

CCI+ in the WGI contribution to the IPCC 6th Assessment Report

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Coordinating Lead Author AR6 WGI Atlas;
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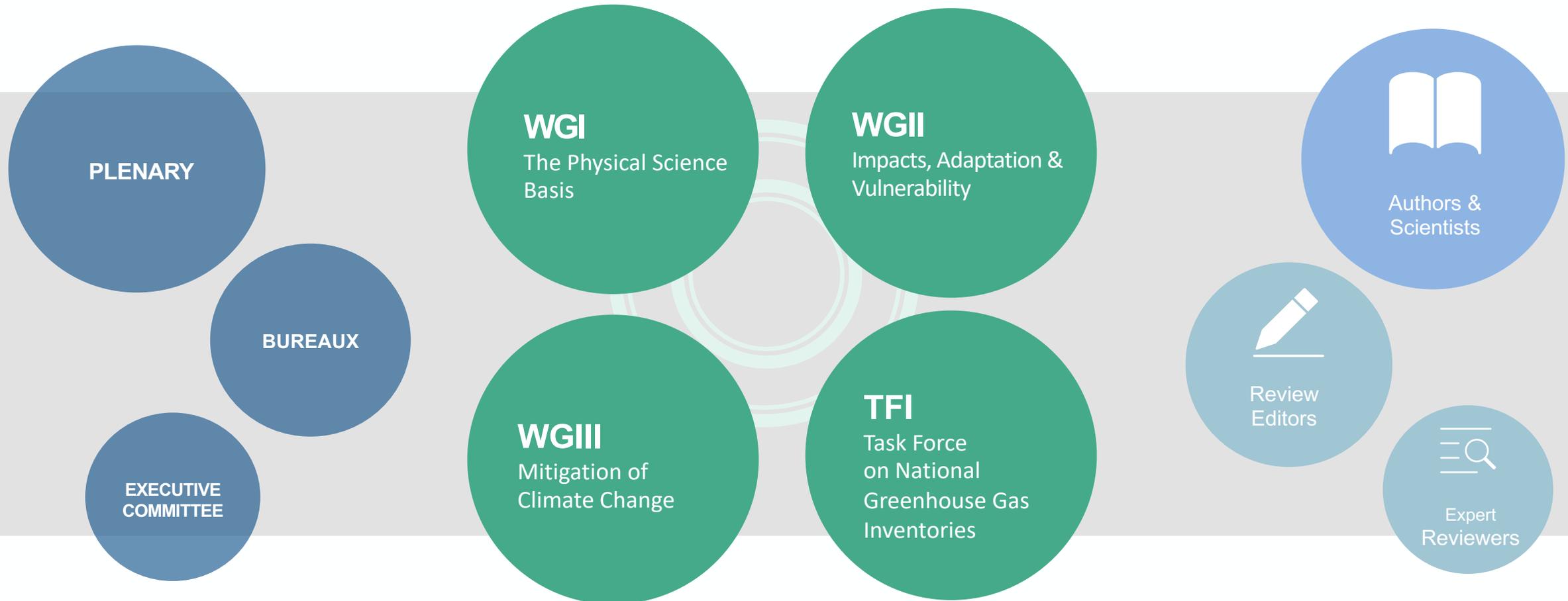
HISTORY | EVOLUTION OF THE IPCC



Intergovernmental Panel

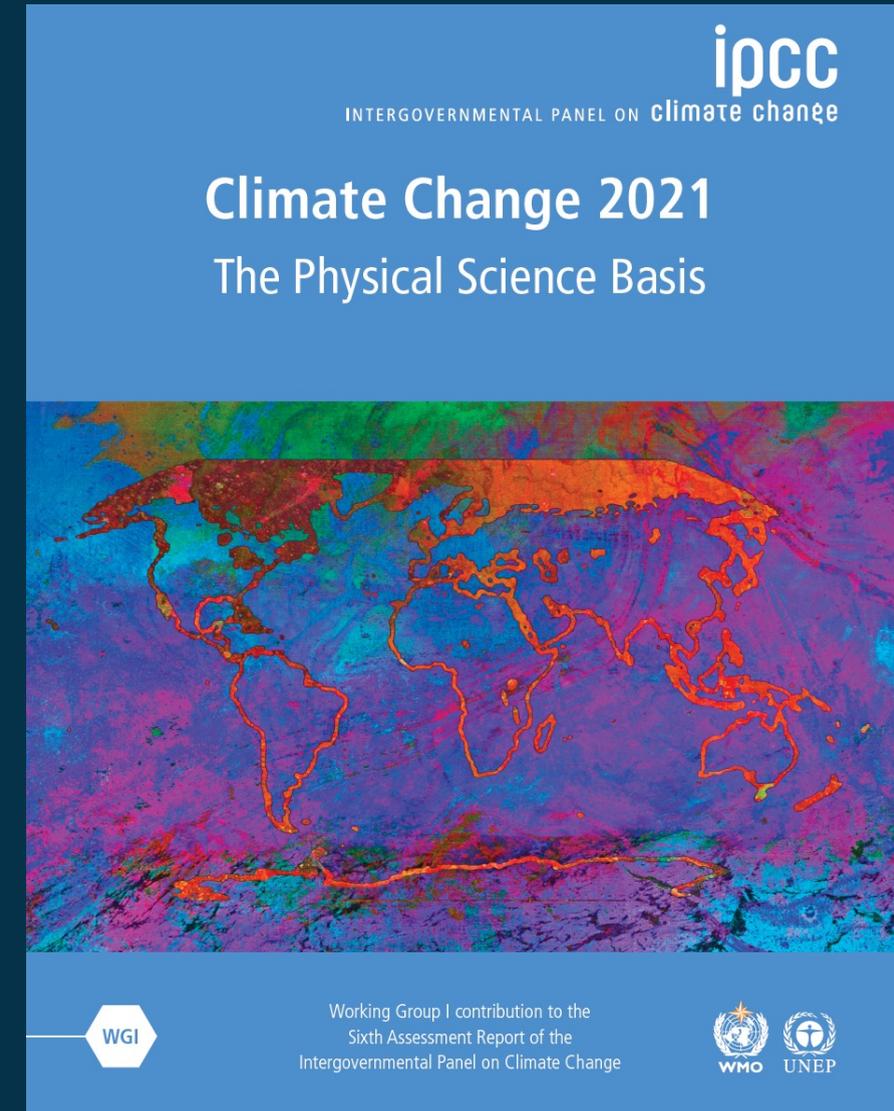
195 member States appointing National Focal Points

