

Climate Change : Key Messages from IPCC AR4 – Global Aspects



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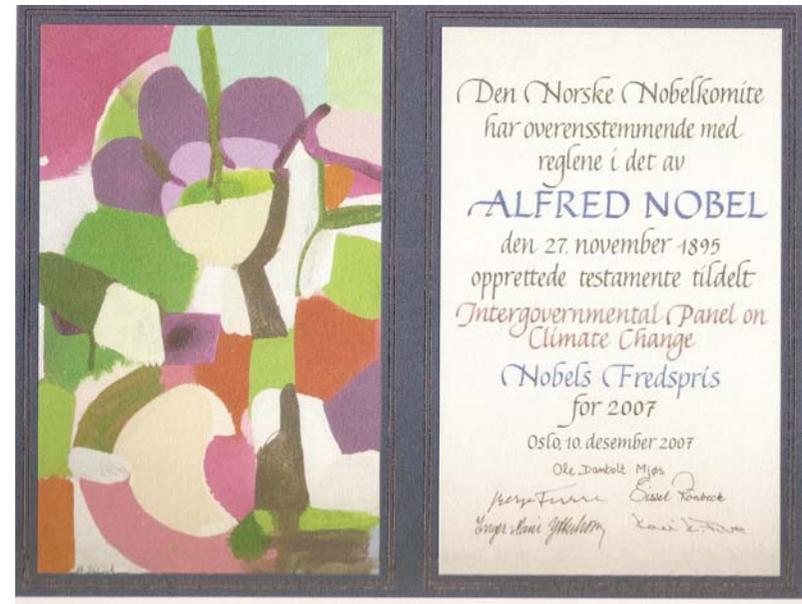
Climate and Water Department

World Meteorological Organization

Geneva, Switzerland

IPCC Assessments of Climate Change

- 3 Working Groups
 - WG1: Scientific Basis
 - WG2: Impacts, Adaptation and Vulnerability
 - WG3: Mitigation
- Hundreds of scientists spread across the world participate.
- Analyses of a large number of new models and new scenarios.
