

Update on the UNFCCC work

26th session of the GCOS Steering Committee

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- Developments since SC 25
 - SBSTA 47 – outcomes on systematic observation
 - SBSTA 48 – the 10th research dialogue
 - The IPCC Special Report on Global Warming of 1.5°C – possible implications for systematic observations
- COP 24 and beyond
 - Overview and main issues under negotiation
 - SBSTA 49 – possible elements for consideration under systematic observation
- Beyond COP 24

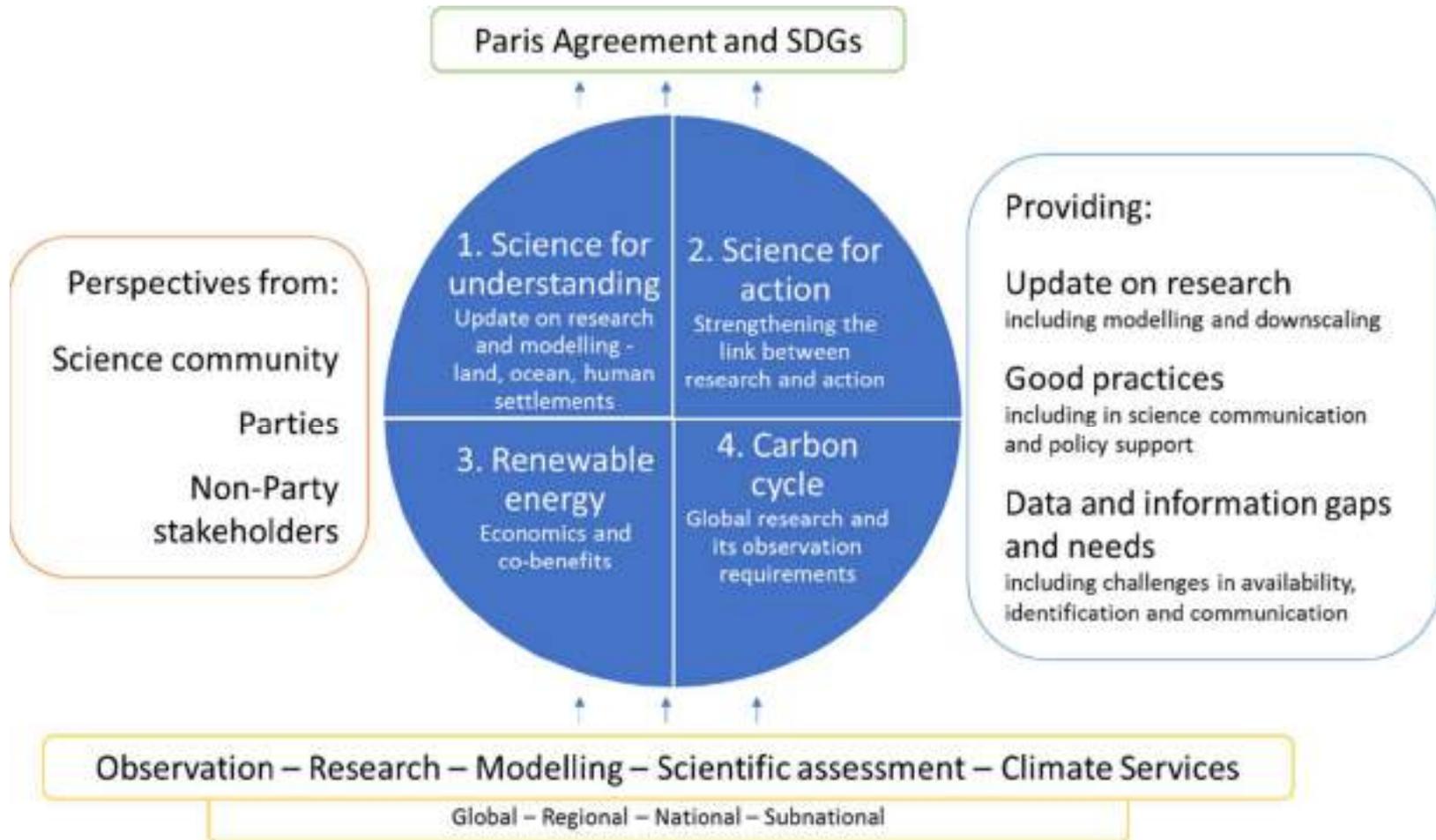


- **Welcomed** the summary **report** prepared by its Chair **on the Earth Information Day** held during COP 22
- **Welcomed** the **report on progress made on the implementation of the GCOS implementation plan**
- **Welcomed** the **comprehensive space agency response to the GCOS IP** (by the Joint CEOS/CGMS Working Group on Climate)
- **Noted** the efforts undertaken by GCOS and the wider science community on **the development of climate indicators**, including global surface temperature, global atmospheric carbon dioxide and glacier change, and by WMO on the categorization of extreme events and *invited* GCOS and WMO to report to it on progress, as appropriate, and noted the relevance of their work in the context of decision 4/CP.22, paragraph 4(c).
- **Noted** the **importance of ocean-related climate indicators**, including ocean heat content, ocean acidification, sea level rise, and Arctic and Antarctic sea ice extent, for informing on the state of the global climate. It encouraged Parties to sustain observations underpinning these indicators. It also noted the Ocean Conference 2017 and the importance of systematic observations related to the oceans



- **Noted** the joint GCOS/WIGOS workshop for Pacific small island developing States in Nadi, Fiji, and the development of a **Pacific region observing network plan**. Also *noted* that GCOS plans to hold the next regional workshop in Africa in 2018
- **Encouraged Parties and relevant organizations** to take advantage of support available via the operating entities of the Financial Mechanism as well as other relevant organizations and channels, as appropriate, **to support the GCOS regional workshops and projects identified in the resulting implementation plans**
- **Recognized the progress** made by the satellite community, in close collaboration with GCOS, **in the development of the essential climate variable inventory**. It noted the usefulness of the essential climate variable inventory for climate services. It invited CEOS and CGMS to report on progress at future sessions of the SBSTA, as appropriate
- **Noted the increasing capability to systematically monitor greenhouse gas concentrations and emissions**, through in situ as well as satellite observations, and its relevance in support of the Paris Agreement. (Footnote - See the section titled “Decision 51 - **IG3IS** Implementation Plan” in the WMO submission and the summary report on the Earth Information Day)





Urban Climate Information for Decision Making in **Cities: Local to Global Decisions and Policies (WCRP)**

Summary

- The need for cities to adapt to, and mitigate, global climate change is driving demand for detailed information on urban climates at scales that cannot be easily met with current observing networks, regional and global climate models (RCMs and GCMs)
- **Impact assessments and adaptation plans for our cities require high spatial resolution climate projections along with: models that represent urban processes; ensemble dynamical and statistical downscaling; and local-impact models**
- There is also an urgent need to **monitor progress on climate change adaptation in urban areas**, so as to reduce risk and increase resilience in the face of climate change
- The foundation of urban-scale climate information includes our current high-resolution urban downscaling expertise, combined with local-impact models, and ensemble dynamical and statistical downscaling. However, there are critical **knowledge gaps around downscaling to city-scales and how to assess and reduce uncertainties**
- This calls the research community to **identify one or more Essential Climate Variables (ECVs), bio-physical and/or socio-economic, that can represent human adaptation to climate change in cities**, in collaboration with research partners (WCRP, GCOS, etc.) as well as through the assistance/advice of relevant stakeholder across the finance and insurance sectors
- **Urban adaptation ECVs** could be: biophysical (e.g. changes in green canopy area); socioeconomic (e.g. investment in adaptation); and linked to urban form and layout and the use of energy efficient construction materials and coatings
- Several **potential urban adaptation ECVs** have been identified, mainly related to the biophysical characteristics of the urban environment

Key messages

- The scientific community in collaboration with research partners (WCRP, GCOS, etc.) as well as through the assistance/advice of relevant stakeholder across the finance and insurance sectors is developing **a set of urban ECVs**
- Robust **bio-physical and/or socio-economic ECVs** will feed directly into local and global climate change policy; such as through monitoring urban environmental adaptation progress and through time and (possibly) against targets



Sustained Observations to support the Paris Agreement (GCOS)

Summary

Systematic observations are vital for the Paris Agreement. Observations are needed to both implement actions and to monitor the progress and impacts:

- Observations are needed to **understand the current state of the environment at a global level**. GCOS is promoting a small set of **Climate Indicators** that present the state of the climate in a simple way (see Global Climate Indicators). The geographic distribution of the changes in the parameters is also available (e.g. Sea ice extent anomaly)
- In some areas, the use of observations is well established, for example, forest and land use/land cover monitoring. In other areas, such as **observing the progress of adaptation**, its use still needs to be demonstrated, such as the potential remote sensing of implementation of adaption actions: ameliorating urban heat extremes
- In many cases, adaptation planning will be based on the **outputs of reanalysis and downscaled models**, these depend on systematic sustained observations to maintain their accuracy

GCOS is supporting all these uses of observations in order to support the Global stocktake and Paris Agreement

Key messages

Systematic Observations are fundamental to **implementing** the Paris Agreement and **assessing its progress**

The GCOS headline climate indicators present the state of the climate in a simple way



There are many pathways to 1.5 °C with different impacts...

