

# Observation of the climate system under UNFCCC

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Bonn, 22 September 2017

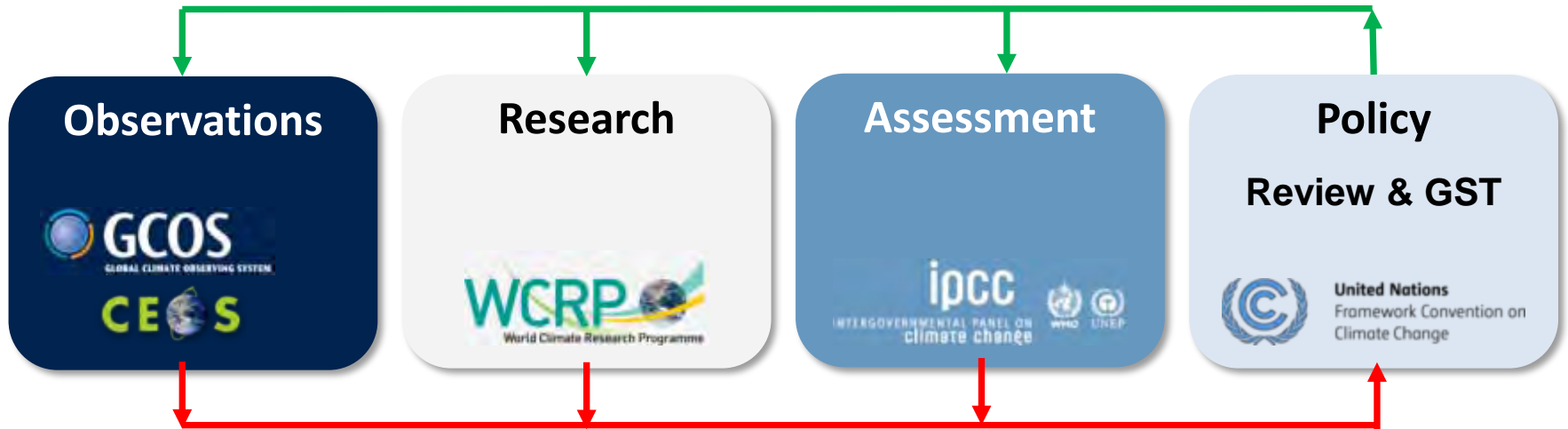


- Systematic observation and the UNFCCC
  - Overview
  - From observations to policies; role of the SBSTA
  - Work done and future work
- Paris Agreement and what it means for future focus
  - Introduction
  - Opportunities for systematic observation
- Concluding remarks



- Systematic observation of the Earth's climate system plays an essential role in **understanding** changes in the climate system, as well as in **predicting** future changes, which are fundamental for informing climate policymaking
- For example, due to systematic observation:
  - Scientists can now **better track changes** in land cover, ice sheets, water resources, sea level, extreme events and human activities such as urban growth, land change, agriculture, deforestation and dam and other infrastructure construction that impact the environment
  - People can **see the changes** that are happening due to climate change on images from space, which are a powerful way to illustrate these changes
  - Decision makers can **better manage disasters**, including from those attributable to climate change, because they are better supported with accurate and timely information for decision making (from disaster risk reduction to disaster response and recovery)
  - Modellers can **better project changes**, including for the near-term and the regional level, due to improved continuity, space and time sampling and accuracy of Earth observations. Such results enhanced the policy relevance of the IPCC's Fifth Assessment Report





WORLD METEOROLOGICAL ORGANIZATION  
IAMC  
Physical Earth Systems  
Integrated Assessment Modelling Community  
UNESCO  
United Nations Educational, Scientific and Cultural Organization  
Intergovernmental Oceanographic Commission  
futureearth  
research for global sustainability  
GFCOS  
GLOBAL FRAMEWORK FOR CLIMATE SERVICES

GEO  
GROUP ON EARTH OBSERVATIONS  
UN-SPIDER  
UNITED NATIONS Office for Outer Space Affairs  
FAO  
FEDERATION OF AGRICULTURAL ORGANIZATIONS OF THE WORLD  
UNEP  
UNITED NATIONS ENVIRONMENTAL PROGRAM  
Ramsar

and other relevant organizations





### Convention

#### Article 4 Commitments

#### Article 5 RSO

- Promote and cooperate in SO of the climate system and exchange of information
- Support and strengthen SO
- Improve capacity for SO  
...particularly in developing countries

### Paris Agreement

#### Article 7 Adaptation including ...

Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making

#### Article 8 Loss & Damage

Cooperation and facilitation of EWS, emergency preparedness, slow onset events, ...



## Policy

Needs and requests (opportunities)

ECVs, indicators, status and implementation of systematic observation and research