- Policy-relevant but not policy-prescriptive assessment.
- Systematic peer review and Governmental review.



IPCC WG1 AR4

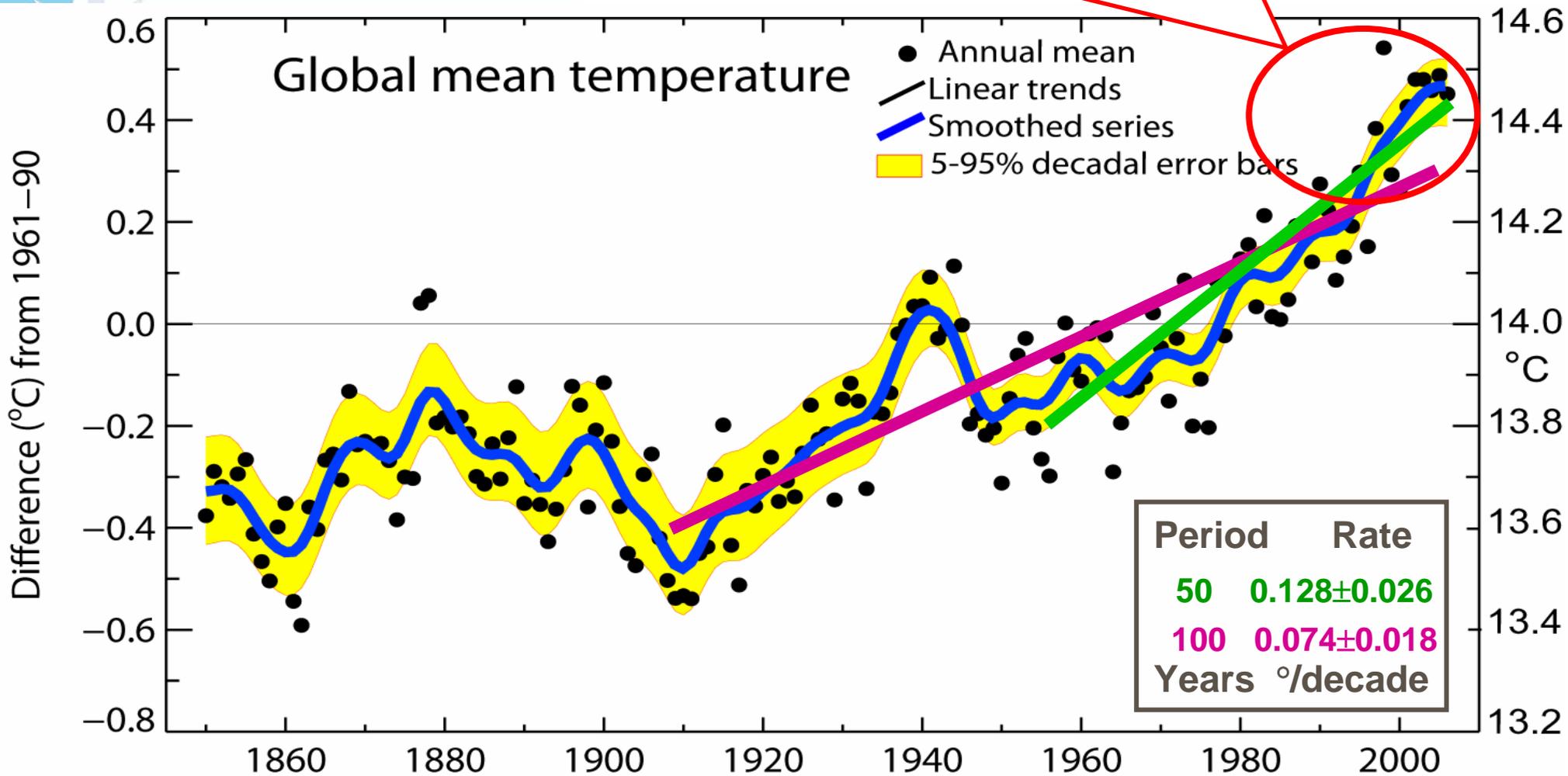
- Warming of the climate system is unequivocal.
- Widespread melting of snow and ice, and rising global average sea level.
- For the next two decades a warming of about 0.2°C per decade is projected.
- Continued greenhouse gas emissions would cause further warming and induce many changes in the climate system during the 21st century.