- The COP invited the IPCC to provide in 2018 a Special Report on impacts of global warming of 1.5 °C and related global greenhouse gas emission pathways. The report will inform the discussions on the collective mitigation action needed for maintaining a reasonable chance to limit global warming at 1.5 °C

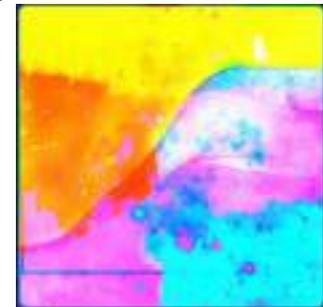
The level of global emission reductions in 2030 for **stabilization at 1.5 °C** is different from **overshooting 1.5 °C** and depends on the probability (**22.5 GtCO₂e/50%** vs **37.1 GtCO₂e/50%**)

Mitigation

- IPCC complemented the two above-mentioned topics with a **context**: *strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. This addressed concerns that limiting warming at 1.5 °C, as compared to 2 °C, could have a negative impact on sustainable development, on poverty eradication and on food production

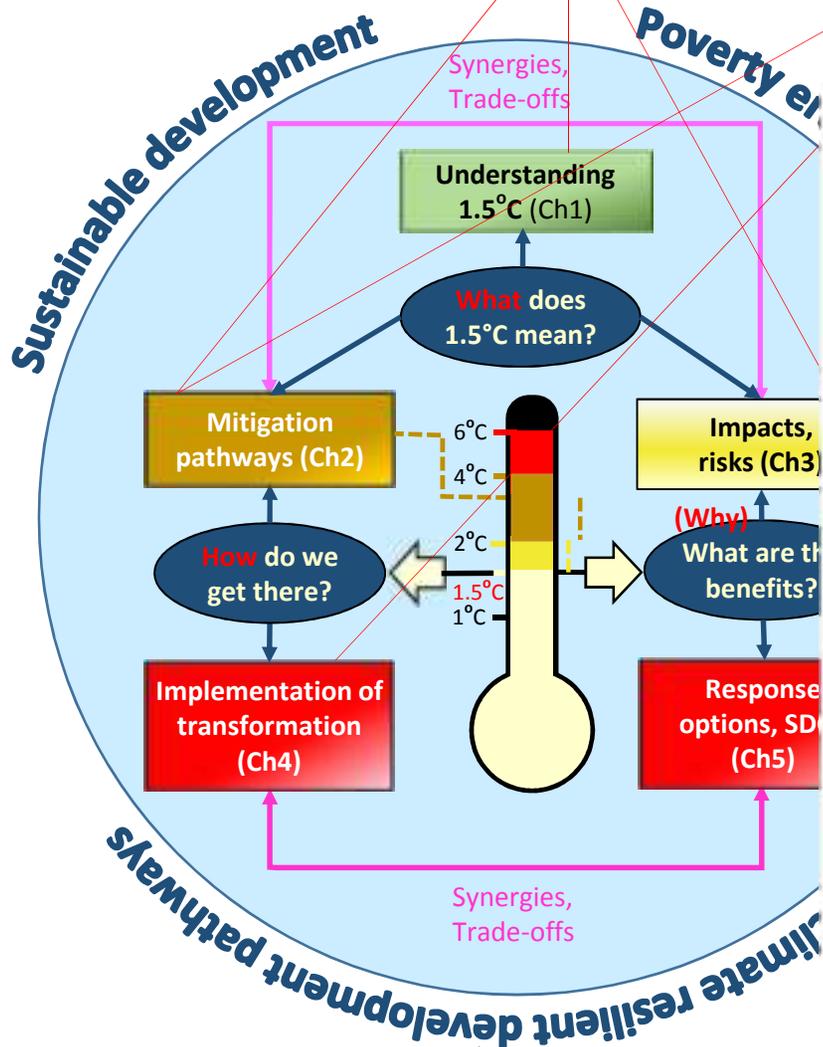
Bioenergy, agriculture and natural sinks will compete for land and the food price will increase

- The report in numbers: 91 authors from 40 countries; 1,113 reviewers; 6,000 papers; 42,000 comments



Draft SPM: Pathways that aim for **no or limited (zero to 0.2°C) overshoot of 1.5°C** have substantial emission reductions by 2030, keeping global GHG emissions in 2030 to **25-30 GtCO₂eq/yr** (interquartile range), a 45% reduction from 2010

Feasible: geophysical and environmental; technological and economic; social/cultural and institutional



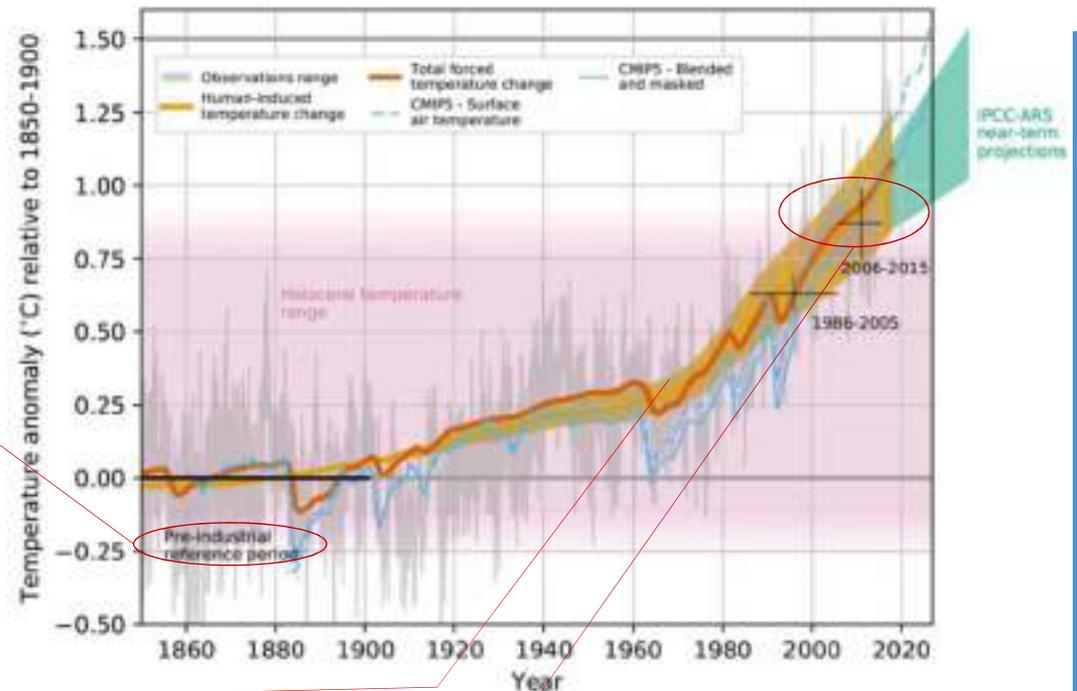
low-emission, sustainable development trajectories that **promote fair and equitable** climate resilience and well-being for all in a 1.5°C warmer world, in alignment with the Agenda 2030 and the SDGs

Global average temperature = global mean surface temperature: estimated global average of near-surface air temperatures over land and sea-ice, and sea surface temperatures over ice-free ocean regions, with changes normally expressed as departures from a value over a specified reference period

Reference period: as in AR5 (1850-1900)

Anthropogenic warming – global temperature will fluctuate equally on either sides of 1.5°C over a sufficiently long time period and in absence of large volcanic eruptions

Mitigation studies focus on human induced warming. While studies on climate change impacts typically refer to total warming



The decade **2006–2015** was **0.87°C** warmer than **1850–1900** (1.5°C relative to preindustrial corresponds to 0.63°C relative to 2006–2015)