SBSTA

Gaps and needs in RSO

Recommendations and advice

COP

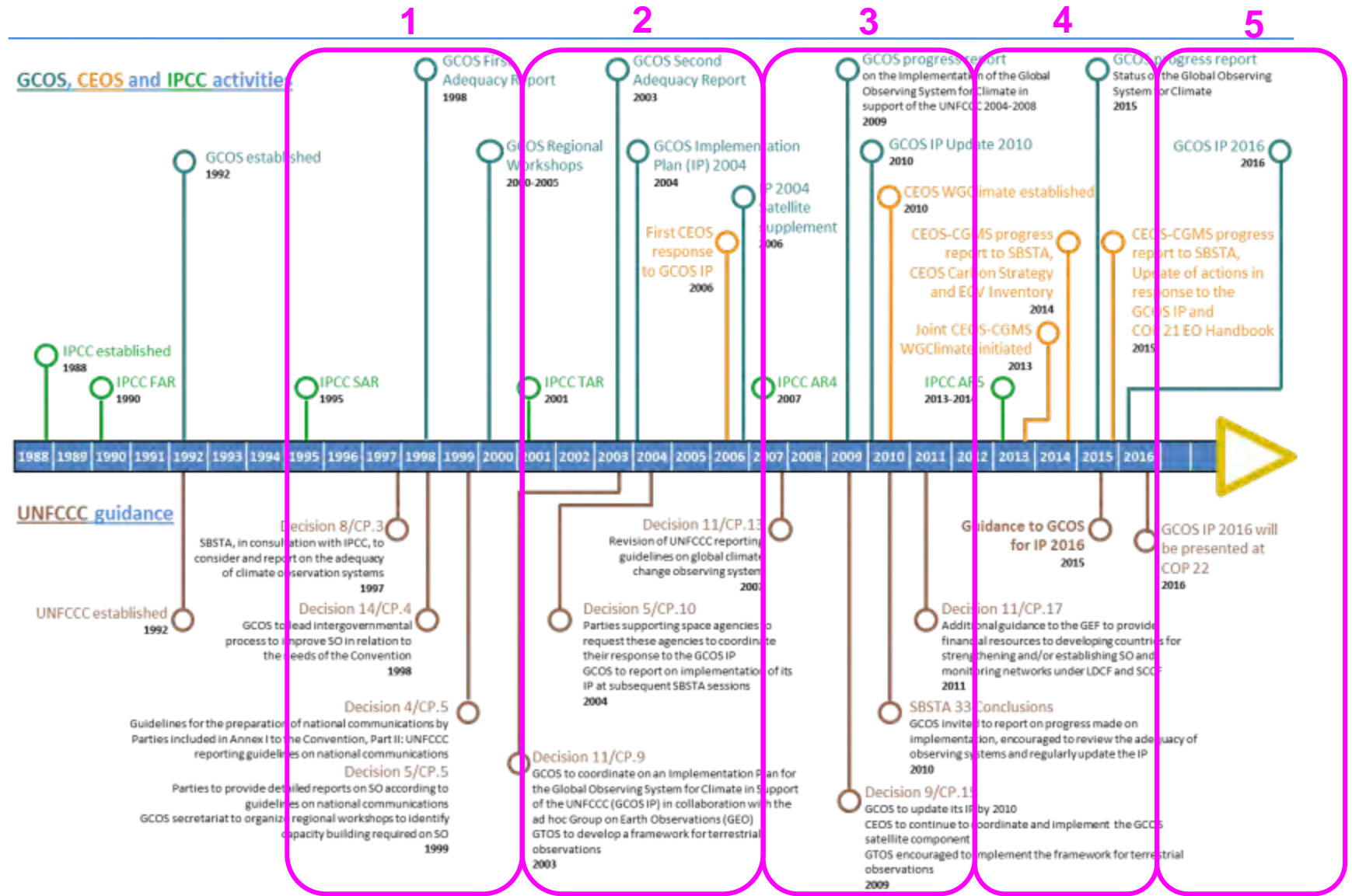
Assessment, planning, implementation, monitoring and evaluation