Direct Observations of Recent Climate Change (IPCC AR4)

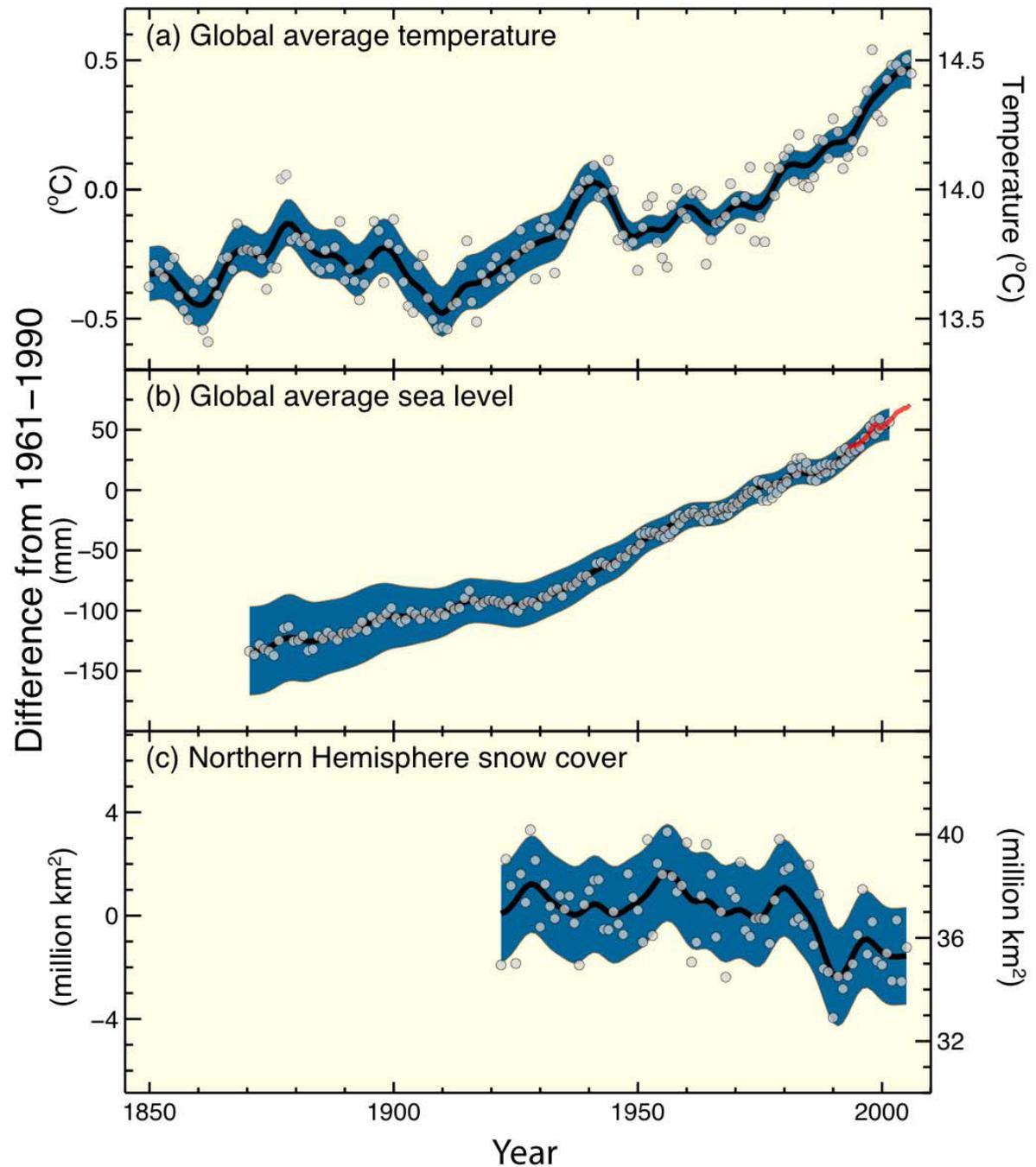
- Global average air temperature warming trend has accelerated (see, for example, the 100-year linear trends):
 - 1906-2005 : 0.74°C
 - 1901-2006 : 0.60°C
- Average ocean temperature increased to depths of at least 3000 m – ocean has absorbed 80% of heat added (sea water expansion and sea-level rise)

