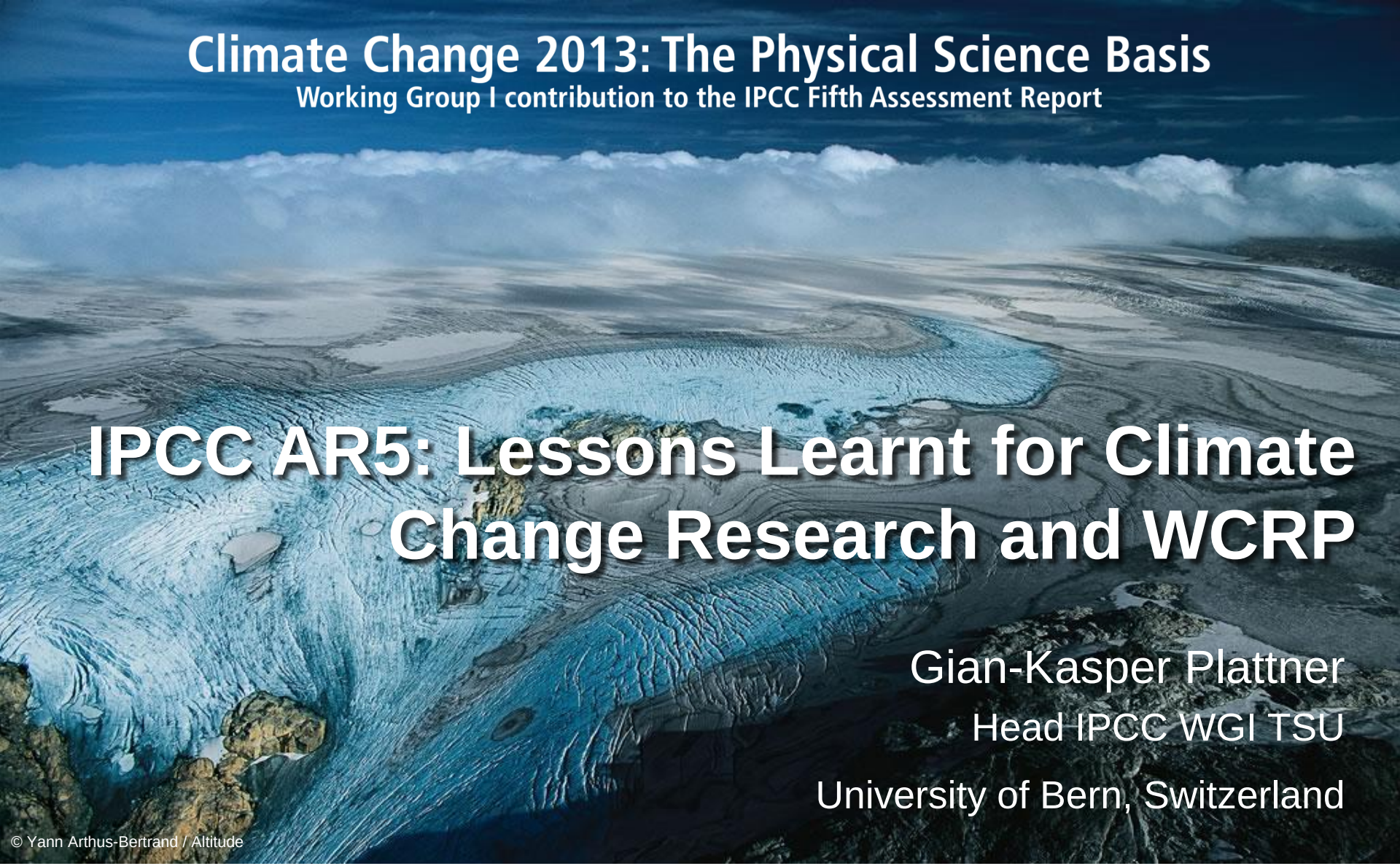

IPCC AR5: Lessons Learnt for Climate Change Research and WCRP

Gian-Kasper Plattner
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WMO UNEP

