

**THIRTY-FIRST SESSION OF THE IPCC
Bali, 26-29 October 2009**

IPCC-XXXI/Doc. 19
(28.X.2009)
Agenda Item: 3
ENGLISH ONLY

**CHAPTER OUTLINE OF THE WORKING GROUP I CONTRIBUTION
TO THE IPCC FIFTH ASSESSMENT REPORT (AR5)**

**Revised version of WG-I: 11th/Doc.2 adopted by the Eleventh Session
of Working Group I**

(Submitted by the Co-Chairs of Working Group I)

**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 CO₂, CH₄, N₂O 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 21st century
- Projections beyond the 21st 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

Annex II: Glossary

Annex III: Acronyms and Regional Abbreviations

Annex IV: List of Authors

Annex V: List of Reviewers

Index