Global mean temperature

Warmest 12 years:
1998, 2005, 2003, 2002, 2004, 2006,
2001, 1997, 1995, 1999, 1990, 2000

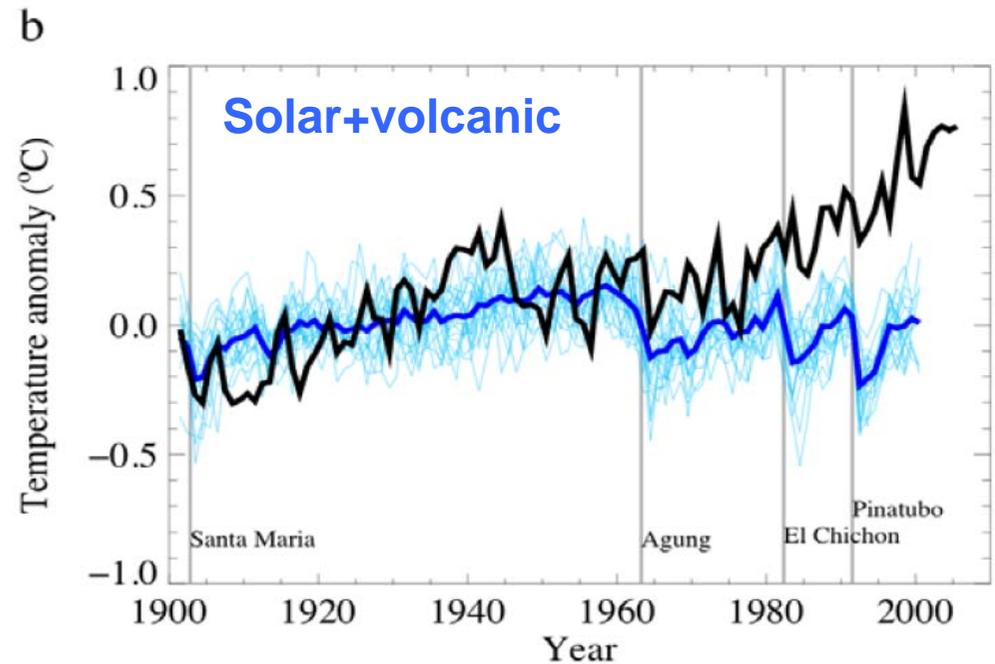
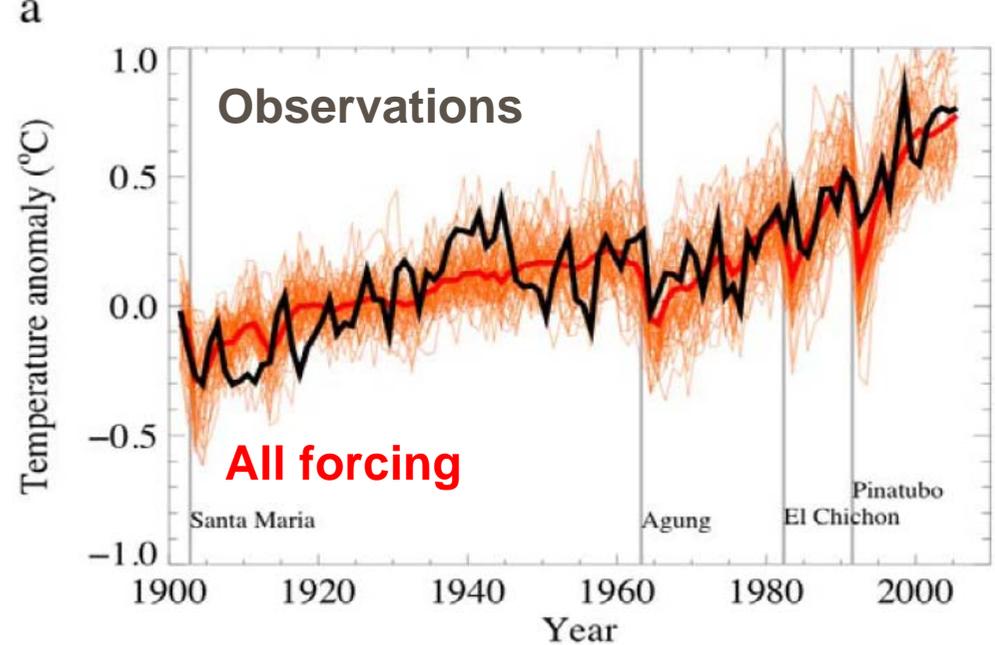


Observed Changes in Temperature, Sea Level and Northern Hemisphere Snow Cover (IPCC WG1 AR4)



Attribution

- Observed changes are
 - ☑ consistent with expected responses to natural+human forcings
 - ☒ inconsistent with alternative explanations (e.g., natural only)

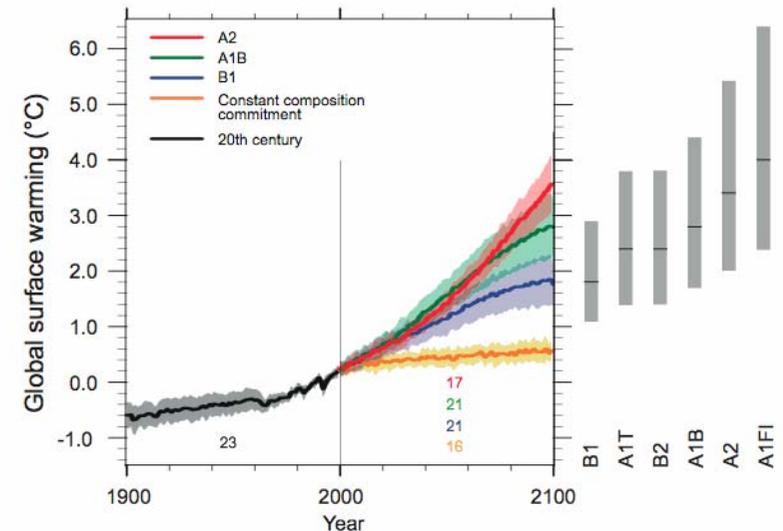


Projections of Future Changes in Climate

- Continued greenhouse gas emissions at or above current rates would
 - cause further warming
 - induce many changes in the global climate system during the 21st century
- Such changes would *very likely be* larger than those observed during the 20th century.