The 5th IPCC Assessment Report 2008 - 2014

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INTERGOVERNMENTAL PANEL ON climate change
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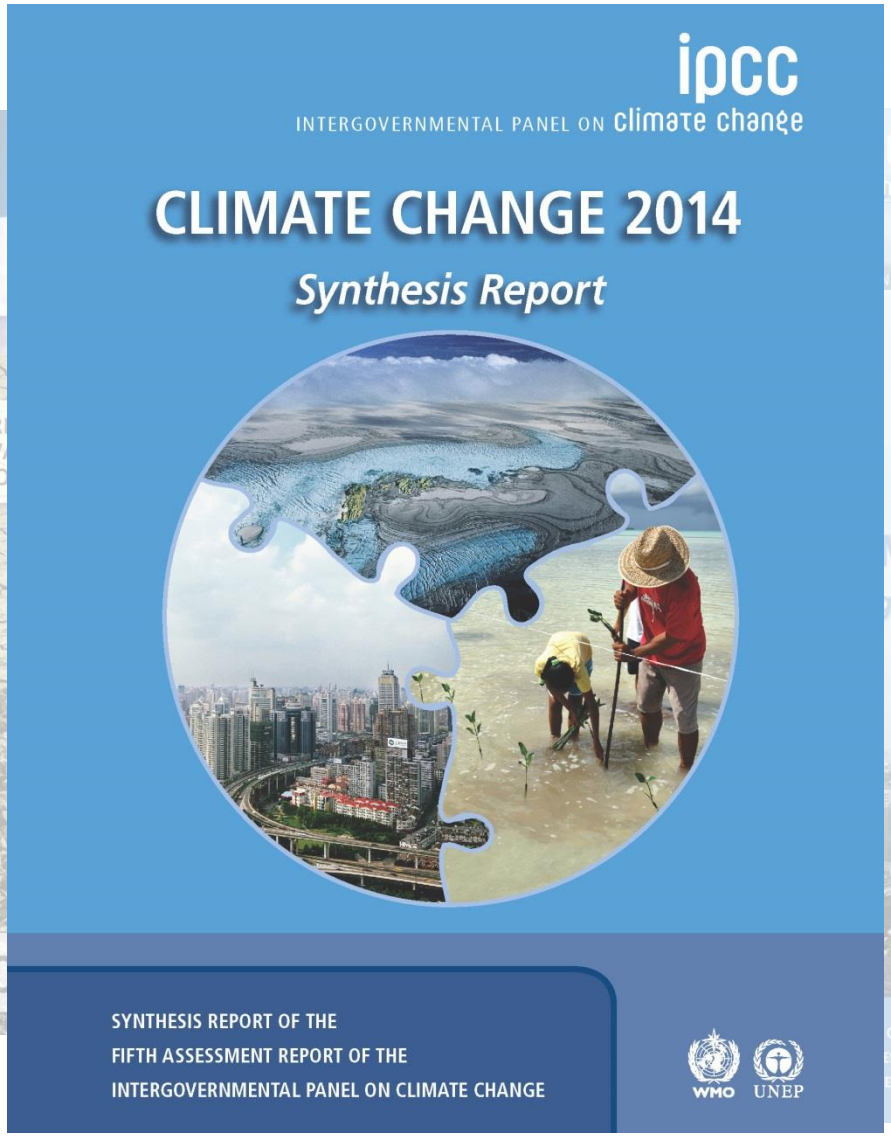
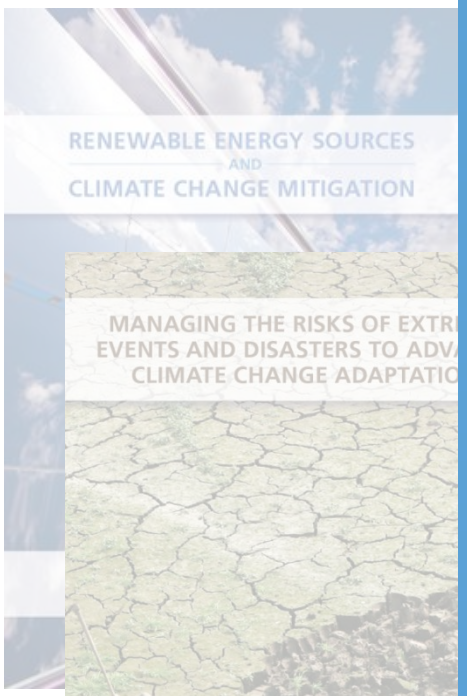
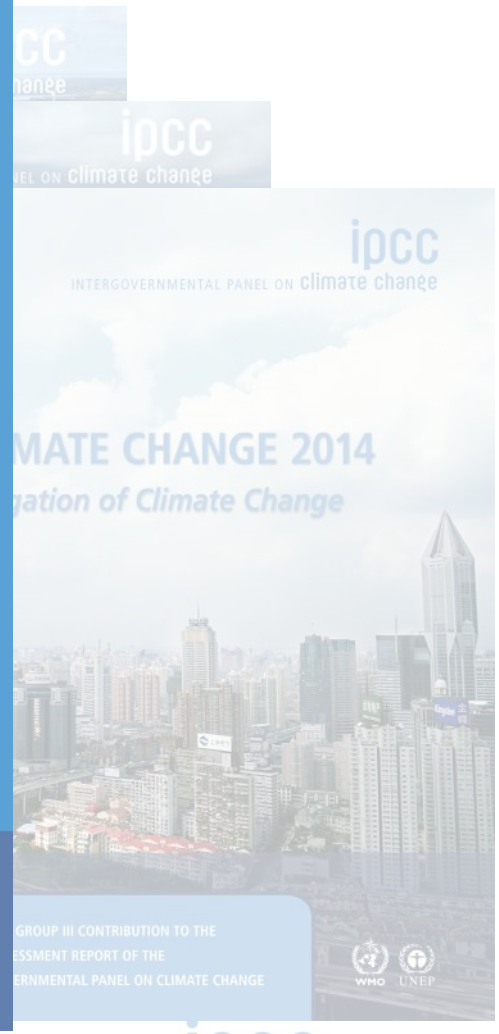
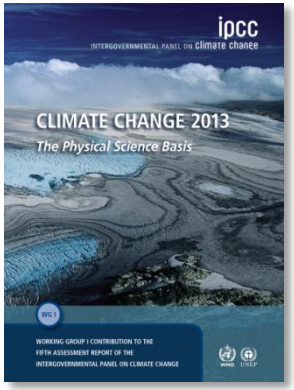
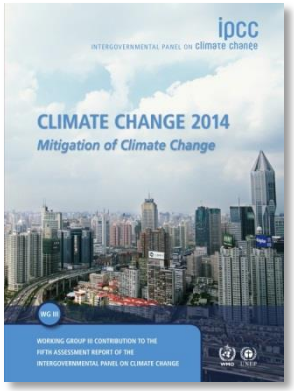
The 5th IPCC Assessment Report 2008 - 2014