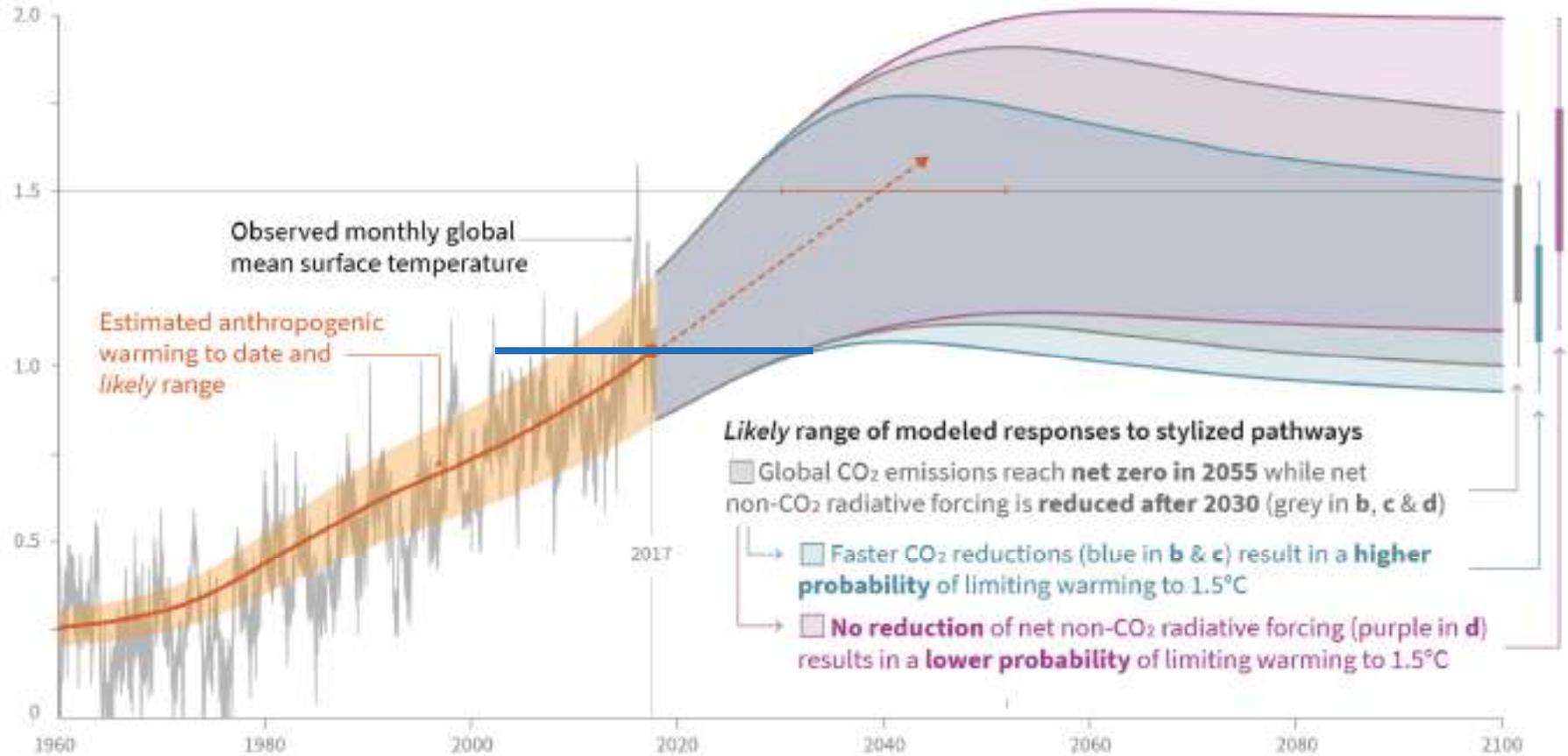
Warming is not spatially distributed nor distributed uniformly across all the months of the year!



At the present rate of human-induced warming global temperatures would reach 1,5°C around 2040 (2030-2052)

Understanding global warming of 1.5 °C | Where are we in a given year?

Global warming relative to 1850-1900 (°C)



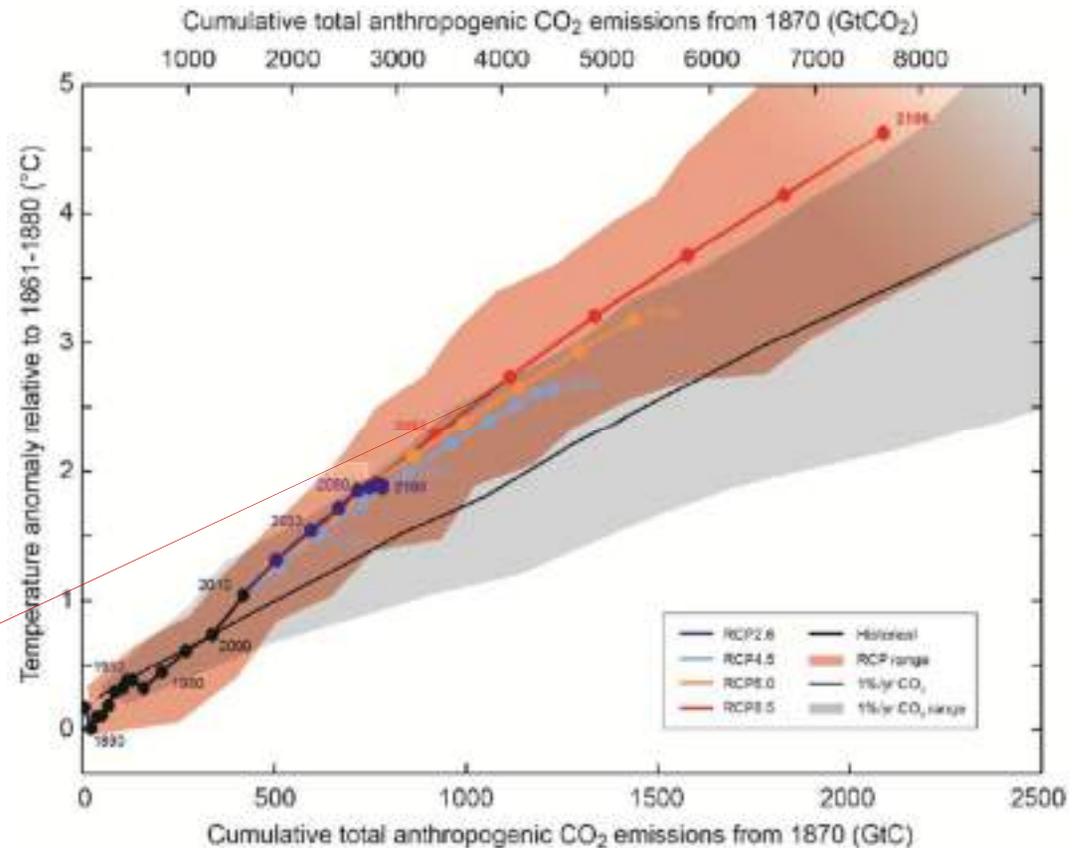
Global warming: The estimated increase in GMST averaged over a 30-year period, or the 30-year period centered on a particular year or decade, expressed relative to pre-industrial levels unless otherwise specified. For 30-year periods that span past and future years, the current multi-decadal warming trend is assumed to continue



Cumulative total emissions of CO₂ and global mean surface temperature response are approximately **linearly** related (TCRE)

Limiting the warming caused by CO₂ emissions alone with 66% probability to less than 2°C will require cumulative **anthropogenic CO₂ emissions** to stay between 0 and about **1,000 GtC** since that period. These upper amounts are reduced to about **800 GtC** respectively, **when accounting for non-CO₂ forcings**

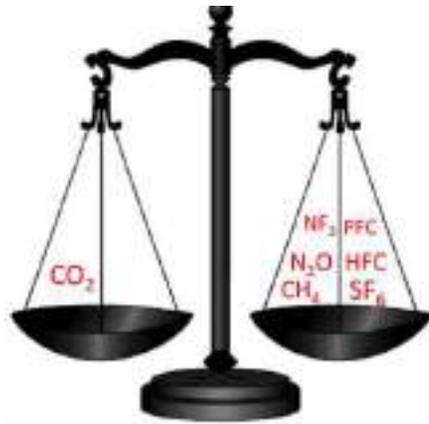
→ “Balance” in Article 4.1 of PA



Warming over a given time period = cumulative CO₂ emissions * TCRE + **any warming caused by non-CO₂ climate forcing**. Under ambitious mitigation scenarios involving limited future cumulative CO₂ emissions, **non-CO₂ climate forcing becomes more important**



- Article 4: In order to achieve the long-term temperature goal set out in Article 2, Parties aim to [...], so as **to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century**, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty

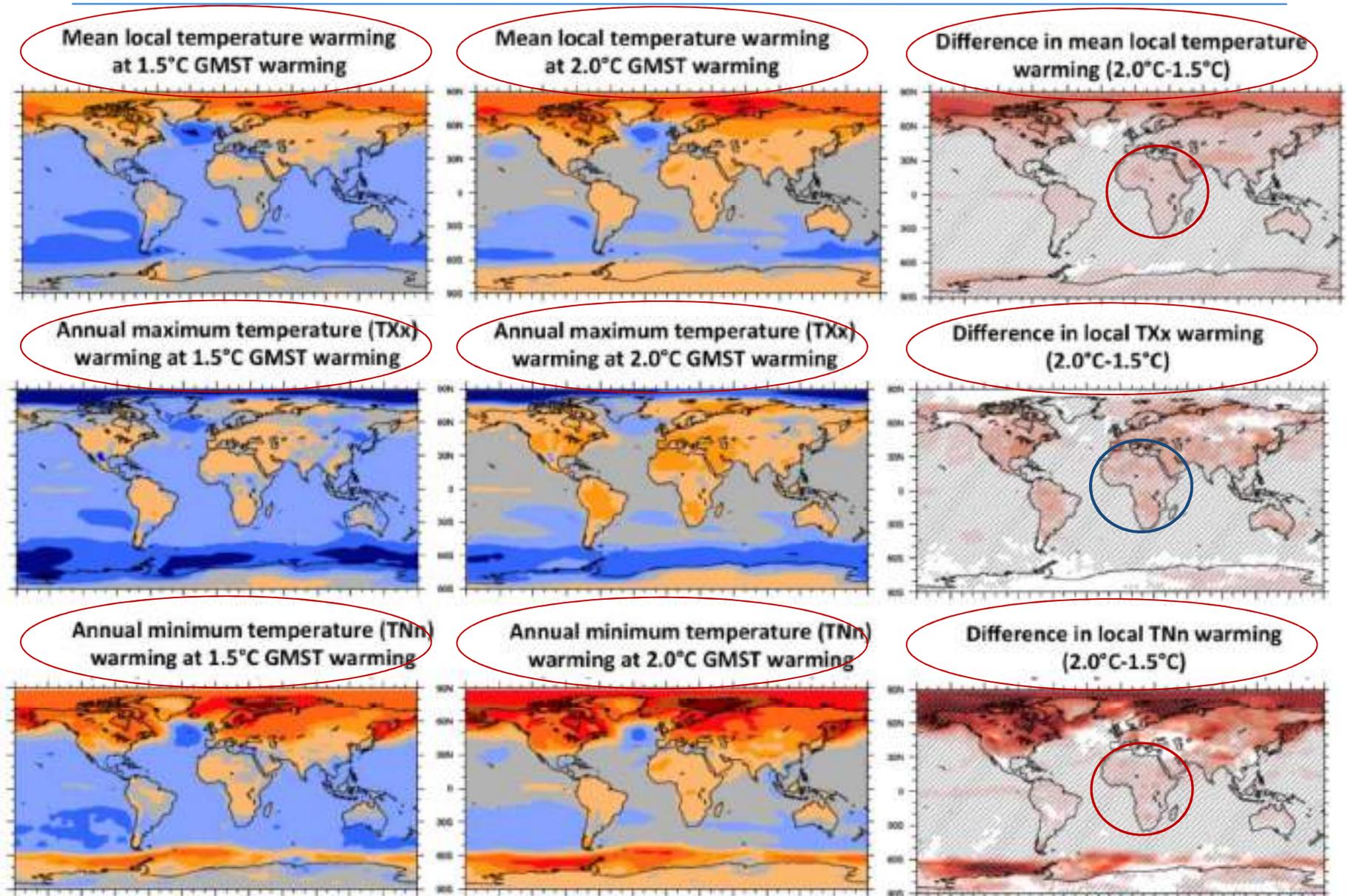


Negative emissions

Positive emissions

- **Several ways to define balance**; metric issue open
- Aerosols are not included in balance
- **Default approach**: balance assessment can be applied to Kyoto basket of GHGs (not yet specified)
 - Achieving and maintaining **net-zero CO₂-equivalent** emissions based on GWP100 (Kyoto Protocol and UNFCCC reporting) would **result in a sustained decline in global temperature**
- **Alternative approach** to the use of GWP100 (**GWP***)
 - results in **global temperatures remaining approximately constant once net-zero CO₂-equivalent emissions are achieved** and maintained
- **Definition of balance could change the overall ambition of Paris Agreement!!!**

Projected changes in climate | Mean local temperature and annual maximum and minimum temperature (transient RCP8.5)



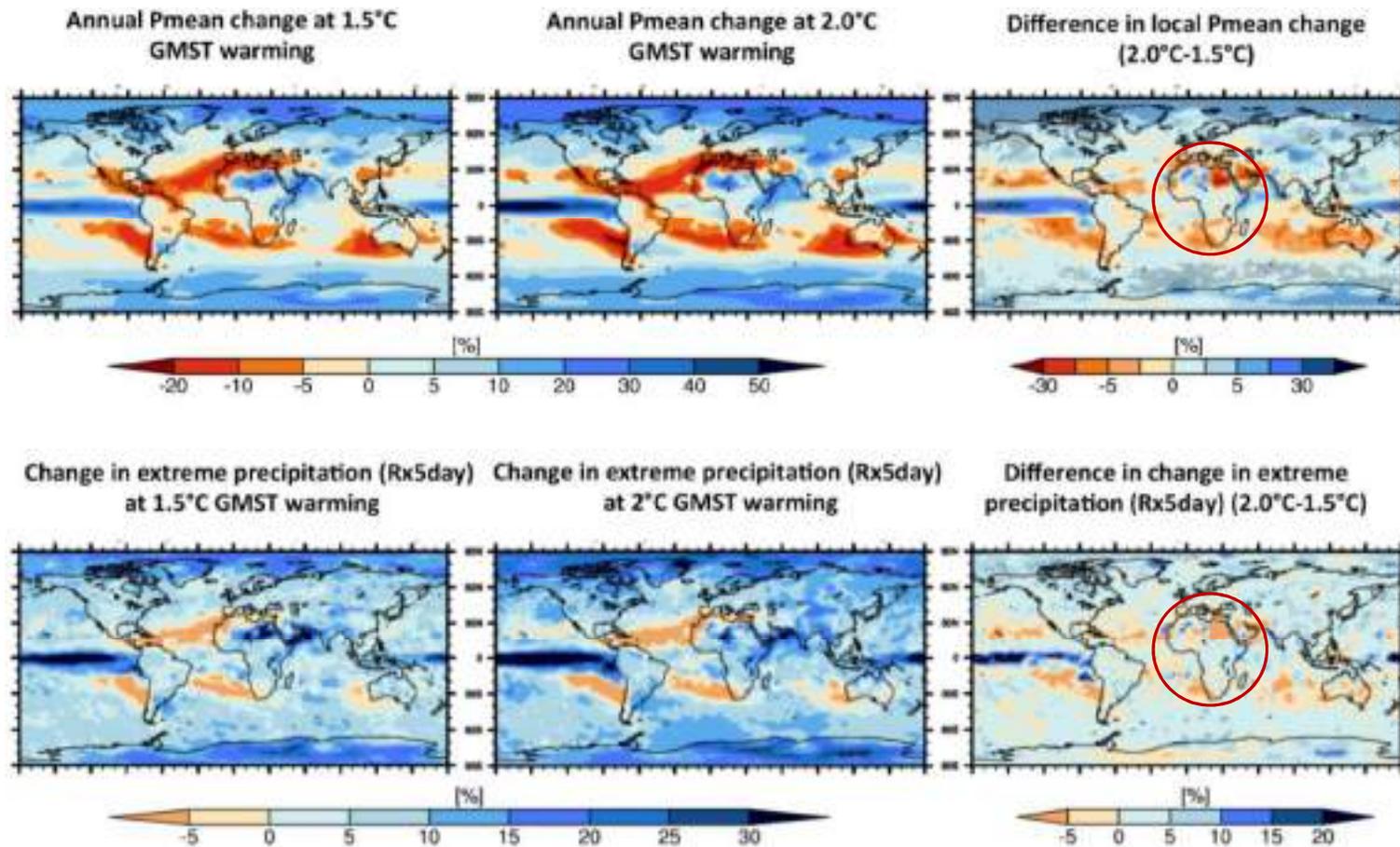
3. Projected changes in climate | Significance of regional differences of mean and temperature indices between 1.5 °C and 2°C

Global Land	ALA	AME	CAM	CAS	CEU	CGI	CNA	EAF	EAS	ENA	MED	NAS	NAU	NEB	NEU	SAP	SAH	SAS	SAU	SEA	SEA	TIB	WAF	WAS	WNA	WSA	
T	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
CSDD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DTW	-	-	+	+	+	+	-	+	+	+	-	+	-	+	+	-	+	-	-	+	-	-	-	-	-	-	+
FD	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
GM	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SU	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
TN10p	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TN10y	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
TN5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
TN5y	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
TN5z	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
TNz	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
WSDI	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	

Significant differences are shown in red shading (increases indicated with +, decreases indicated with -), insignificant differences are shown in grey shading