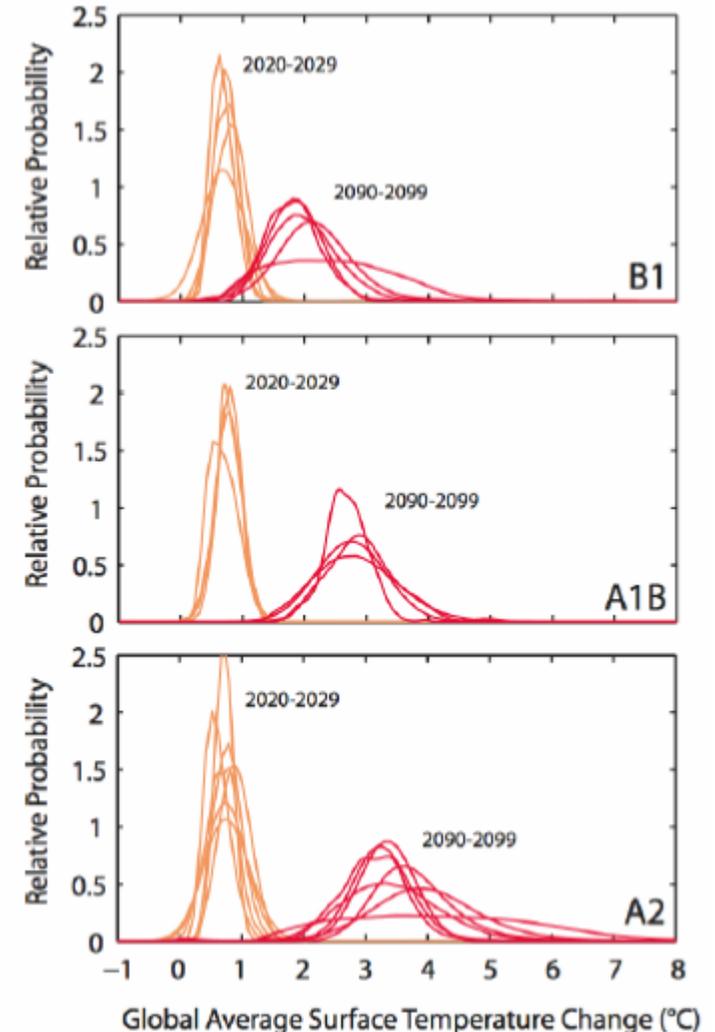
Projections of Future Changes in Climate

- Best estimate for low emission scenario (B1) is 1.8°C (likely range is 1.1°C to 2.9°C), and for high emission scenario (A1FI) is 4.0°C (likely range is 2.4°C to 6.4°C).
- Broadly consistent with span quoted for SRES in TAR, but not directly comparable



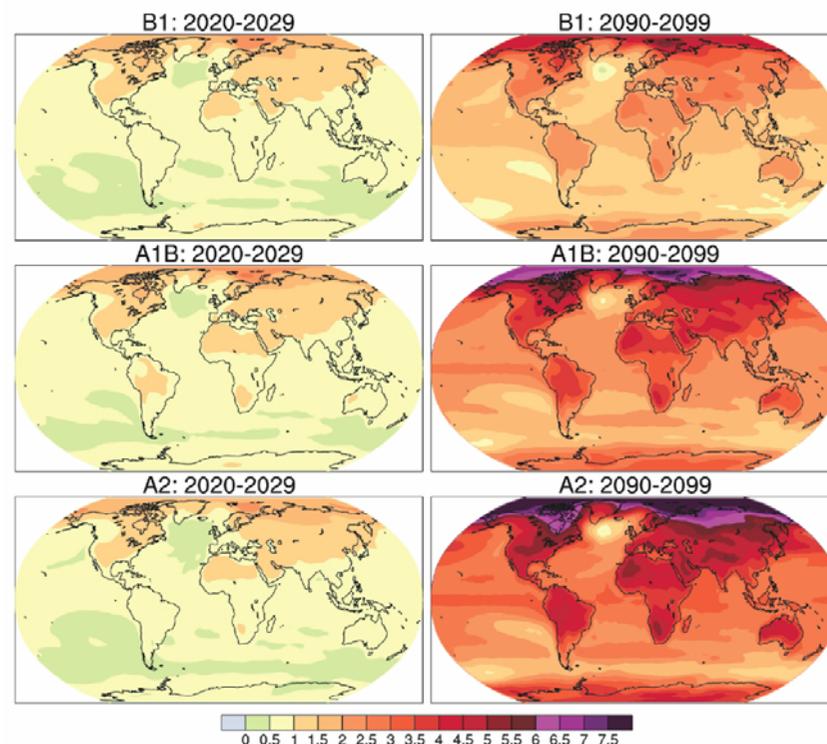
Projections of Future Changes in Climate