Human influence on the climate system is clear.

Changes in climate have caused impacts in natural and human systems.

Continued GHG emissions will cause further warming and amplify existing risks.

Multiple pathways exist to *likely* limit warming to below 2°C.

UNEP

Outline

- A Brief Synthesis of the IPCC AR5
- Lessons Learnt from IPCC AR5:
  Report from the WCRP – IPCC Workshop, Bern 2014
- One Question, One Challenge
- On the Future of the IPCC

Lessons Learnt from IPCC AR5: a Joint WCRP – IPCC Workshop

(Photo courtesy of Saliba Saliba, ISSI)

More Information

http://www.wcrp-climate.org/ipcc-wcrp-about

Lessons Learnt from IPCC AR5: Purpose

- *From an IPCC point of view*
  - What worked and what could be improved?
  - Is the science community ready for 2020 and beyond?
  - Is the IPCC process ready to receive the best science?

- *From a WCRP point of view*
  - Take stock of key scientific issues identified through the IPCC assessment in WCRP's research plans.
  - Help the scientific community to identify new research directions and priorities and perhaps to develop new research programs.
  - Use this opportunity for WCRP to define ways to help IPCC in its future assessments.

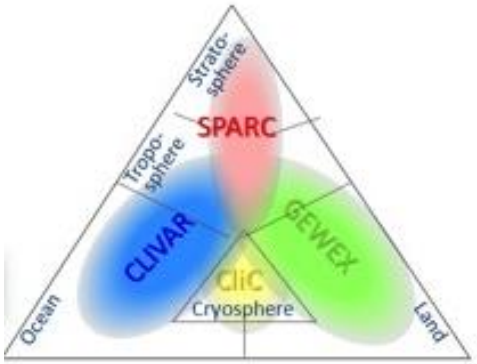
WCRP
World Climate Research Programme

WCRP Organization

Joint Scientific Committee | **Joint Planning Staff**

Modeling Advisory Council | **Data Advisory Council**

Working Groups on: Coupled Modelling (WGCM), Regional Climate (WGRC), Seasonal to Interannual Prediction (WGSIP), Numerical Experimentation (WGNE)



