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INTERGOVERNMENTAL PANEL ON climate change

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PROPOSED CHAPTER OUTLINES OF THE WORKING GROUP I CONTRIBUTION TO THE IPCC SIXTH ASSESSMENT REPORT (AR6)

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

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Proposed chapter outlines of the Working Group I contribution to the IPCC Sixth Assessment Report (AR6)

Summary for Policy Makers

Technical Summary

Chapter 1:

Framing, context, methods

Executive Summary

- Synthesis of key findings from AR5 and connections to AR6 Special Reports
- Framing in the context of the Global Stocktake, mitigation, adaptation, and risk assessment
- Assessment approach
- Observational and reanalysis developments since the AR5
- Model and experimental design developments since the AR5
- Emissions and forcing scenarios
- Treatment of uncertainty

Frequently Asked Questions

Chapter 2:

Changing state of the climate system

Executive Summary

- Multi-millennial context, pre-industrial to present day
- Natural and anthropogenic forcings
- Radiative forcing
- Large-scale indicators of change in the atmosphere, ocean, cryosphere, land, and biosphere
- Modes of variability

Frequently Asked Questions

Chapter 3:

Human influence on the climate system

Executive Summary

- Overview of model performance and development since the AR5
- Simulated large-scale indicators of change in the atmosphere, ocean, cryosphere, land, and biosphere
- Simulated modes of variability
- Natural variability versus anthropogenically-forced change
- Attribution of large-scale observed changes

Frequently Asked Questions

Chapter 4:

Future global climate: scenario-based projections and near-term information

Executive Summary

- Projections of global mean surface temperature and other key global indicators
- Evaluation of multi-model ensemble methods
- Large scale patterns of climate change
- Commitment, climate targets, overshoot, irreversibility, abrupt change.
- Greenhouse gas removal and solar radiation management
- Interplay between internal variability and forced change

- Variability and unexpected changes of global mean surface temperature
- Near-term predictability, sources and capabilities
- Responses to short-lived forcings, including volcanoes in context of near term predictability
- Synthesis of climate information in the near-term

Frequently Asked Questions

Chapter 5:

Carbon budgets, biogeochemical cycles and feedbacks

Executive Summary

- Feedbacks between climate and biogeochemical cycles, including paleoclimate information
- Ocean acidification
- Historical trends and variability of CO₂, CH₄ and N₂O; sources and sinks
- Projections of global biogeochemical cycles from near-term to long-term
- Abrupt change, irreversibility
- Model evaluation, emergent constraints
- Transient climate response to cumulative emissions and remaining carbon budgets for climate targets
- Impacts of mitigation options including greenhouse gas removal and solar radiation management on biogeochemical cycles

Frequently Asked Questions

Chapter 6:

Short-lived climate forcings and air quality

Executive Summary

- Key emissions: natural, anthropogenic, historical and scenarios
- Observed and reconstructed concentrations and radiative forcing
- Direct and indirect-aerosol forcing
- Greenhouse gases lifetimes
- Future air pollution, including cities
- Implications of different shared socio-economic pathways

Frequently Asked Questions

Chapter 7:

The Earth's energy budget, climate feedbacks, and climate sensitivity

Executive Summary

- Energy budget and its changes through time
- Radiative forcing: definitions, estimates, and its representation in models
- Climate feedbacks
- Sensitivity of the climate system: methods and uncertainty
- Empirical constraints on the sensitivity of the climate system, including paleoclimate
- Global warming potential, global temperature change potential, and other metrics

Frequently Asked Questions

Chapter 8:

Water cycle changes

Executive Summary

- Observations, models, methods and their reliability
- Past, present and projected changes, trends, variability and feedbacks in the water cycle
- Circulation, processes and phenomena affecting moisture and precipitation patterns (e.g. cloud-aerosol processes, monsoon)
- Extremes
- Changes in seasonality of natural storage and water availability
- Abrupt change
- Confidence in projections

Frequently Asked Questions

Chapter 9:

Ocean, cryosphere, and sea level change

Executive Summary

- Past and future changes in ocean circulation and properties (trends, variability and extremes)
- Past and future changes in marine and terrestrial cryosphere
- Evaluation of models and projection methods
- Detection and attribution
- Past global and regional sea level changes
- Projections of global and regional sea level change
- Abrupt change and long-term commitment
- Extreme water levels (tides, surge and ocean waves)

Frequently Asked Questions

Chapter 10:

Linking global to regional climate change

Executive Summary

- Regional phenomena, drivers, feedbacks and teleconnections
- Regional scale observations and reanalyses
- Interplay between internal variability and forced change at the regional scale, including attribution
- Evaluation of methods, including downscaling and bias adjustment
- Confidence in regional climate information, including quantification of uncertainties
- Scale specific methodologies e.g. urban, mountains, coastal, catchments
- Approaches to synthesizing information from multiple lines of evidence

Frequently Asked Questions

Chapter 11: Weather and climate extreme events in a changing climate

Executive Summary

- Event type definitions including weather and climate timescales and compound events
- Observations for extremes and their limitations, including paleo
- Mechanisms, drivers and feedbacks leading to extremes
- Ability of models to simulate extremes and related processes
- Attribution of changes in extremes and extreme events
- Assessment of projected changes of extremes and potential surprises
- Case studies across timescales

Frequently Asked Questions

Chapter 12:

Climate change information for regional impact and risk assessment

Executive Summary

- Framing: physical climate system and hazards
- Region-specific integration of information, including confidence
- Information (quantitative and qualitative) on changing hazards: present day, near term and long term
- Region-specific methodologies
- Relationship between changing hazards, global mean temperature change, scenarios and emissions

Frequently Asked Questions

ANNEXES

Options for cross-WG integration including Regional Atlas

Cross Working Group Glossary

Technical Annexes

List of Acronyms

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