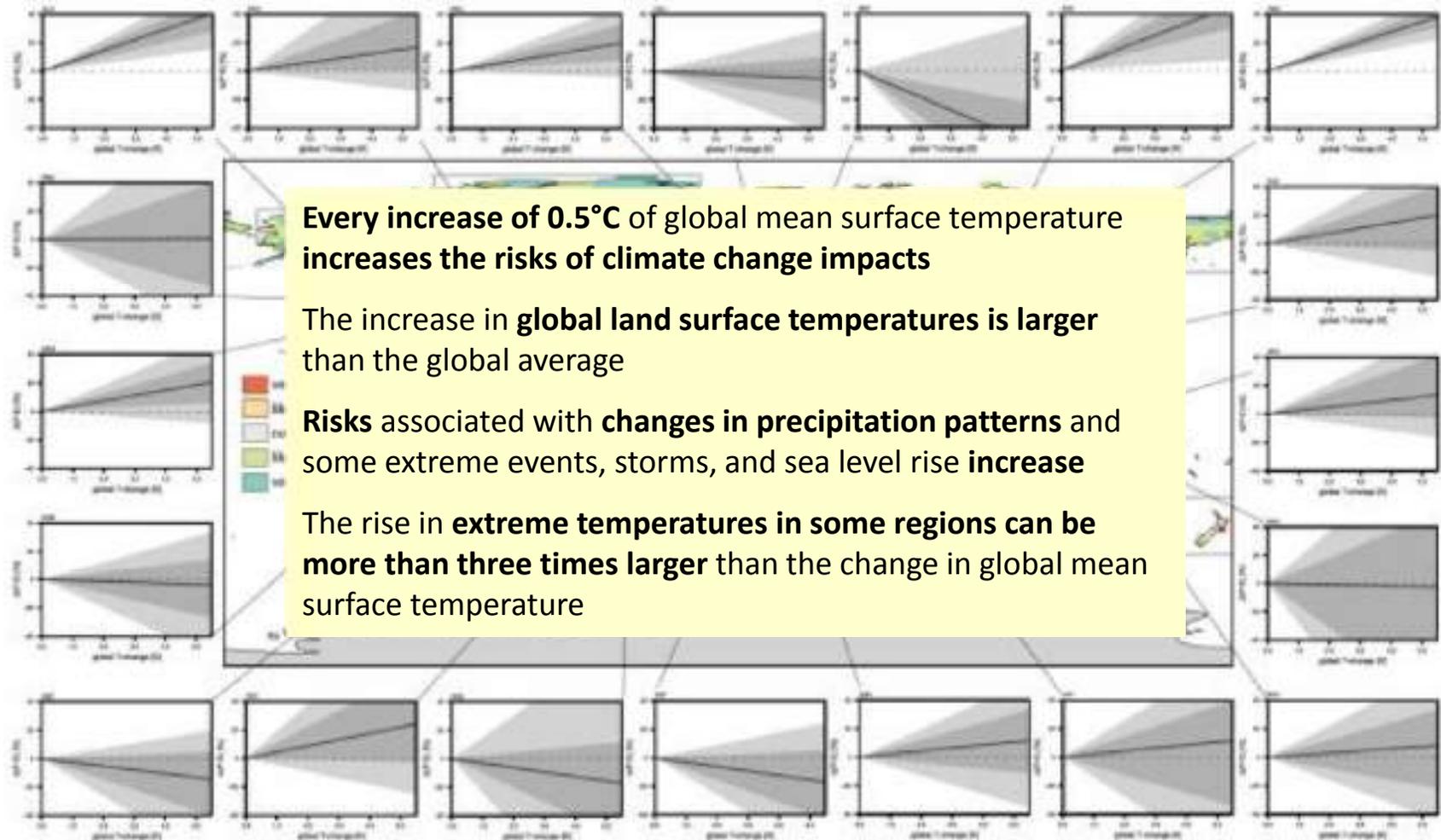


There are robust differences between temperature indices (warm extremes increase while cold extreme decrease!). Few regions are not affected



Projections for heavy precipitation are less robust than for temperature means and extremes. However, several regions display statistically significant differences in heavy precipitation at 1.5°C vs. 2°C warming (with stronger increase at 2°C) and there is a global tendency towards increases in heavy precipitation on land between these two temperature levels





1.5°C could **substantially reduce the risk** of experiencing extreme changes in regional **water availability**. Strong increase is predicted in dryness and reduced water availability in the Mediterranean region, in Northeastern Brazil, and in Southern Africa



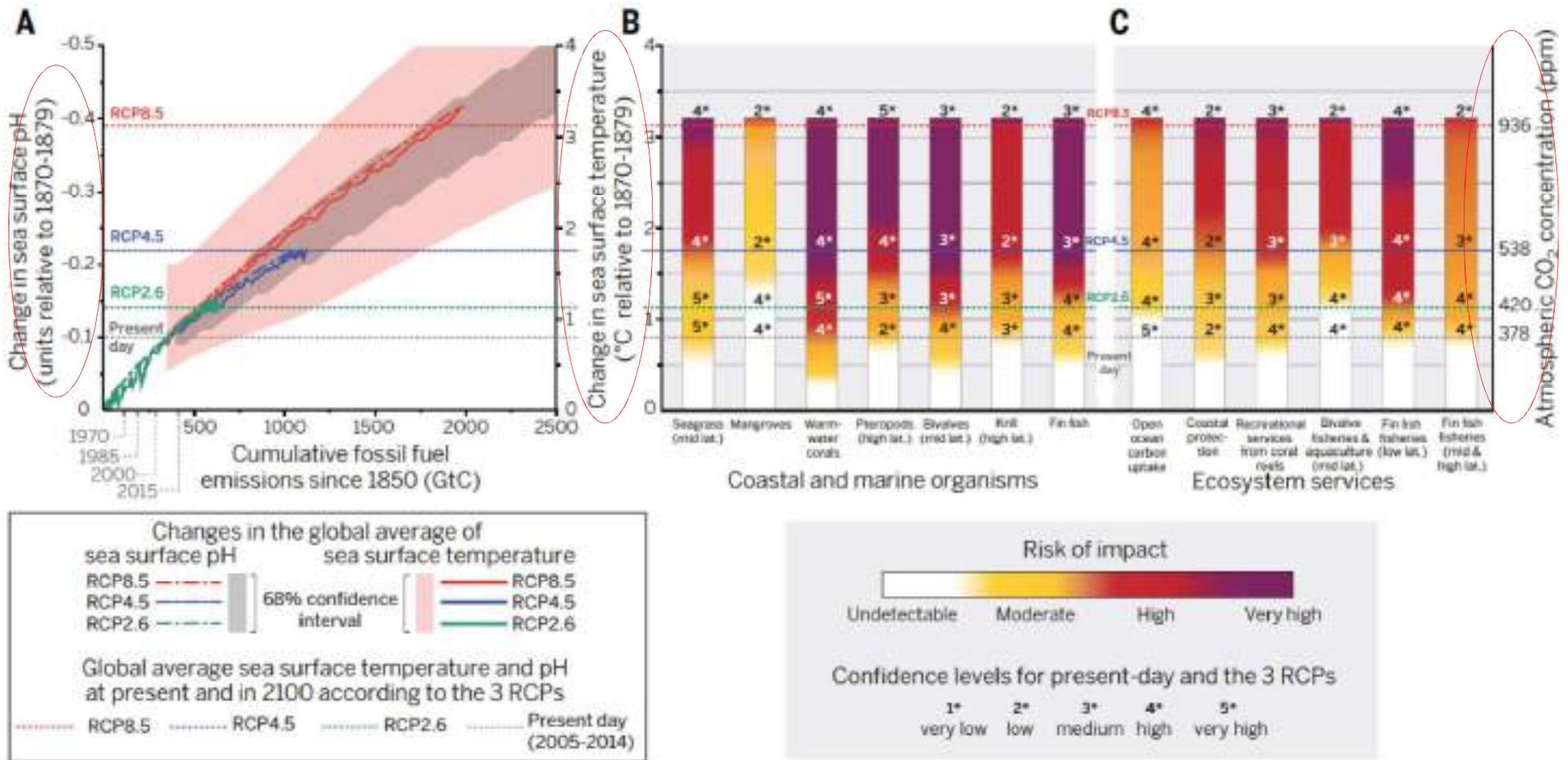
Observed and projected impacts at 1.5°C | Oceans (1)