CliC	CLIVAR		GEWEX	SPARC
Cryosphere-Climate Interactions	Ocean-Atmosphere Interactions	Regional Climate Information	Land-Atmosphere Interactions	Troposhere-Stratosphere Interactions
		Sea-Level Rise and Regional Impacts		
		Cryosphere in a Changing Climate		
		Changes in Water Availability		
		Clouds, Circulation and Climate Sensitivity		
		Climate Extremes		

WMO IOC ICSU

IPCC AR5 Working Group I Outline

Overview of topical groups of chapters in WGI of AR5:

❖ Introduction	**Chapter 1**
❖ Observations and Paleoclimate Information	**Chapters 2, 3, 4, 5**
❖ Process Understanding	**Chapters 6, 7**
❖ From Forcing to Attribution of Climate Change	**Chapters 8, 9, 10**
❖ Future Climate Change and Predictability	**Chapters 11, 12**
❖ Integration	**Chapters 13, 14**
❖ Atlas Global & Regional Climate Projections	**Annex I**

14 Chapters &
Atlas of Global and Regional Climate Projections

Lessons Learnt from IPCC AR5: a Joint WCRP – IPCC Workshop

- Organized jointly by the Joint Scientific Committee of WCRP and by IPCC Working Group I
- "IPCC AR5: Lessons Learnt for Climate Change Research and WCRP"
- *Location:* International Space Science Institute, Bern, Switzerland 8–10 September 2014
- Meeting report WCRP No. 5, 2015
- Scientific publication in BAMS (or similar) in preparation
- **Website: http://www.wcrp-climate.org/ipcc-wcrp-about**

(WCRP Report No. 5, 2015)

Lessons Learnt from IPCC AR5: a Joint WCRP – IPCC Workshop

- Stimulated by the successful model of the Workshop organized post AR4:
- "Future Climate Change Research and Observations: GCOS, WCRP and IGBP Learning from the IPCC Fourth Assessment Report"
- *Location:* Sidney, Australia, 4-6 October 2007.
- Meeting report GCOS-117, WCRP-127, IGBP Report No. 58, 2008.
- Publication Doherty et al., BAMS, 2008.

LESSONS LEARNED FROM IPCC AR4

Scientific Developments Needed To Understand, Predict, And Respond To Climate Change

BY SARAH J. DOHERTY, STEPHAN BOJINSKI, ANN HENDERSON-SELLERS, KEVIN NOONE, DAVID GOODRICH, NATHANIEL L. BINDOFF, JOHN A. CHURCH, KATHY A. HIBBARD, THOMAS R. KARL, LUCKA KAJFEZ-BOGATAJ, AMANDA H. LYNCH, DAVID E. PARKER, I. COLIN PRENTICE, VENKATACHALAM RAMASWAMY, ROGER W. SAUNDERS, MARK STAFFORD SMITH, KONRAD STEFFEN, THOMAS F. STOCKER, PETER W. THORNE, KEVIN E. TRENBERTH, MICHEL M. VERSTRAETE, AND FRANCIS W. ZWIERS

This view-from-above of Sydney, Australia exemplifies the close interaction between man and his environment and reminds us of the local scales over which climate change will affect human, natural, and economic systems. These relationships and how they should drive future research were discussed during a workshop held in Sydney in October, 2007. (Image courtesy of NASA/GSFC/METI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team)

The periodic assessments of the Intergovernmental Panel on Climate Change (IPCC) of the causes, impacts, and possible response strategies to climate change are the most comprehensive and up-to-date reports available on the subject and form the standard reference for all concerned with climate change in academia, government, and industry worldwide. Hundreds of international experts contributed to the IPCC's Fourth Assessment Report (AR4), which has received unprecedented attention and acclaim by policy makers, scientists, industry, and the general public.

AMERICAN METEOROLOGICAL SOCIETY APRIL 2009 BAMS | 497

(Doherty et al., BAMS, 2008l)

Lessons Learnt from IPCC AR5: Objectives

- Enable *brain-storming and informal, open and frank exchanges* between scientists involved in climate change research, research coordination, and authors contributing to the IPCC AR5.
- *Revisit key conclusions and uncertainties* reported in the IPCC AR5, primarily Working Group I, in light of ongoing climate research.
- *Assess ongoing climate research directions* in light of the IPCC AR5 key conclusions and uncertainties, in particular activities organized and coordinated by WCRP.
- Focus *on long standing and emerging scientific uncertainties* highlighted in the IPCC AR5 and consider how the WCRP core projects and Grand Challenges can help address these uncertainties.
- Potentially prepare a *set of recommendations* to WCRP on, e.g., possible new/revised research directions and/or programs and new/revised research priorities.