- Near term projections insensitive to choice of scenario
- Longer term projections depend on scenario and climate model sensitivities



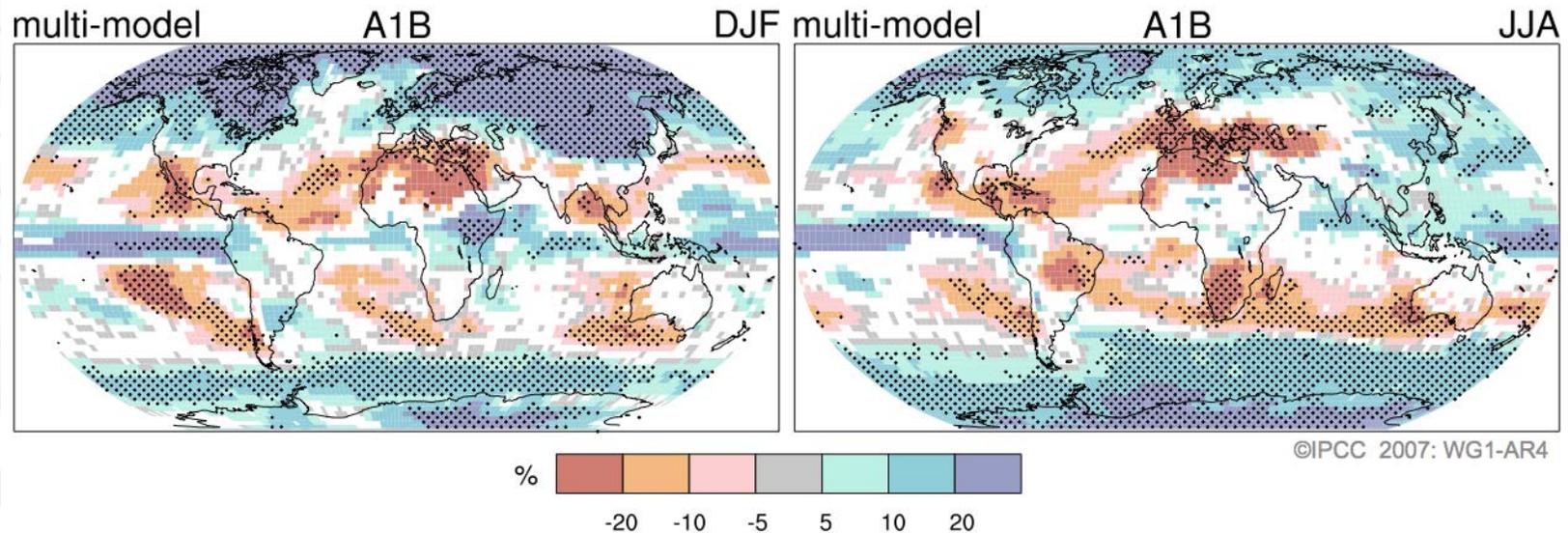
Projections of Future Changes in Climate

- Projected warming in 21st century expected to be
 - greatest over land and at most high northern latitudes; and
 - least over the Southern Ocean and parts of the North Atlantic Ocean