Implementation and MRV

Adaptation

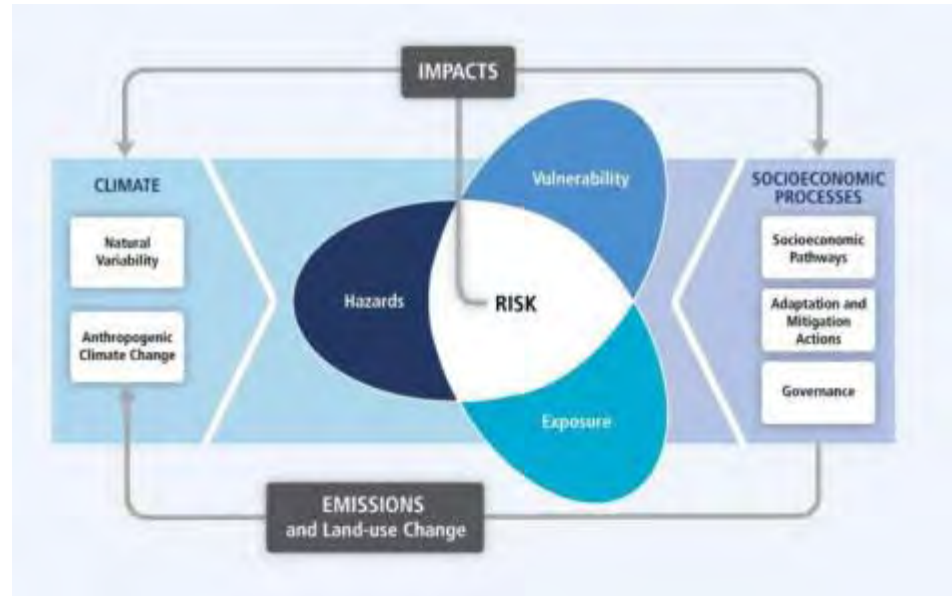
Mitigation

# Systematic observation | Overview of work done – the GCOS and IPCC assessment cycles and the UNFCCC guidance





# GRAND CHALLENGES



Climate-related drivers of impacts				Level of risk & potential for adaptation					
								Potential to address adaptation to reduce risk Risk level with high adaptation   Risk level with current adaptation	
Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation					
Shifts in biome distribution, and severe impacts on wildlife due to diseases and species extinction (high confidence) (22.3.2.1, 22.3.2.3)	Very few adaptation options; migration corridors, protected areas, better management of natural resources	 	Present Near term (2010-2040) Long term (2040-2100) etc	Very Low Low Medium Very High					
Compounded stress on water resources facing significant strain from overexploitation and degradation at present and increased demand in the future, with drought stress exacerbated in drought-prone regions of Africa (high confidence) (22.3.4)	<ul style="list-style-type: none"> <li>Reducing non-climate stressors on water resources</li> <li>Strengthening institutional capacities for demand management, groundwater assessment, integrated water-wastewater planning, and integrated land and water governance</li> <li>Sustainable urban development</li> </ul>	  	Present Near term (2010-2040) Long term (2040-2100) etc	Very Low Low Medium Very High					
Degradation of coral reefs results in loss of protective ecosystems and fishery stocks (medium confidence) (22.3.1.1)	Few adaptation options, marine protected areas, conservation and protection; better management of natural resources	  	Present Near term (2010-2040) Long term (2040-2100) etc	Very Low Low Medium Very High					



## A game changing

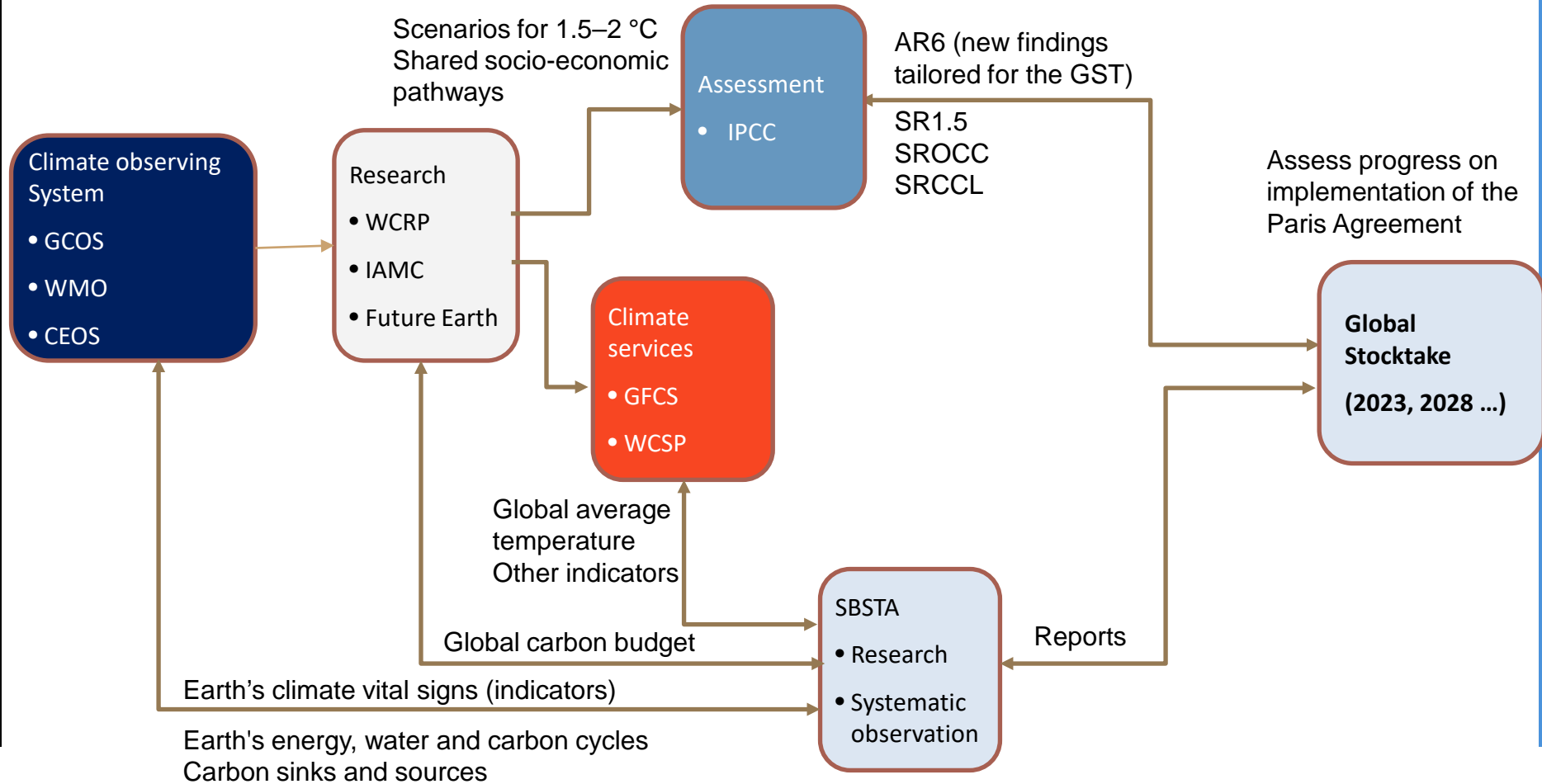
- Climate change **mitigation** is now firmly **founded on national action**. This reflects the current reality of climate change politics and economics
- Governments locked in the upper limit of global warming of **2 °C** and agreed to pursue efforts to limit the increase to **1.5 °C** as an important statement of solidarity with vulnerable countries and an investment in future generations (scientific interpretation)
- Provided the **policy certainty** that the business sector has been seeking. A legal agreement “global peaking” and a “balance” between global emissions and removals, i.e. climate neutrality (scientific interpretation)
- Climate **adaptation and loss and damage** have become pillars of the climate change regime. The NAP decision established a process to assess progress and invited relevant organizations to continue efforts to coordinate support for the NAP process



