KNOWLEDGE GAPS IN AR5

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ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

PHYSICAL SCIENCE BASIS

KEY UNCERTAINTIES - EXAMPLES

- Tropical cyclone frequency and intensity
- Changes in the Antarctic (warming, sea ice extent)
- Precipitation changes and trends in drought or dryness
- Global mean sea level rise and ice sheet dynamics
- Aerosol cloud interaction and carbon cycle feedback

PHYSICAL SCIENCE BASIS

CHALLENGES FOR

CLIMATE RESEARCH AND ASSESSMENT

- Regional modeling with a focus on the water cycle
- Statistics of extreme events, quantification of the tails
- Detection and Attribution of regional changes
- Spatial quantification of vulnerability and exposure for a well chosen set or variables

PHYSICAL SCIENCE BASIS

CHALLENGES FOR

CLIMATE RESEARCH AND ASSESSMENT

- Maintenance and upgrade of high-quality, high-density observation networks
- Accessibility and manageability of massive amounts of numerical data from of climate model simulations
- Climate research in the regions: capacity still limited

IMPACTS, ADAPTATION & VULNERABILITY

FUTURE RISKS - EXAMPLES

- Information about risks of large temperature increase is still limited
- Few quantitative estimates of global economic impacts for additional warming above 3 degrees
- Limited information on low probability, high consequence events and tipping points

IMPACTS, ADAPTATION & VULNERABILITY

ADAPTATION

- Few evaluation of adaptation have addressed implementation processes or actual adaptation actions

- There is a need for a better assessment of global adaptation costs, funding and investment

IMPACTS, ADAPTATION & VULNERABILITY

REGIONAL ASPECTS

- Geographic disparities persist in available evidence for assessing climate change impacts.

- Continued unequal distribution of publications remains a challenge for comprehensive, balanced assessment.

MITIGATION

KNOWLEDGE GAPS – EXAMPLES

- Improved understanding of system integration aspects for power grids
- Role of infrastructure and lock-in effects
- Scale of the contribution of cities and human settlements
- Interaction between climate change policies and broader resource use issues
- Historic emissions and energy data with appropriate sectoral and regional resolution

MITIGATION

UNDERSTANDING
HUMAN CHOICE PROCESSES

- Cross-cultural differences in human perceptions and reactions to climate change

- How do individuals and their social preferences respond to policy instruments

MITIGATION

COSTS

- Integration of micro- and macro-economic approaches
- Improved damage functions and estimates of social costs of carbon that closer connect to estimates of physical impacts across sectors
- Co-benefits and adverse side-effects

MITIGATION

POLICY ANALYSIS

- Ex-post analysis of existing climate change mitigation policies and other regulation

- Interaction of multiple policy instruments -> environmental effectivness, economic efficiency, distributional aspects

MODELING EFFORTS ACROSS COMMUNITIES

- Coordinated model inpercomparison projects (MIP) accross topics of three WGs

- More comprehensive integration of results from ESM, IAM and IAV communities -> scenario process
  - Broader set of socio-economic and technology storylines
  - More focus on alternative formulation of climate goals (e.g. Temperature)
  - Integration of mitigation and adaptation
  - New, improved representations of regions.

- Coupling of economic models