A. Changes relative to 1990-1999						
	Δ SST	Δ pH	Δ O ₂	Sea level	Vol Ω _a	Vol Ω _a
	(°C)	(units)	(%)	(m)	(>1%)	(>3%)
2090-2099 (RCP 8.5)	2.73	-0.33	-3.48	0.67	9.4	0
2090-2099 (RCP 4.5)	1.28	-0.15	-2.37	0.49	15	0.57
2090-2099 (RCP 2.6)	0.71	-0.07	-1.81	0.41	17.3	1.22
1990s (1990-1999)	0	0	0	0	24	1.82
Pre-industrial (1870-1899)	-0.44	0.07	-	-	25.6	2.61
Pre-industrial (1870-1879)	-0.38	0.07	-	-	25.6	2.67
B. Changes relative to 1870-1899 (except sea level, relative to 1901)						
2090-2099 (RCP 8.5)	3.17	-0.4	-	0.86	-	-
2090-2099 (RCP 4.5)	1.72	-0.22	-	0.68	-	-
2090-2099 (RCP 2.6)	1.15	-0.14	-	0.6	-	-
2010s (2005-2014)	0.83	-0.11	-	-	-	-
Past 10 years (2005-2014)	0.72	-0.1	-	0.19*	-	-
1990s (1990-1999)	0.44	-0.07	-	-	-	-
Pre-industrial (1870-1899)	0	0	-	0	-	-
<i>*Value for 2010 obtained from instrumental records</i>						



In the oceans, higher levels of temperature, acidification and hypoxia increase the risk to ecosystems and biodiversity. The loss of Arctic sea ice and the degradation of subtropical and tropical coral reefs are significantly larger at 2°C than at 1.5°C

Observed and projected impacts at 1.5°C | Oceans (2)



- Sea level will continue to rise for centuries and **will be greater with 2°C global warming compared to 1.5°C**, increasing risks to coastal ecosystems, infrastructure, and freshwater supplies. High risk levels and adaptation limits are expected to be reached earlier at 2°C compared to 1.5°C in many locations
- Sea level will **continue to rise well beyond the end of the current century** and the GMSR by 2100 will be ~0.1m greater in a 2°C world compared to 1.5°C. Thresholds for irreversible, multi-millennial loss of the Greenland and West Antarctic ice sheets may occur at 1.5°C or 2°C
- The **risks for hundreds of millions of people in coastal communities** from eroding livelihoods, loss of cultural identity, ill health, and reduced coastal/mangrove protection **are lower with global warming of 1.5°C compared to 2°C**
- Impacts associated with sea level rise and salinity changes to groundwater or estuaries are critically important in sensitive environments such as **small islands**. **Preserving or restoring natural coastal ecosystems** can be a more cost-effective protection of coastal regions from rising sea levels and intensifying storms compared to artificial interventions, such as building sea walls and coastal hardening



1st week (2-8 December)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Open the COP and CMP and resume the CMA	Official opening ceremony and the high-level segment	Negotiations	Negotiations	Wrap-up Talanoa Dialogue preparatory phase	Negotiations	Closing SBSTA, SBI and APA
Open the SBSTA, SBI and APA	High-level nat. statements Joint session for statements	SBSTA-IPCC special event on SR15	Negotiations	Negotiations	Negotiations	Closing SBSTA, SBI and APA

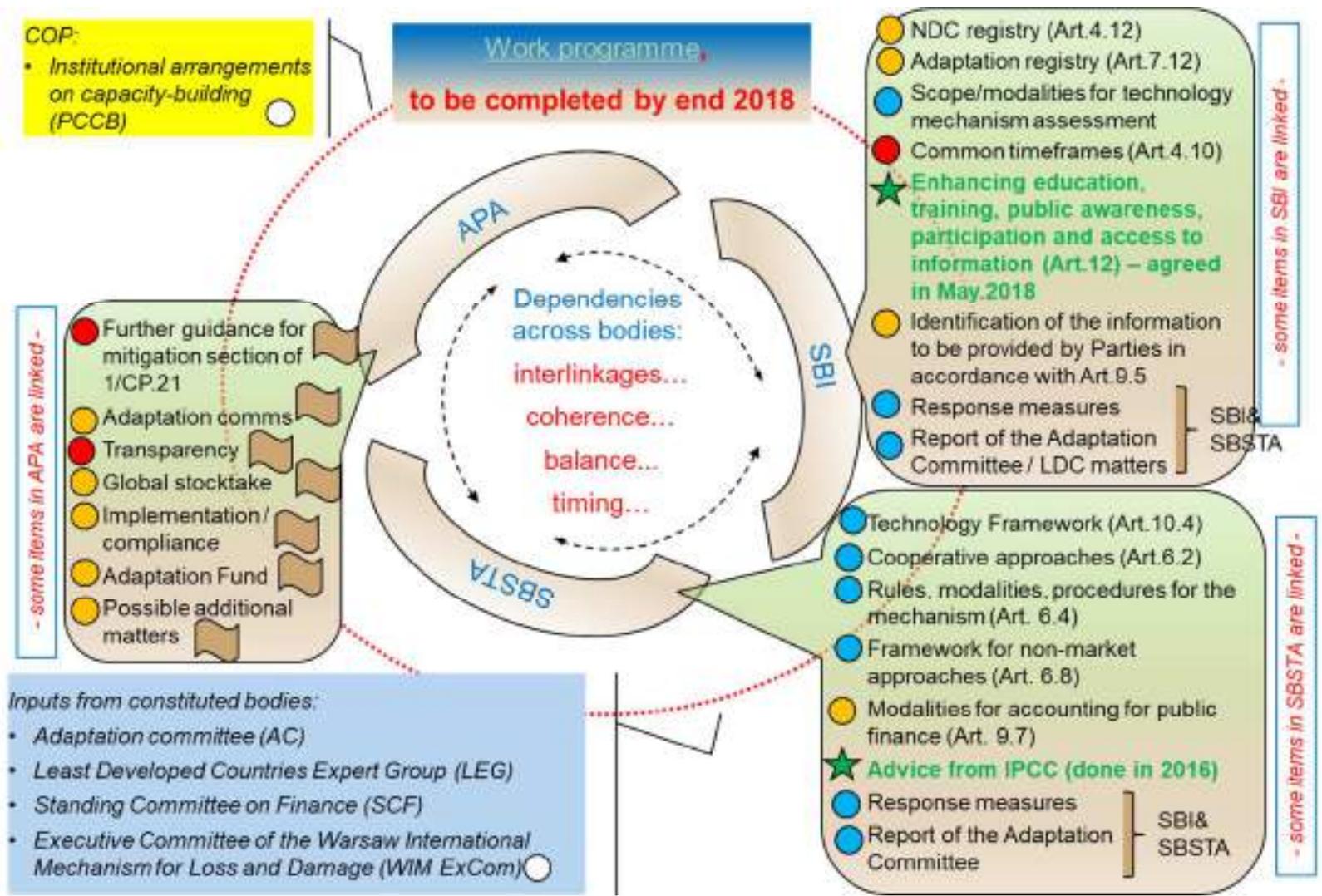
2nd week (10-14 December)

Mon	Tue	Wed	Thu	Fri
...		High-level statements	...	Closing plenaries of the COP and CMA (PAWP)
....	High-level statements (resumed)	High-level statements Closing TD	Closing plenaries of COP and CMP (nonP AWP agenda items)	Closing plenaries of the COP and CMA (PAWP)



