

**Working Group I Contribution to the IPCC Fifth Assessment Report  
Climate Change 2013: The Physical Science Basis**

**Summary for Policy Makers**

**Technical Summary**

**Chapter 1: Introduction**

Executive Summary

- Rationale and key concepts of the WG1 contribution
- Treatment of uncertainty
- Climate change projections since FAR

Frequently Asked Questions

**Chapter 2: Observations: Atmosphere and Surface**

Executive Summary

- Changes in surface temperature and soil temperature
- Changes in temperature, humidity and clouds
- Changes in atmospheric composition
- Changes in radiation fields and energy budget
- Changes in hydrology, runoff, precipitation and drought
- Changes in atmospheric circulation, including wind
- Spatial and temporal patterns of climate variability
- Changes in extreme events, including tropical and extratropical storms

Frequently Asked Questions

**Chapter 3: Observations: Ocean**

Executive Summary

- Changes in ocean temperature and heat content
- Ocean salinity change and freshwater fluxes
- Sea level change, ocean waves and storm surges
- Ocean biogeochemical changes, including ocean acidification
- Changes in ocean surface processes
- Changes in ocean circulation
- Spatial and temporal patterns of ocean variability

Frequently Asked Questions

## **Chapter 4: Observations: Cryosphere**

### Executive Summary

- Changes in ice sheets, including mass balance
- Changes in ice shelves
- Changes in glaciers and ice caps
- Sea ice variability and trends
- Snow and ice cover variability and trends
- Changes in frozen ground
- Dynamics of ice sheets, ice shelves, ice caps, glaciers and sea ice

### Frequently Asked Questions

## **Chapter 5: Information from Paleoclimate Archives**

### Executive Summary

- Characteristics of early instrumental, documentary and natural climate archives
- Reconstruction of radiative forcing and climate response
- Reconstruction of regional variability and extremes
- Abrupt climate changes and their regional expression
- Sea level and ice sheets: patterns, amplitudes and rates of change
- Paleoclimate perspective on irreversibility in the climate system
- Paleodata-model intercomparisons

### Frequently Asked Questions

## **Chapter 6: Carbon and Other Biogeochemical Cycles**

### Executive Summary

- Past changes in CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and biogeochemical cycles
- Recent trends in global and regional sources, sinks and inventories, including land use change
- Processes and understanding of changes, including ocean acidification
- Interactions between the carbon and other biogeochemical cycles, including the nitrogen cycle
- Projections of changes in carbon and other biogeochemical cycles
- Greenhouse gas stabilisation
- Carbon cycle – climate feedbacks and irreversibility
- Geoengineering involving the carbon cycle

### Frequently Asked Questions

## **Chapter 7: Clouds and Aerosols**

### Executive Summary

- Observations of clouds and their representation in models
- Coupling of clouds, water vapour, precipitation and the large-scale circulation
- Cloud and water vapour feedbacks and their effects on climate sensitivity
- Observations of aerosols and their representation in models
- Aerosol types including black carbon: chemistry, sources, sinks and distribution
- Direct and indirect aerosol forcing and effects, including contrails and cosmic rays
- Aerosol-cloud-precipitation interactions
- Geoengineering involving clouds and aerosols

### Frequently Asked Questions

## **Chapter 8: Anthropogenic and Natural Radiative Forcing**

### Executive Summary

- Natural radiative forcing changes: solar and volcanic
- Anthropogenic radiative forcing, including effects from land surface changes
- Effects of atmospheric chemistry and composition
- Spatial and temporal expression of radiative forcing
- Greenhouse gas and other metrics, including Global Warming Potential (GWP) and Global Temperature Change Potential (GTP)

### Frequently Asked Questions

## **Chapter 9: Evaluation of Climate Models**

### Executive Summary

- The hierarchy of climate models: from global to regional
- Downscaling methods
- Assessing model performance, including quantitative measures and their use
- New model components and couplings
- Representation of processes and feedbacks in climate models
- Simulation of recent and longer term records
- Simulation of regional patterns, variability and extremes

### Frequently Asked Questions

## **Chapter 10: Detection and Attribution of Climate Change: from Global to Regional**

### Executive Summary

- Evaluation of methodologies
- Atmospheric and surface changes
- Changes in ocean properties
- Cryosphere changes
- Extreme events
- Pre-instrumental perspective
- Implications of attribution for projections

### Frequently Asked Questions

## **Chapter 11: Near-term Climate Change: Projections and Predictability**

### Executive Summary

- Predictability of interannual to decadal climate variations and change
- Projections for the next few decades
- Regional climate change, variability and extremes
- Atmospheric composition and air quality
- Possible effects of geoengineering
- Quantification of the range of climate change projections

### Frequently Asked Questions

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

### Executive Summary

- Scenario description
- Projections for the 21<sup>st</sup> century
- Projections beyond the 21<sup>st</sup> century
- Regional climate change, variability and extremes
- Forcing, response and climate sensitivity
- Climate change commitment and inertia
- Potential for abrupt change and irreversibility in the climate system
- Quantification of the range of climate change projections

### Frequently Asked Questions

## **Chapter 13: Sea Level Change**

### Executive Summary

- Synthesis of past sea level change and its components
- Models for sea level change
- Projections of globally averaged sea level rise
- Projections of the regional distribution of sea level change
- Extreme sea level events
- Potential ice sheet instability and its implications
- Multi-century projections

### Frequently Asked Questions

## **Chapter 14: Climate Phenomena and their Relevance for Future Regional Climate Change**

### Executive Summary

- Patterns of variability: observations, understanding and projections
- Monsoon systems: observations, understanding and projections
- Extremes: observations, understanding and projections
- Interconnections among phenomena

### Frequently Asked Questions

## **Annex I: Atlas of Global and Regional Climate Projections<sup>1</sup>**

## **Annex II: Climate System Scenario Tables**

## **Annex III: Glossary**

## **Annex IV: Acronyms and Regional Abbreviations**

## **Annex V: List of Authors**

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<sup>1</sup> Annex I: Atlas of Global and Regional Climate Projections will provide comprehensive information on a selected range of variables (e.g., temperature and precipitation) for a few selected time horizons (e.g., 2020, 2050, and 2100) for all regions and, to the extent possible, for the four basic RCP scenarios. Numerical fields corresponding to the figures together with the specification of the data sources and the description of how the figures were constructed will also be included. The information used in Annex I will be based on material assessed in WGI Chapters 9, 11, 12 or 14. Each Figure caption will include a reference to the location in the assessment report where the underlying information is assessed and vice versa. Each figure included in the Atlas will be assessed and reviewed as part of the underlying chapter in which it originates. The Atlas will be produced by an Editorial Team consisting of 2 members of the Lead Author Teams of each of WGI Chapters 9, 11, 12 and 14. This Editorial Team will be assisted by an Advisory Board consisting of 2 WGI Vice-Chairs and an invited member of the WGII AR5 Lead Author Team. The review process will be overseen by a Review Editor Team consisting of one Review Editor of each of WGI Chapters 9, 11, 12 and 14.