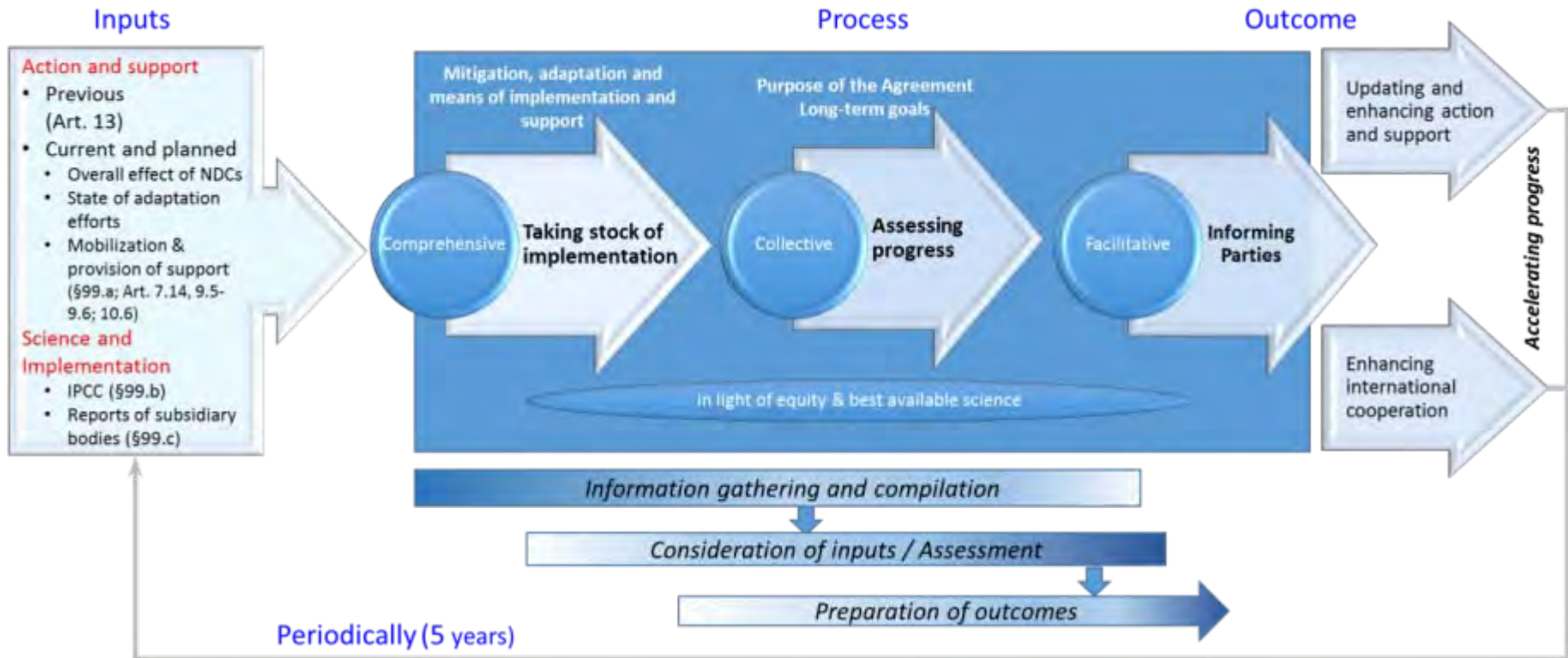


- An **enhanced transparency framework** for all – Nationally Determined Contributions
  - Mitigation
  - Adaptation (NAPs)
  - Finance
- **Means of implementation** – reaffirmed the \$100 billion USD goal from the Copenhagen Climate Change Conference and enhanced attention to reporting and assessment of support to developing countries; recognition of the possibility of developing countries providing such support; and robust outcome on capacity-building to enable developing countries to fulfil their undertakings
- **Global stocktake** – every five years to systemize moving to more ambitious action (clear direction and no “backsliding”)





## The Global Stocktake



Two issues:

- Assessing the linkages between **high-level climate stabilization goals** and scenarios on the one hand and the **practical steps needed in the short- and medium-term** to make the realization of these goals possible
- Anchoring climate responses firmly in the context of development needs



## The Agreement emphasizes the strengthening of scientific knowledge in regards to adaptation

Article 7, para 7

“Parties should strengthen their cooperation on enhancing action on adaptation, taking into account the Cancun Adaptation Framework, including with regard to:

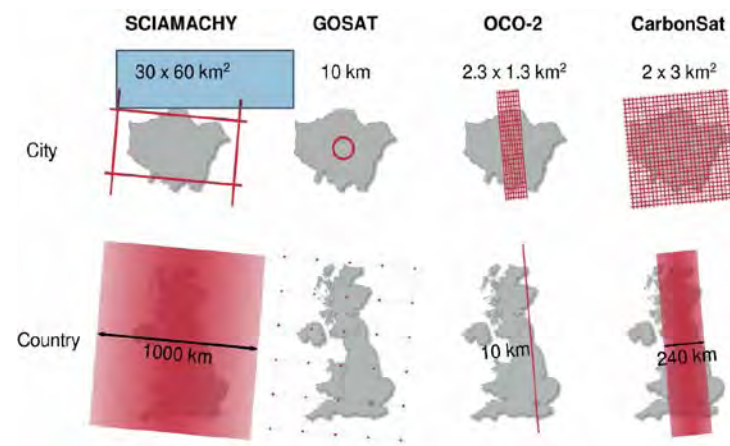
...