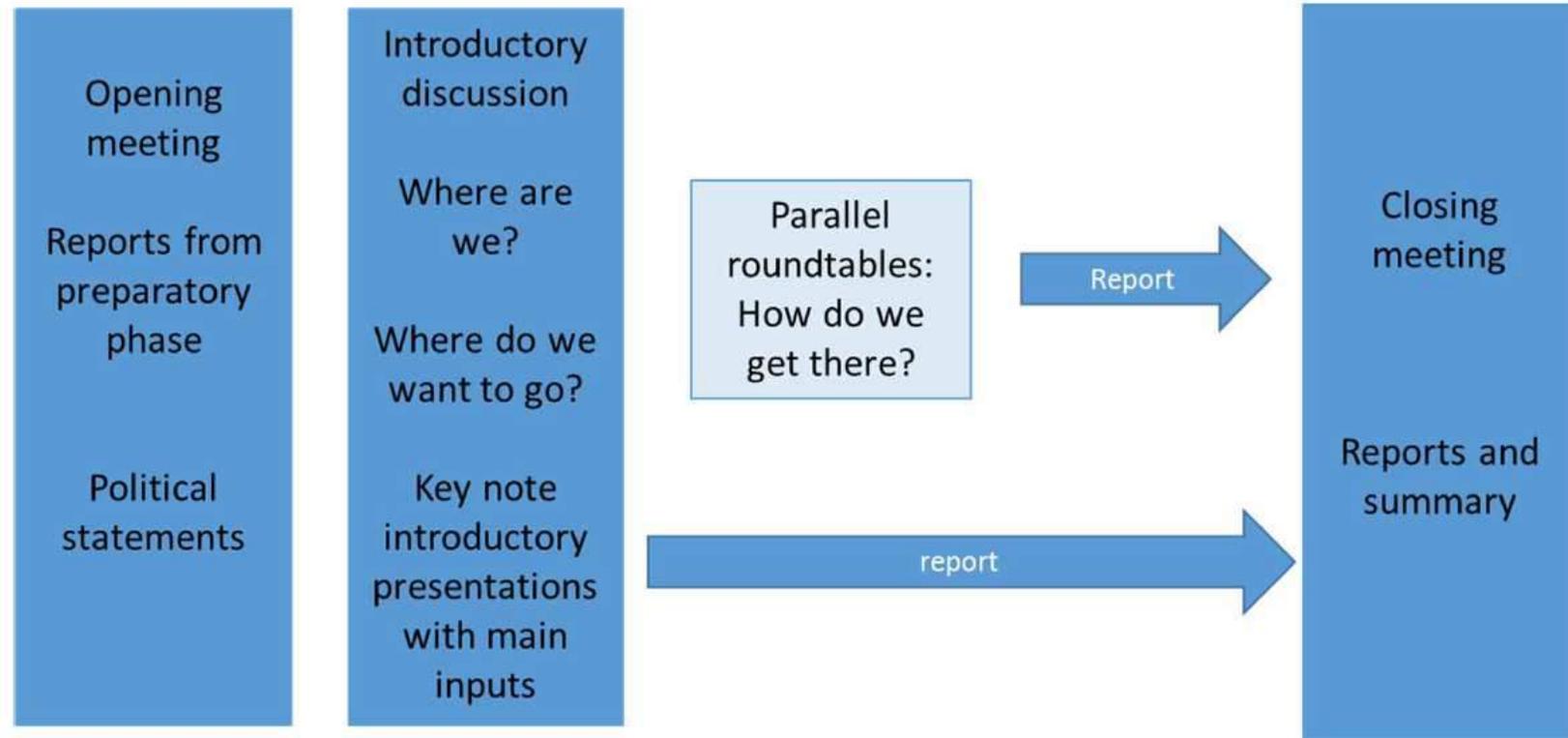
Agenda item	Content
3. Further guidance in relation to the mitigation section of decision 1/CP.21	<ul style="list-style-type: none"> • Further guidance on features of the NDCs; • Further guidance for the information to be provided by Parties to facilitate clarity, transparency and understanding of NDCs; • Guidance for accounting for Parties' NDCs
4. Further guidance in relation to the adaptation communication	Additional guidance to complement Article 7.10 ("each Party should, as appropriate, submit and update periodically an adaptation communication, which may include its priorities, implementation and support needs, plans and actions...") and Article 7.11 ("the adaptation communication shall be, as appropriate, submitted and updated periodically, as a component of or in conjunction with other communications or documents...")
5. Modalities, procedures and guidelines for the transparency framework	Recommendations for modalities, procedures and guidelines (MPGs) in accordance with Article 13.13, of the Paris Agreement and the year of their first and subsequent review and update
6. Global stocktake	<ul style="list-style-type: none"> • Identification of the sources of input for the global stocktake • Development of the modalities of the global stocktake
7. Modalities/procedures for the committee to facilitate implementation and promote compliance	Modalities and procedures for the committee
8-1. Adaptation Fund	Preparatory work for the Adaptation Fund to serve the Paris Agreement, including governance/institutional arrangements, safeguards and operating modalities
8-2. Additional matters	Five issues remaining: modalities for biennially communicating finance information on the provision of public financial resources to developing countries; initial guidance by the CMA to GCF, GEF, and to LDCF and SCCF; guidance on adjustment of existing NDCs; and setting a new collective quantified goal on finance.







- Overview of inputs (May)
- Update of the Overview of inputs (29 October deadline for new inputs)
- Synthesis report: Talanoa discussions + overview of inputs + implications of IPCC SR15

