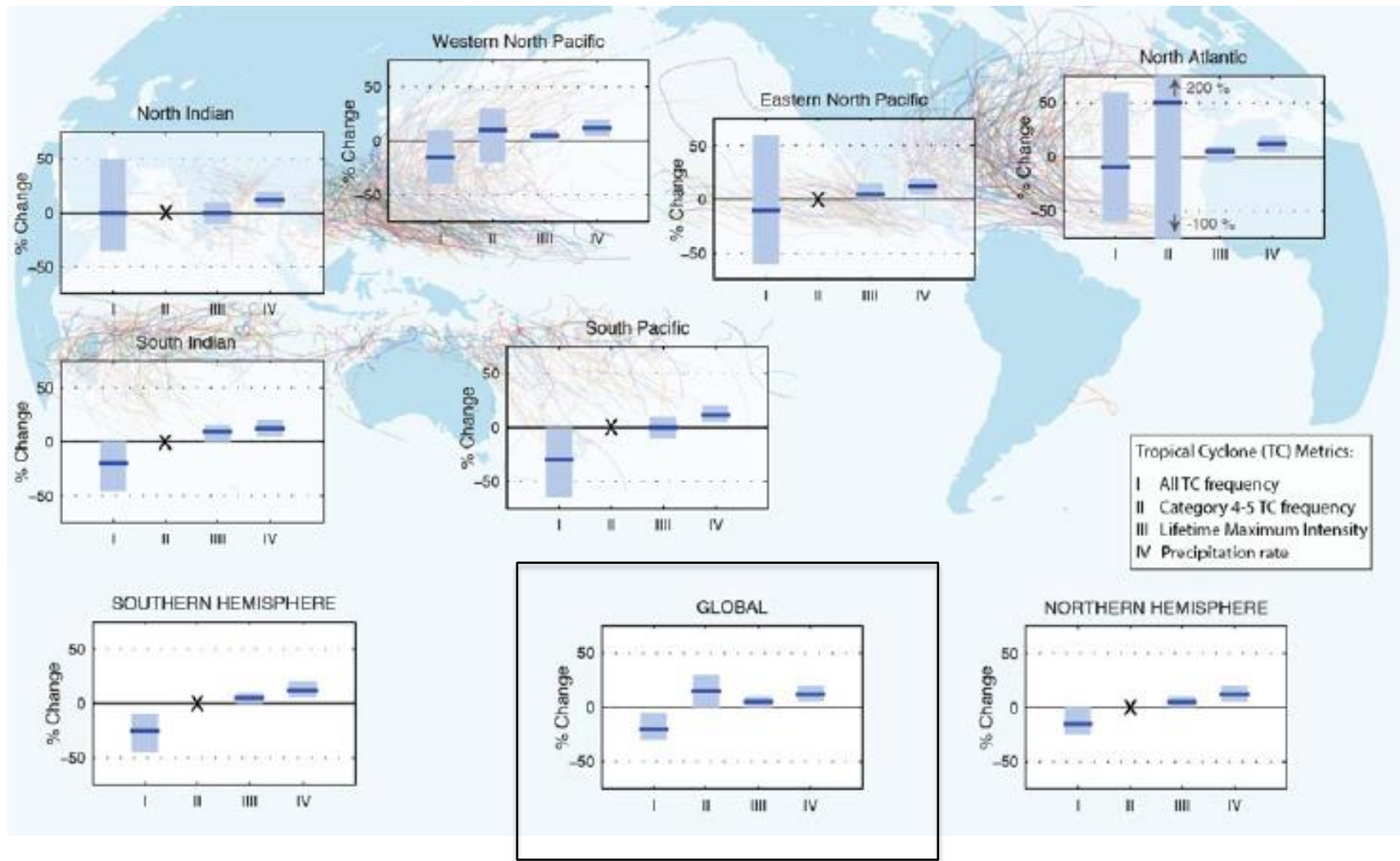
Projected Future Changes in the Variability of El Niño/Southern Oscillation (ENSO)

