IPCC overview: reliability of regional projections

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IPCC regional predictions

- Significant temperature changes are very likely and patterns of change are becoming clear.
- Many statements are made relative to the global average warming which is still uncertain.
- Patterns of precipitation change are becoming clear for many areas but little confidence in the magnitude of the changes.
- Level of confidence/uncertainty is regionally dependent – key regions have high uncertainty.
- Information on extremes and local changes is very patchy.
Model consensus implies a level of reliability
- but need mechanisms as well
Lack of consensus implies no information –
- but assessed at grid-scale thus maybe misleading
No information on fine temporal or spatial scales
Response of All India rainfall (A1B, 2080s)

- Most models give positive change
- Change often large thus policy relevant
- Support from physical insight
Lack of consensus from model patterns

- Combination of some pattern and sign differences lead to lack of consensus
- How relevant is this if monsoon processes are captured in the models?
Winter temperature change summary

DJF Surf Temp (degC), COMPOSITE

SRESA1B minus 2OC3M

Models gt 4deg

(SRESA1B–2OC3M)/StDev

Models gt 2deg
Summer temperature change summary
NARCCAP models in an IPCC context
Winter temperature change:
NARCCAP models

**CCCMA**

**CCSM**

**GFDL**

**HadCM3**
Summer temperature change: NARCCAP models

CCCMA

CCSM

GFDL

HadCM3
Winter precipitation change summary

DJF Precip (mm/day), COMPOSITE

SRESA1B minus 20C3M

(SRESA1B−20C3M)/Control

(SRESA1B−20C3M)/StDev

Models gt 0
Summer precipitation change summary

JJA Precip (mm/day), COMPOSITE

(SRESA1B minus 20C3M)

(SRESA1B–20C3M)/Control

(SRESA1B–20C3M)/StDev

Models > 0

[Map depicting various climate change scenarios related to summer precipitation.]
Winter precipitation change: NARCCAP models

CCCMA

CCSM

GFDL

HadCM3
Summer precipitation change: NARCCAP models

CCCMA

CCSM

GFDL

HadCM3
Precipitation validation - CCCMA

DJF Precip (mm/day), CGCM3.1.T47

JJA Precip (mm/day), CGCM3.1.T47
Precipitation validation - CCSM

DJF Precip (mm/day), CCSM3

JJA Precip (mm/day), CCSM3
Precipitation validation - GFDL

DJF Precip (mm/day), GFDL-CM2.1

JJA Precip (mm/day), GFDL-CM2.1
Precipitation validation – HadCM3

DJF Precip (mm/day), UKMO–HadCM3

JA Precip (mm/day), UKMO–HadCM3

20C3M
CCM3 winter responses
(1961-90) - (2041-70)

2m T

Precip.
CCM3 summer responses
(1961-90) (2041-70) - (1961-90)

2m T

Precip.
CCCMA summer responses
(1961-90)

CGCM3 - CRU2

2m T

Precip.
CCSM response summary: 2050s – 1980s

Temperature and precipitation

[Images of temperature and precipitation maps for JJA and DJF seasons]
HadCM3 temperature: model, obs, bias
HadCM3 precipitation: model, obs, bias
GFDL model response (low/high resolution)
winter and summer surface air temperature

Near Surface Air Temperature, deg C, DJF

CM2.1 (M45)

AM2.1 (M180)

Near Surface Air Temperature, deg C, JJA

CM2.1 (M45)

AM2.1 (M180)
GFDL model response (low/high resolution)
winter and summer precipitation

Precipitation Response, percent, DJF
CM2.1 (M45)

Precipitation Response, percent, JJA
CM2.1 (M45)

AM2.1 (M180)

AM2.1 (M180)