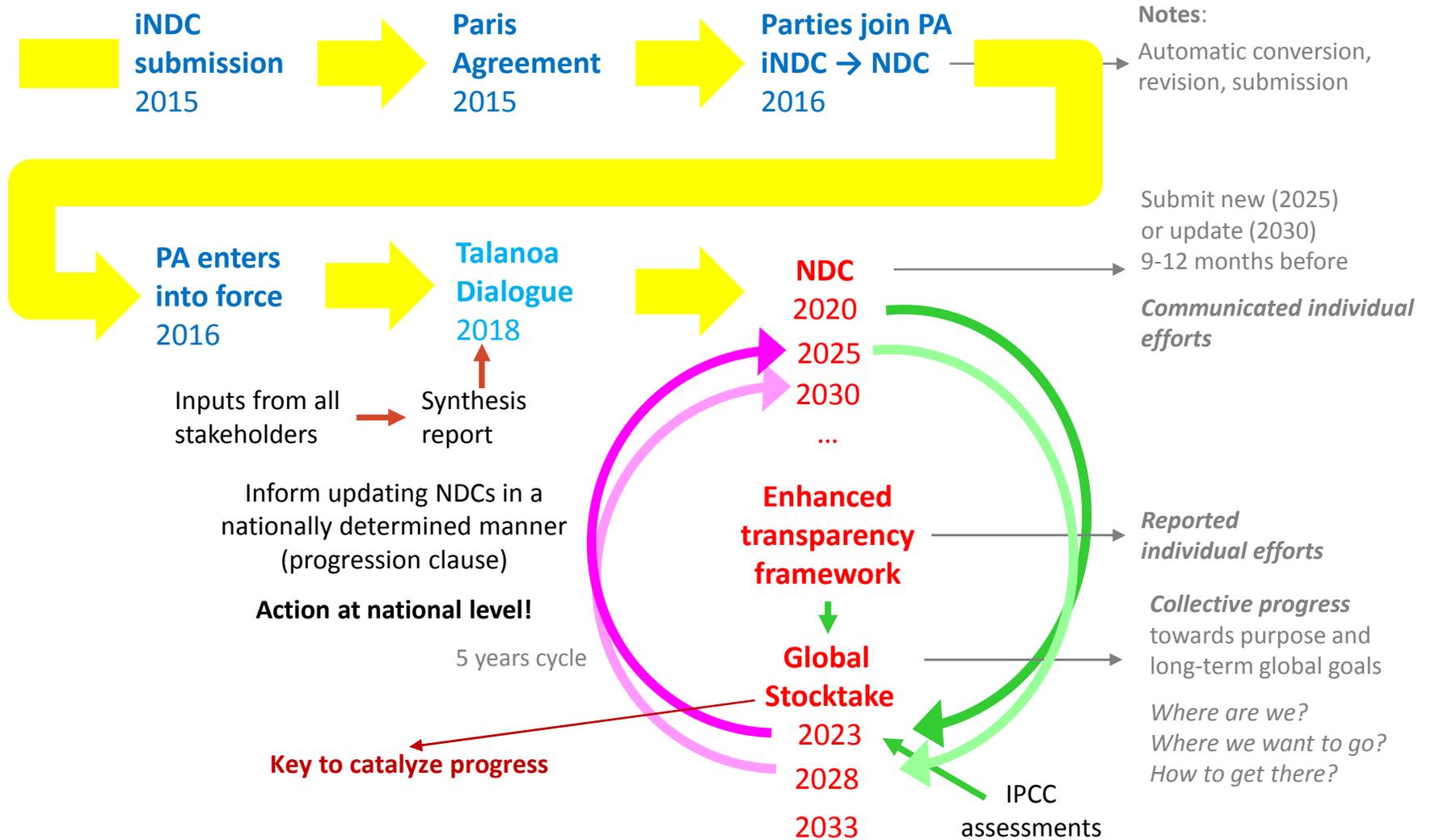


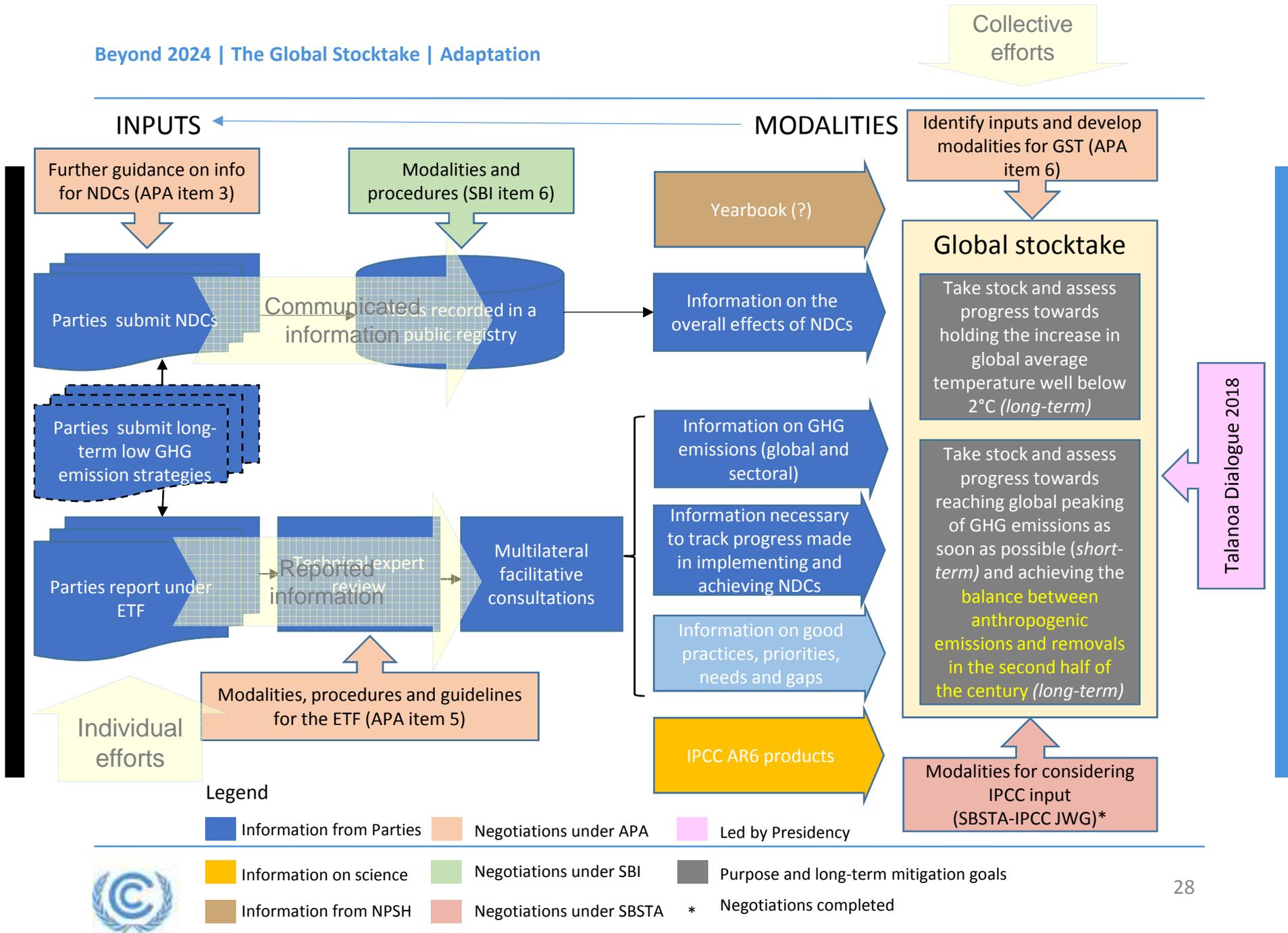
- Ministerial roundtables
- Key findings of the IPCC SR15 will be presented

- Recognition of:
 - The **value of Earth Information Day** (EID) is recognized; standing mandate to organise an EID annually at future COPs
 - The importance of **strengthening climate services** to support adaptation and mitigation, particularly in developing countries – and need for Parties to support this work
 - **Gaps in systematic observation** to support climate indicators, climate services and research– (e.g., in IPCC SR1.5, Oceans, GCOS headline climate indicators, Global Carbon Project)
 - The **GCOS workshop in East Africa** and the importance of strengthening systematic observation and data reporting in East Africa
 - The satellite community work on **ECV Inventory Gap Analysis** and on defining an **optimum GHG monitoring constellation**
 - The potential **top-down approaches** to support Parties’ national GHG emission reporting under the Convention and Paris Agreement
- Encouragement to Parties and relevant organizations **to support observation, data services and climate services as far as possible** and take advantage of funding opportunities available



Beyond 2024 | Paris Agreement | The “ambition” cycle





Collective efforts

INPUTS

MODALITIES

Identify inputs and develop modalities for GST (APA item 6)

Further guidance on info for NDCs (APA item 3)

Modalities and procedures (SBI item 6)

Yearbook (?)

Parties submit NDCs

Communicated, recorded in a information public registry

Information on the overall effects of NDCs

Parties submit long-term low GHG emission strategies

Parties report under ETF

Reported information Technical expert review Multilateral facilitative consultations

Information on GHG emissions (global and sectoral)

Information necessary to track progress made in implementing and achieving NDCs

Information on good practices, priorities, needs and gaps

Modality, procedures and guidelines for the ETF (APA item 5)

IPCC AR6 products

Global stocktake

Take stock and assess progress towards holding the increase in global average temperature well below 2°C (long-term)

Take stock and assess progress towards reaching global peaking of GHG emissions as soon as possible (short-term) and achieving the balance between anthropogenic emissions and removals in the second half of the century (long-term)

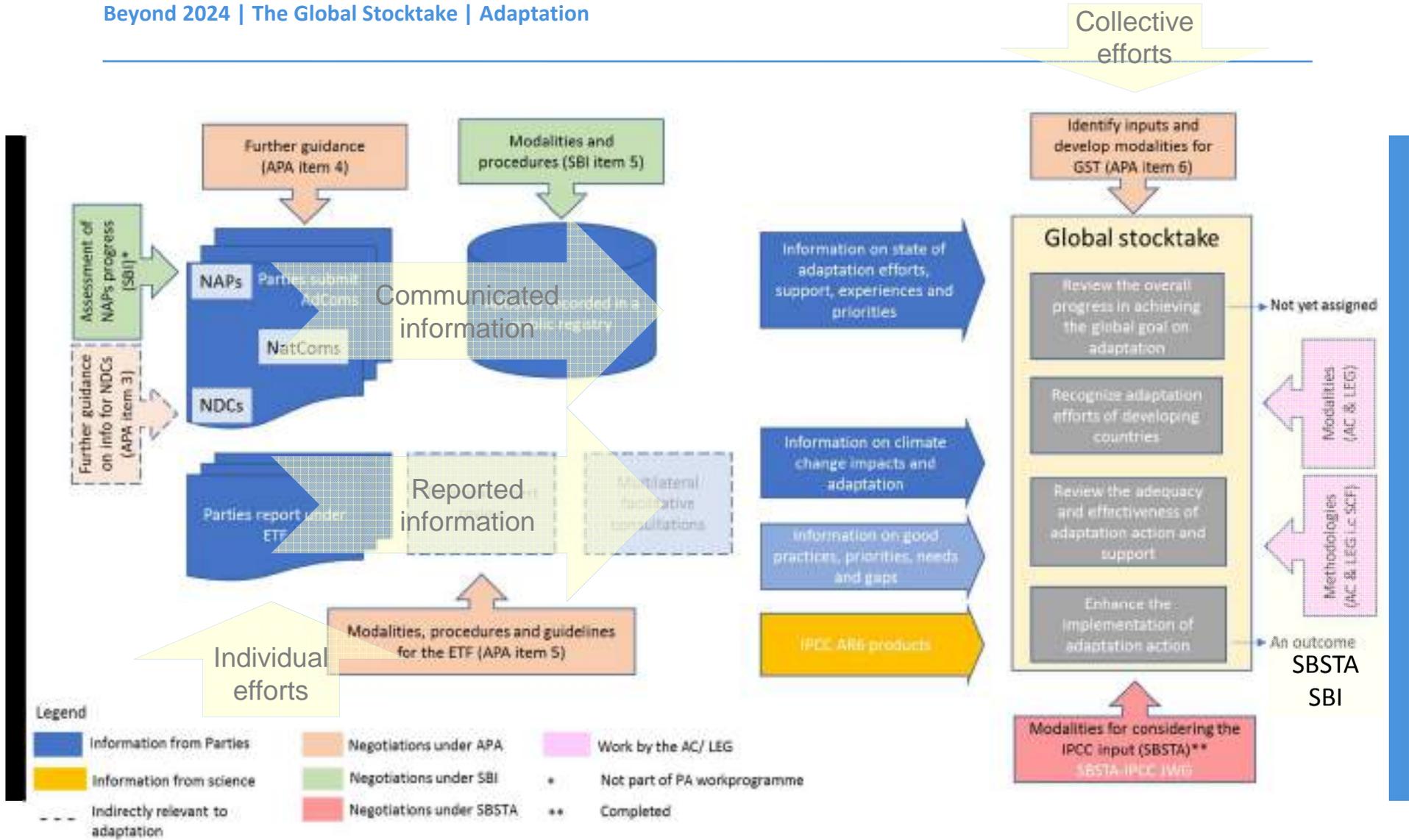
Talanoa Dialogue 2018

Modalities for considering IPCC input (SBSTA-IPCC JWG)*

Legend

- Information from Parties
- Negotiations under APA
- Led by Presidency
- Information on science
- Negotiations under SBI
- Purpose and long-term mitigation goals
- Information from NPSH
- Negotiations under SBSTA
- * Negotiations completed





Thank you!