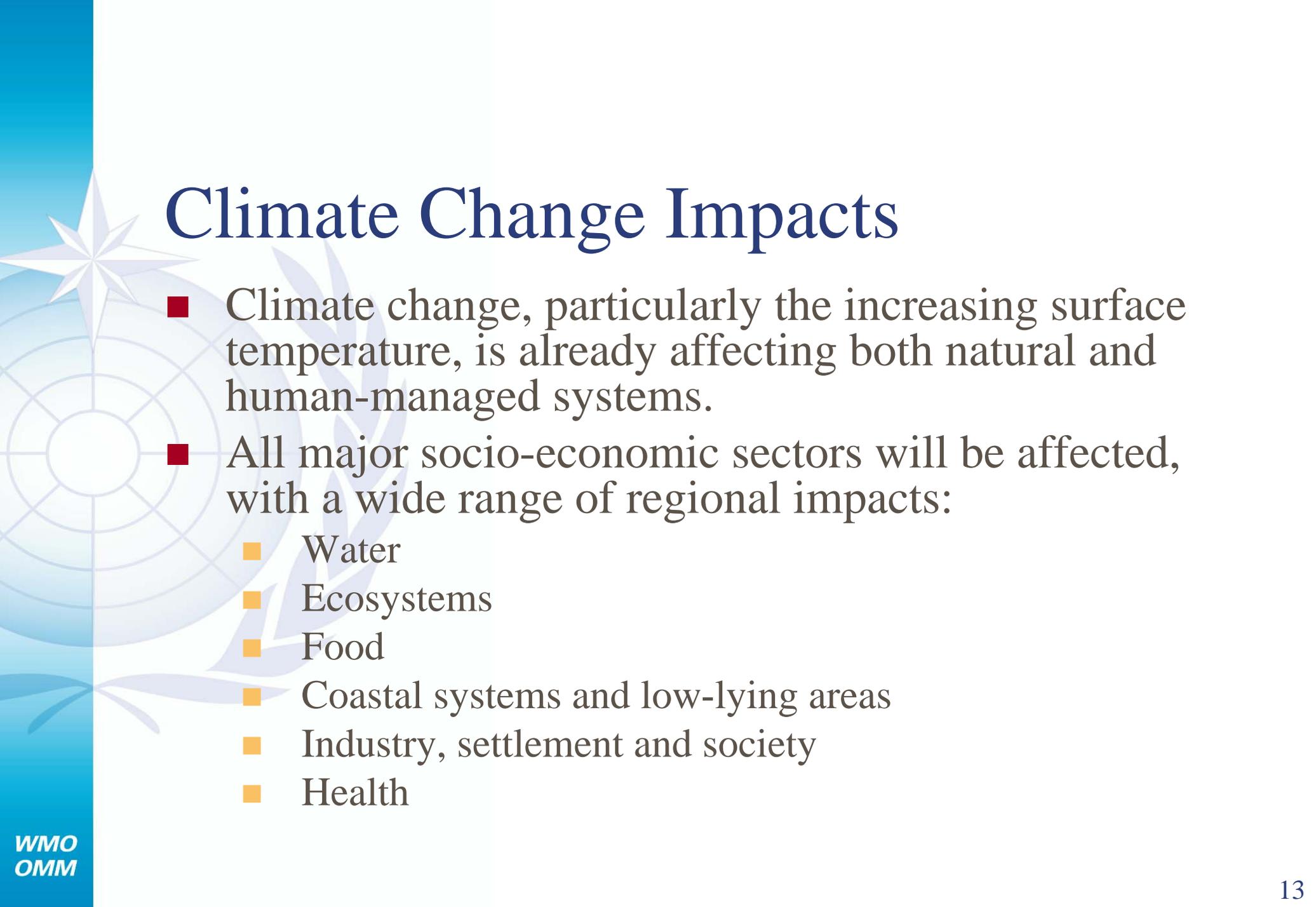


Projections of Future Changes in Climate

Projected Patterns of Precipitation Changes



- Precipitation increases very likely in high latitudes
- Decreases likely in most subtropical land regions



Climate Change Impacts

- Climate change, particularly the increasing surface temperature, is already affecting both natural and human-managed systems.
- All major socio-economic sectors will be affected, with a wide range of regional impacts:
 - Water
 - Ecosystems
 - Food
 - Coastal systems and low-lying areas
 - Industry, settlement and society
 - Health

Some key messages from WG2

- **Impacts of climate change are occurring now.**
- **Key impacts and the most vulnerable places can now be identified.**
- **There are very likely to be impacts due to altered frequencies and intensities of extreme weather, climate and sea-level events.**
- **The overall effect of climate change will be negative.**
- **Adaptation will be necessary to address impacts resulting from the warming which is already unavoidable due to past emissions.**
- **We will need a mix of adaptation and mitigation measures to meet the challenge of climate change**





Concluding Remarks

- We are already witnessing the warming of the climate system, termed “unequivocal” by global scientific consensus.
- This is unprecedented in at least the last 1300 years.
- Most of this warming has been convincingly attributed to human influence.
- Future projections of warming and other regional-scale climate patterns are gaining confidence.
- Climate change has significant and varied impacts on both natural and human-managed systems.
- Climate information needs to be integrated into decision making at all levels for sustainable development.



Thank You