Lessons Learnt from IPCC AR5: Organization

- *Participants:* 76 experts, roughly half IPCC authors (mainly from WGI), half WCRP projects representatives (with quite some overlap).
- *Structure of the Meeting:*
  - Plenary presentations: by IPCC authors and by WCRP Grand Challenges leaders
  - Breakout Groups: one per WCRP Grand Challenge, plus one on "biogeochemical cycles, aerosols and chemistry", and on "decadal time-scale quantification" (attribution, prediction/predictability)
  - Survey of the climate research community: conducted by WCRP prior to the meeting as input to the discussions
- *Starting point for Discussions:*
  - IPCC WGI AR5 – Emerging themes and key uncertainties
  - WCRP Grand Challenges – Strategies to address key uncertainties
  - Impacts, risk assessment and scenario development

Lessons Learnt from IPCC AR5: Organization (continued)

Steering Questions for Breakout Groups

- What are the major gaps in understanding of the climate system revealed by the IPCC AR5 process? What are the best strategic approaches to address these scientific issues in the next 5–8 years?
- How could the community contribute to key scientific questions, uncertainties and research issues raised/identified by IPCC?
- What are the inadequacies/requirements of the current/future observing system?
- How could WCRP contribute efficiently to the preparation of the next IPCC assessments? Should WCRP produce some specific synthesis papers in preparation to these IPCC assessments and if so, on which topics?

Lessons Learnt from IPCC AR5: Key Outcomes

- The importance of *maintaining strong research links* between WCRP and other partners was reaffirmed.
- The *WCRP Grand Challenges were revisited and for some the key science questions* they will focus on over the next years were revised.
- A *good match* between goals of the WCRP Grand Challenges –and knowledge gaps identified in WGI AR5 was found.
- A need for a more comprehensive, e*nd-to-end approach for climate change assessments*, i.e., better integrating paleoclimatic evidence, observations, physical understanding, model evaluation, near and long term projections, etc., was mentioned; A number of participants stressed that WCRP would be ideally suited for conducting/leading such projects.

Lessons Learnt from IPCC AR5: Key Outcomes (continued)

Recurring topics across Breakout Groups/Panel discussions included:

- *Need for increased skill on decadal time scales*: the need for WCRP to promote and strengthen its Decadal Climate Prediction Project was repeatedly highlighted.
- *Potential for an Earth System Reanalysis project:* the need for better and more systematic sources of and access to data was emphasized repeatedly by almost all speakers/BOG reports. Such an effort could build on the enormous impact of meteorological reanalyses through a very broad effort to gather and assimilate data products from across and beyond WCRP activities.
- *Model inter-comparison projects (MIP):* the utility and persistent need for MIPs across many topics was highlighted. Yet fundamental concerns were raised about limited resources to support such continued efforts and the potential to divert the attention from more scientific questions.

Lessons Learnt from IPCC AR5: Key Outcomes (continued)

Areas where uncertainties are still substantial and which might deserve more attention in the framework of WCRP Grand Challenges are:

- *Ocean (particularly deep ocean) heating and ocean circulation*: ocean heat is identified within the sea level Grand Challenge, ocean circulation is linked to decadal prediction challenges;
- *Understanding natural variability and forced change on annual to decadal time scales*: better understanding is relevant and urgently needed for predictions of climate extremes (particularly related to water availability) and other climate impacts on regional scales;
- *Aerosols (and other short-lived climate forcers)*: improved understanding of aerosols, aerosol processes etc. is central for improved understanding and prediction of climate change on annual to decadal time scales and on local to regional spatial scales;
- *Interactive carbon cycle*: growing need to interactively include biogeochemical cycles and ecology in model and other analyses.