**c) Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making**

...”



- The scientific community tells us that satellite remote sensing of column CO<sub>2</sub> and CH<sub>4</sub> mixing ratio with global coverage and forthcoming integrated carbon observation systems (e.g., WMO IG<sup>3</sup>IS) will open new possibilities for **quantification and attribution of regional-scale fluxes** and **quantification of strong local sources of CO<sub>2</sub> and CH<sub>4</sub>**. These new developments could:
  - Allow for a better understanding of the carbon cycle and a top-down quantification and attribution of greenhouse gas emissions and sinks
  - Support the transparency framework by allowing Parties to verify and validate the uncertainties in their GHG inventories (bottom up) and for better planning
  - Support the global stocktake and the aggregation of the collective mitigation efforts by Parties

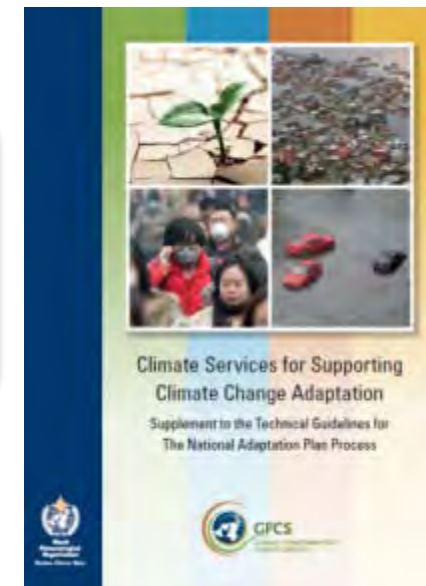
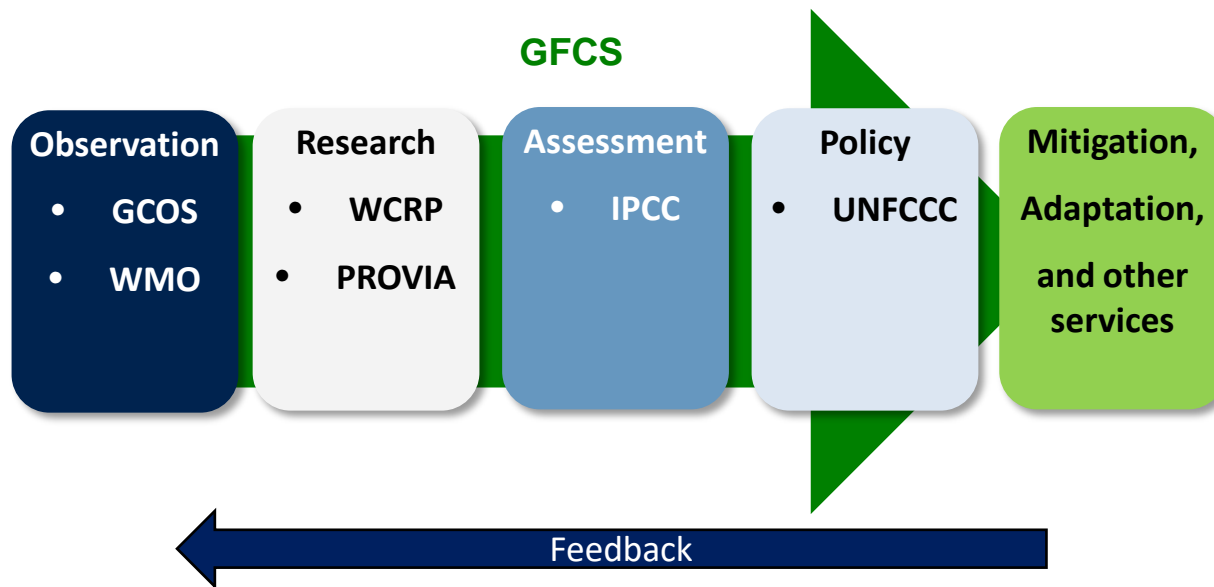