Regional Changes

Standard Deviation of NINO3



Tropical cyclones



Annex I: Atlas of Global and Regional Climate Projections

- ❖ **35 regions**
- ❖ **42 global climate models**
- ❖ **2 variables**
Temperature, Precipitation
- ❖ **4 scenarios**
RCPs 2.6, 4.5, 6.0, 8.5
- ❖ **2 seasons**
temp: DJF, JJA (for temp)
precip: AMJJAS, ONDJFM
- ❖ **Maps for 3 time horizons**
2016-35, 2046-65, 2081-2100

reference period 1986-2005

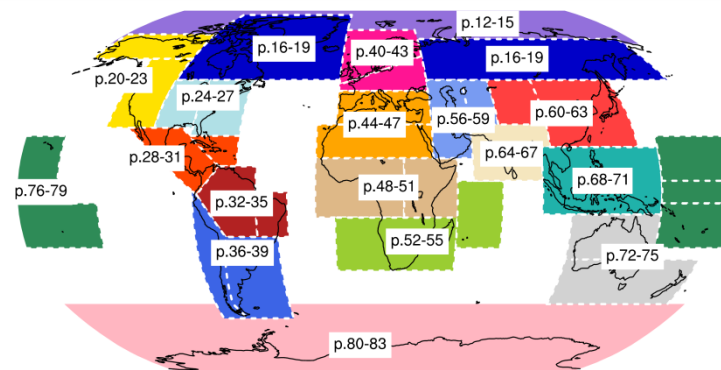
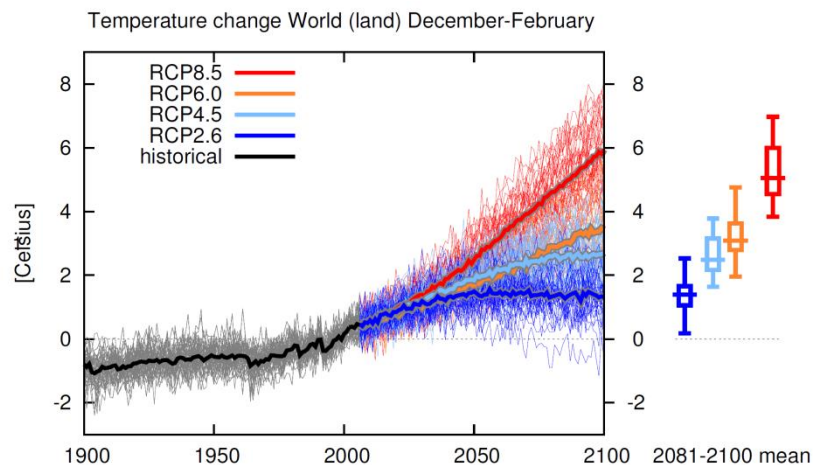


Fig. AI.3



Temperature change RCP4.5 in 2016-2035: December-February

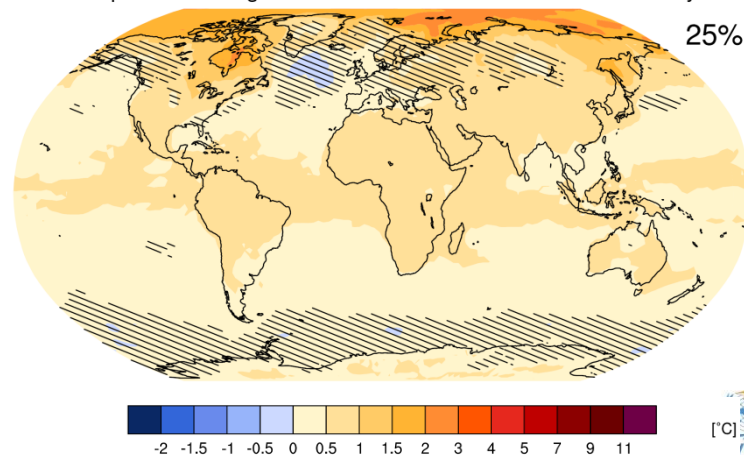


Fig. AI.4

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Further Information
www.climatechange2013.org

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