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Question and Challenge (my personal selection)

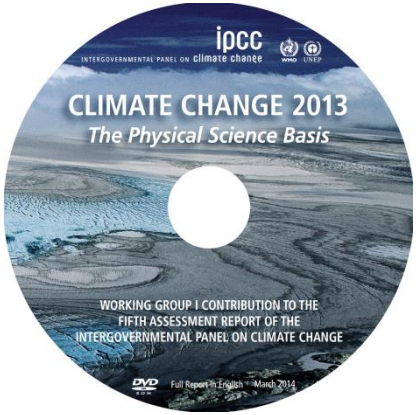
One question to help guide discussion

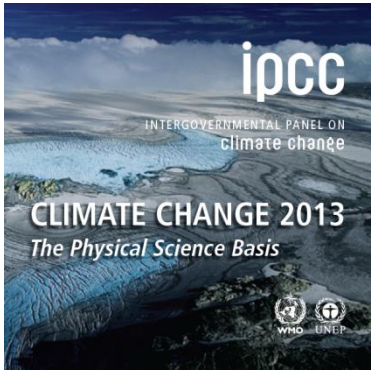
- *Uncertainties*: IPCC puts a lot of emphasis on the quantification and communication of uncertainties in its assessment in order to best serve policymakers and the public. What are areas within the GCOS science domain where progress is most needed in order to be able to reduce key uncertainties in future IPCC assessments?

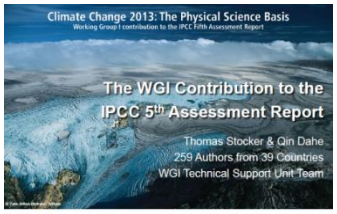
One challenge that needs to be addressed

- *Regional information*: Bridging the gap between global scale and regional scale climate information resulting from international programmes such as, e.g., GCOS or WCRP.

www.climatechange2013.org







IPCC AR5 Working Group I
Climate Change 2013: The Physical Science Basis

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INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

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Future of the IPCC: Status February 2015

- IPCC Panel meeting #37 (Batumi, October 2013): Panel set up a *"Task Group on the Future Work of the IPCC";*

  The mandate of the *Task Group* is to develop options and recommendations for consideration by the Panel;

- *Task Group* meeting #1: Berlin, April 2014; meeting #2 Geneva, September 2014; meeting #3 Copenhagen, October 2014;

- Recommendations by the *Task Group* for the IPCC Panel meeting #41 (February 2015). There the Panel will agree on the
  - size,
  - structure
  - composition

  of the next IPCC Bureau;

- Elections will take place at meeting #42 (October 2015).

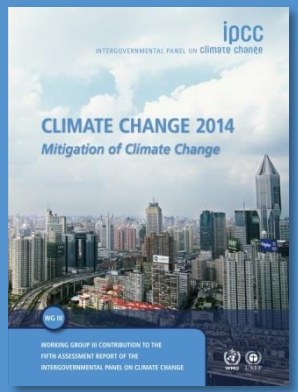
Future of the IPCC: Status February 2015

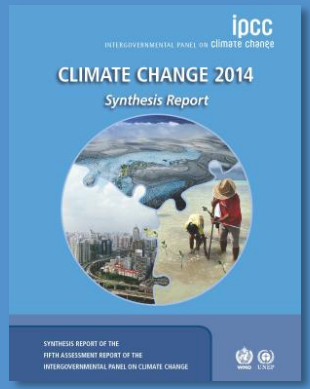
- Revised Options Paper by the *Task Group for* IPCC Panel meeting #41:

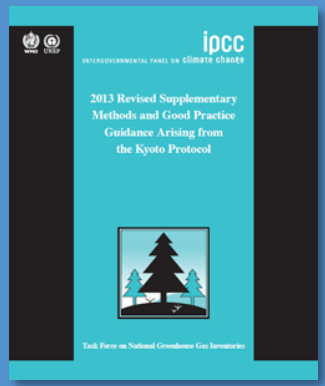
  (available from http://www.ipcc.ch/apps/eventmanager/documents/27/)

  - Future products of the IPCC
  - Appropriate structure and Modus Operandi for the production of these IPCC products
  - Ways to enhance the participation and contribution of developing countries in the future work of the IPCC;

- Considers perspectives of member governments, scientists involved in the preparation of IPCC reports, IPCC observer organizations and other relevant stakeholders, including the Technical Support Units (TSUs) and the Secretariat.







Further Information

www.ipcc.ch
www.climatechange2013.org
www.ipcc-wg2.gov/AR5
www.mitigation2014.org
www.ipcc-syr.nl
www.ipcc-nggip.iges.or.jp