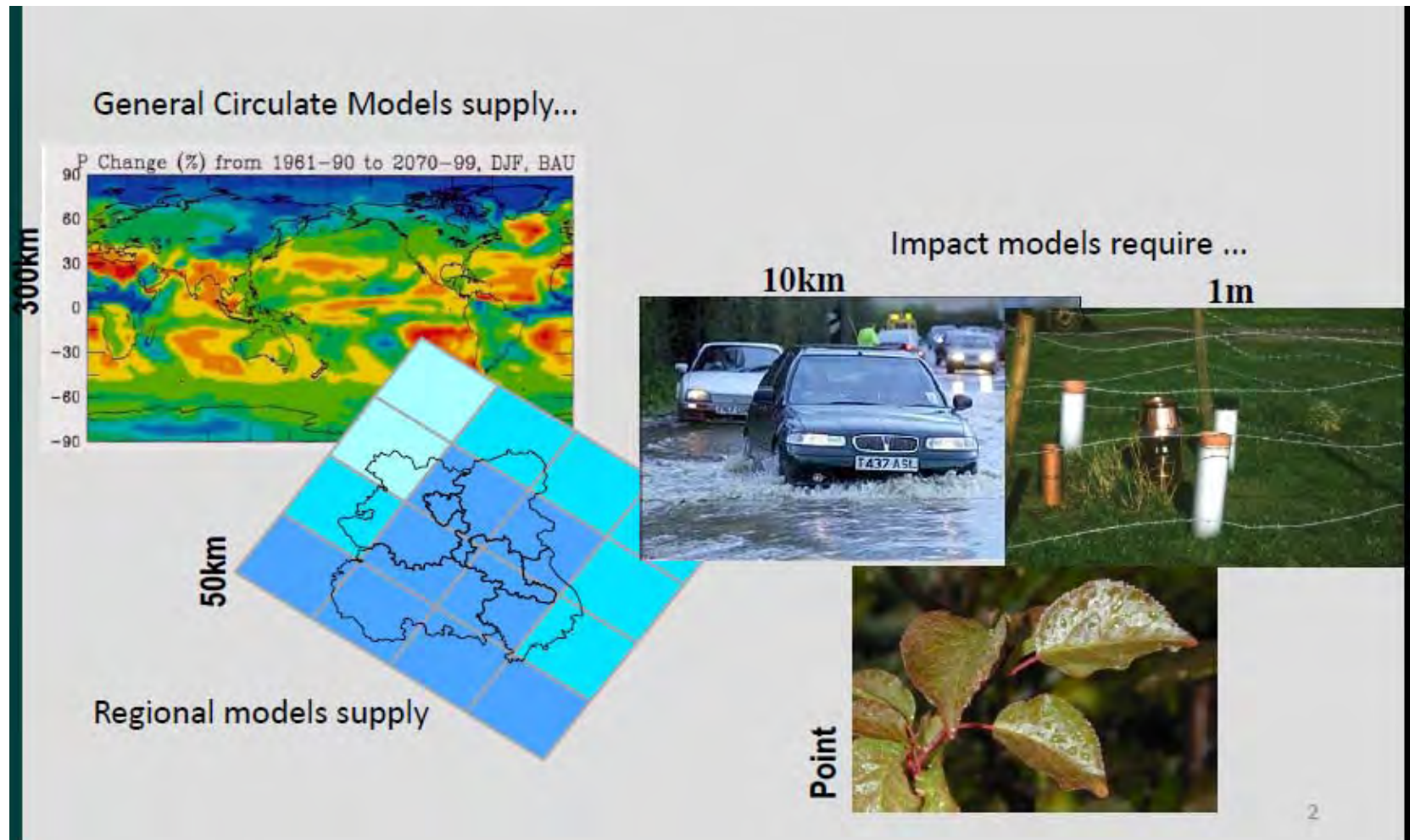
- State of the global climate - provide **climate indicators** for decision-making at national and sub-national level
  - Global average temperature, global mean sea level raise,...
  - GCOS started working on this – historic and future indicators
- Extreme events - improve **early warning**
- Adaptation planning and implementation - **improve access to observations** for National Adaptation Plans and loss and damage planning (national and regional dimension)
  - Engage regional climate centres
  - CMIP6 – higher resolution and data storage
- Research - increase understanding of relevant global weather phenomena, such as El Niño and La Niña



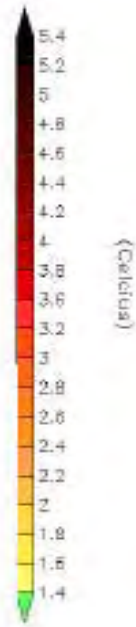
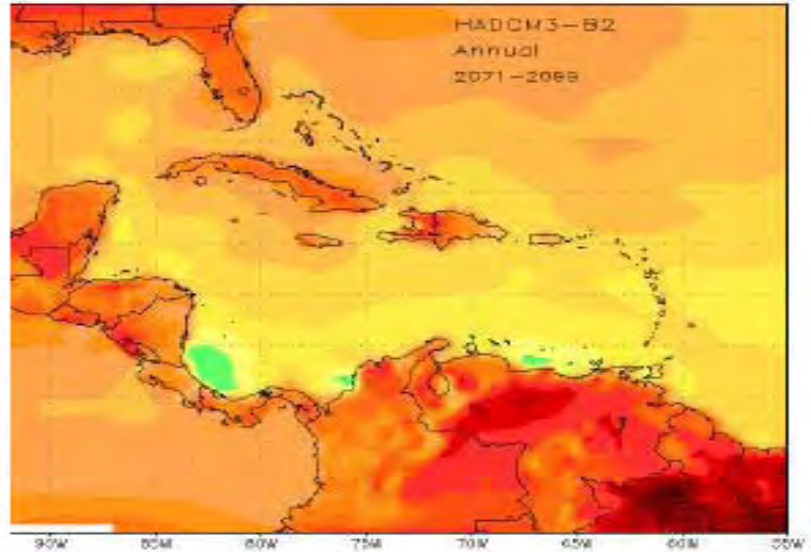
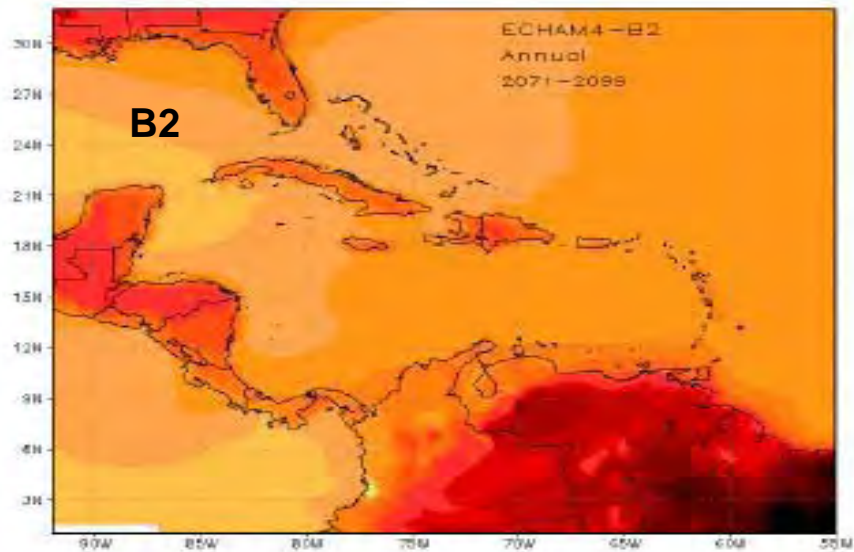
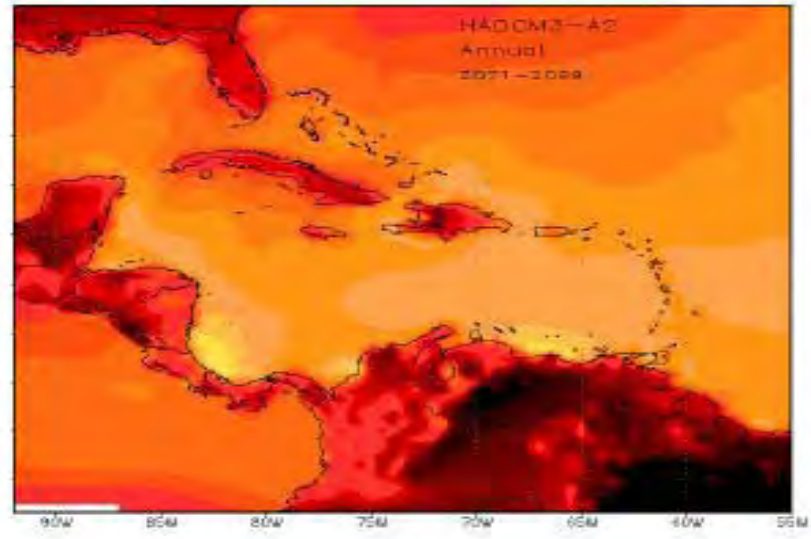
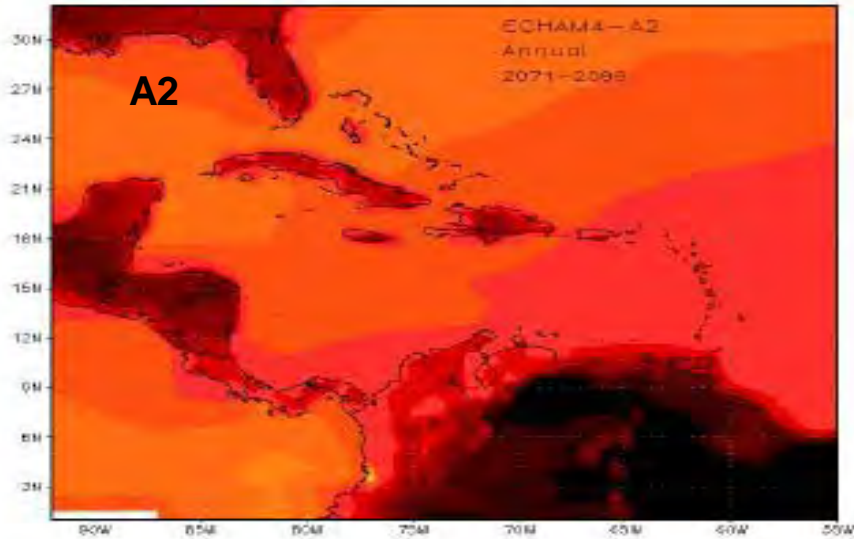


- Strengthen the support of the systematic observations for provision of climate services
- **WMO Global Framework for Climate Services (GFCS)** – Supporting national decision-making and NAPs through the climate services information system, regional centres, national level projects etc.

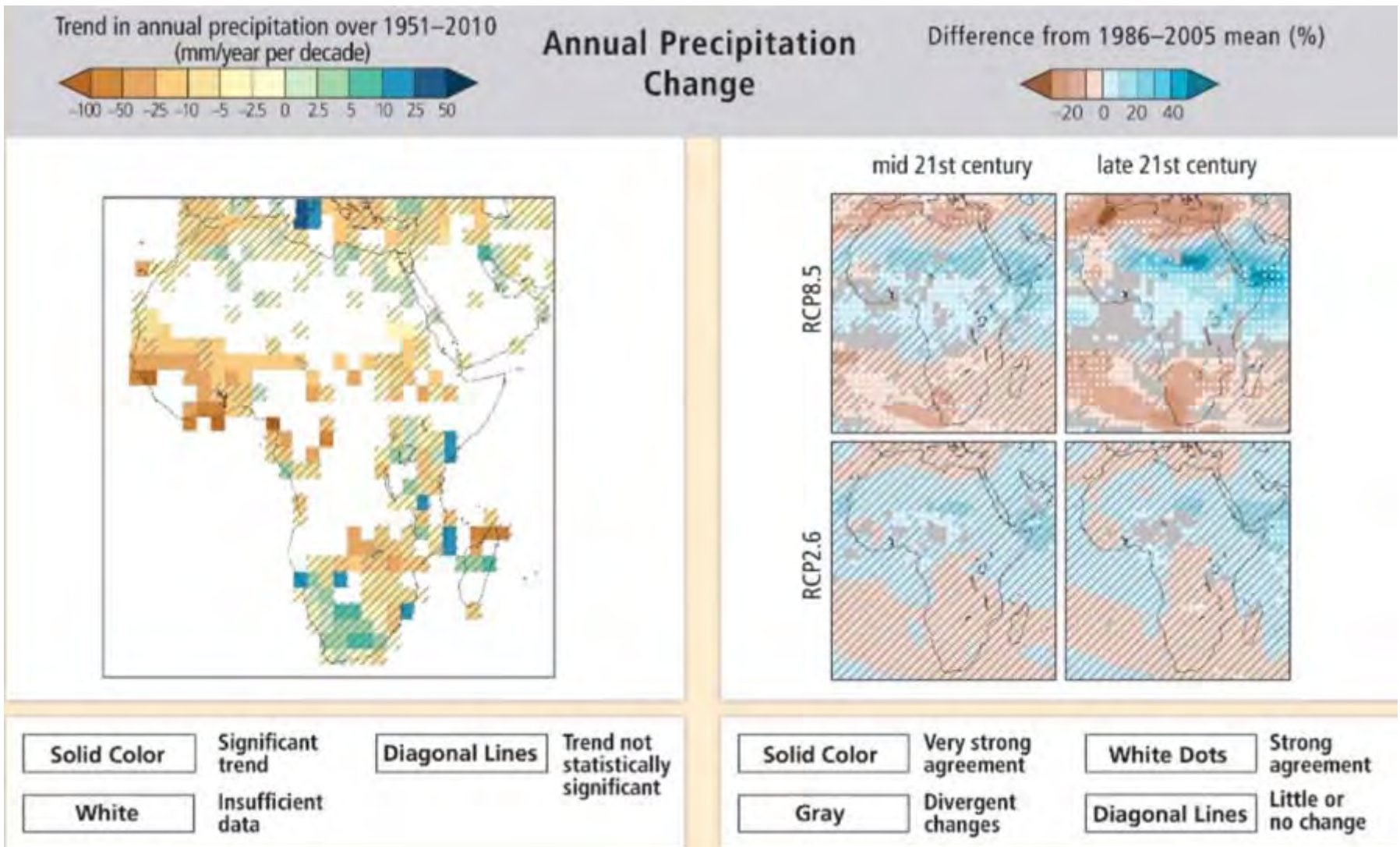




1 °C - 4 °C warming (relative to 1960–1990 mean) projected by end of century







Source: Excerpt from Fig 22-1. IPCC, 2014: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 688.

- **High-quality observations are the foundation for solid decision-making on future action on climate change**
- **Some opportunities for systematic observation:**
  - Inform regularly the process on the state of the climate (WMO State of the Global Climate and Earth Information Day))
  - Better liaise with SBSTA and other implementation bodies - provide relevant information to relevant workstreams under the Convention and the Paris Agreement (e.g., NAPs-LEG, Adaptation Committee, Nairobi work programme and the L&D Ex Com)
  - Contribute to improving the transparency framework and support the global stocktake
  - Identify ways to improve consistency in national reporting of RSO to the UNFCCC
  - Identify indicators and other climate services that could support adaptation decision making and be incorporated into adaptation reporting cycle by all Parties
  - Support the technical examination process (pre-2020 ambition)
  - Integrated approach with SDGs and Sendai Framework and Rio Conventions



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**Thank you**  
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# Systematic observation | Future work

GCOS, IOC-GOOS, CEOS, UNOOSA, GEO, WMO, GFCS and IPCC

← Systematic Observation

**GCOS IP2016 submitted to COP 22**  
(the 4<sup>th</sup> GCOS cycle of assessment of SO)  
2016-2022

**GCOS Expert teams meeting on:**  
climate indicators, adaptation, ECV product requirements, OOPC-TOPC Coastal zone, Cross-validation of ECVs  
GCOS task team meetings to: design and plan **regional workshops**  
**IOC/WCRP Conference: Regional Sea Level Changes and Coastal Impacts**  
2017

**GEO Strategic Plan: Implementing the Global Earth Observation System of Systems (GEOSS)**  
2016-2025

**UNOOSA: UNISPACE +50**  
June 2018

**CEOS to provide regular reports to SBSTA (FCCC/SBSTA/2014/5 para 40)**  
2015+  
• Planned for SBSTA 47 – CEOS response to GCOS IP 2016

**WMO/GFCS to provide regular reports to SBSTA (FCCC/SBSTA/2011/5 para 46)**  
2011+  
For SBSTA 45:  
• Status of global climate<sup>7</sup> annual report  
• Development of **IG3IS** (WMO) and other operational GHG emissions monitoring systems

← Climate services

← Science (assessment of)

**IPCC AR5**  
2013-14

**IPCC SR 1.5 °C**  
2018

**IPCC SRs: Oceans; CC & Desertification**  
2019

**IPCC AR6**  
2021-22



GCOS IP 2016  
The Global Observing System for Climate: Implementation Needs  
2016

CEOS Response to GCOS IP 2016  
2017

UNFCCC: RSO, Review, IPCC and Global Stocktake