Hundreds of **scientists and experts from around the world** are involved in the preparation of IPCC reports



AR6 WG 1 – The Physical Science Base

- Assesses changes in the physical climate system to establish the evidence base for policy responses to climate change
- Strongest, most significant IPCC report to date
- Draws from 14,000 scientific publications
- Author team of 234 from more than 60 countries
- 3 rounds of reviews; responses to ~75,000 comments
- New estimates of chances of crossing global warming level of 1.5°C in coming decades and remaining well below 2°C
- Improved understanding of human influence on all aspects of the climate and in all regions
- Greater focus on regional climate change, changes in extreme events & link to human activity
- Interactive online global and regional atlas for observed & projected climate change information



Chapter 1 – Framing, Context, Methods:

*“**Sentinel missions of the Copernicus programme**...providing high spatial resolution and land-surface images.”*

*“ESA’s **Cryosat-2** radar altimetry satellite mission has continued to provide measurements of the changes in the thickness of sea ice and the elevation of the Greenland and Antarctic ice Sheets....longer timeseries from multiple missions have led to considerable advances in understanding the origin of inconsistencies between mass balances of different glaciers and reducing uncertainties in estimates of changes in the Greenland and Antarctic Ice Sheets.”*

*“ESA **SMOS**...filling critical gaps in the observation of hydrological trends and variability over land (Dorigo et al).”*

Chapter 10 - Linking Global to Regional Climate Change:

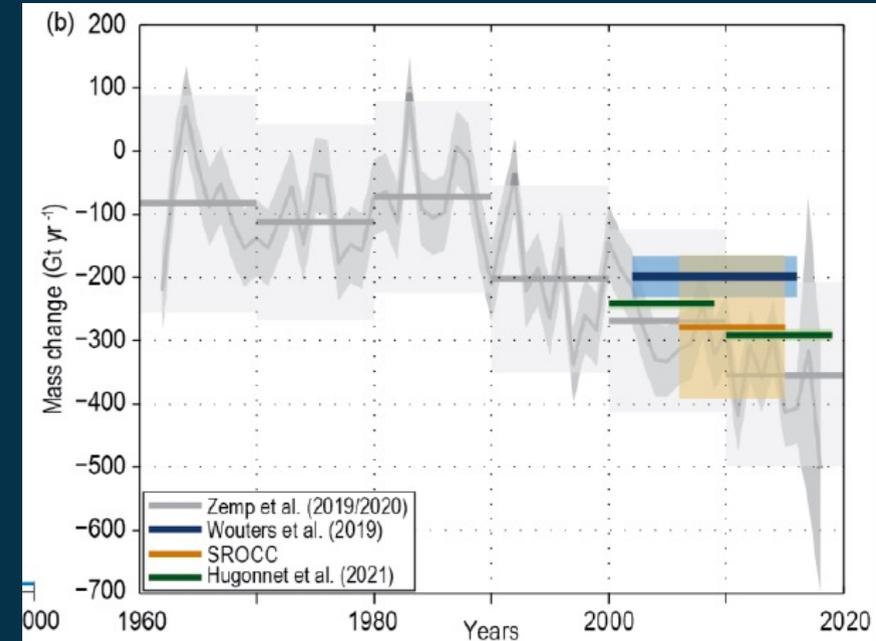
*“Satellite products provide a valuable complement to in situ measurements, particularly over regions where in-situ measurements are unavailable...Currently 54 essential climate variables (ECVs; Bojinski et al., 2014) are defined on...**to the Copernicus Climate Change Service of the European Union, to the ESA Climate Change Initiative ESA-CCI**...by the Global Climate Observing System (GCOS) program, and passed Their observations are valuable (high confidence) for regional applications since they provide multi-channel images at very high spatiotemporal resolutions.”*

ESA Science: support for headline statements

"It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean cryosphere and biosphere has occurred."

"The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years."

"Improved knowledge of climate processes, paleoclimate evidence and the response of the climate system to increasing radiative forcing gives a best estimate of equilibrium climate sensitivity of 3 degrees with a narrower range compared to AR5."



AR6 Chapter 2 Figure 2.23: Annual and decadal global glacier mass change

ESA's Climate Change Initiative: contributions

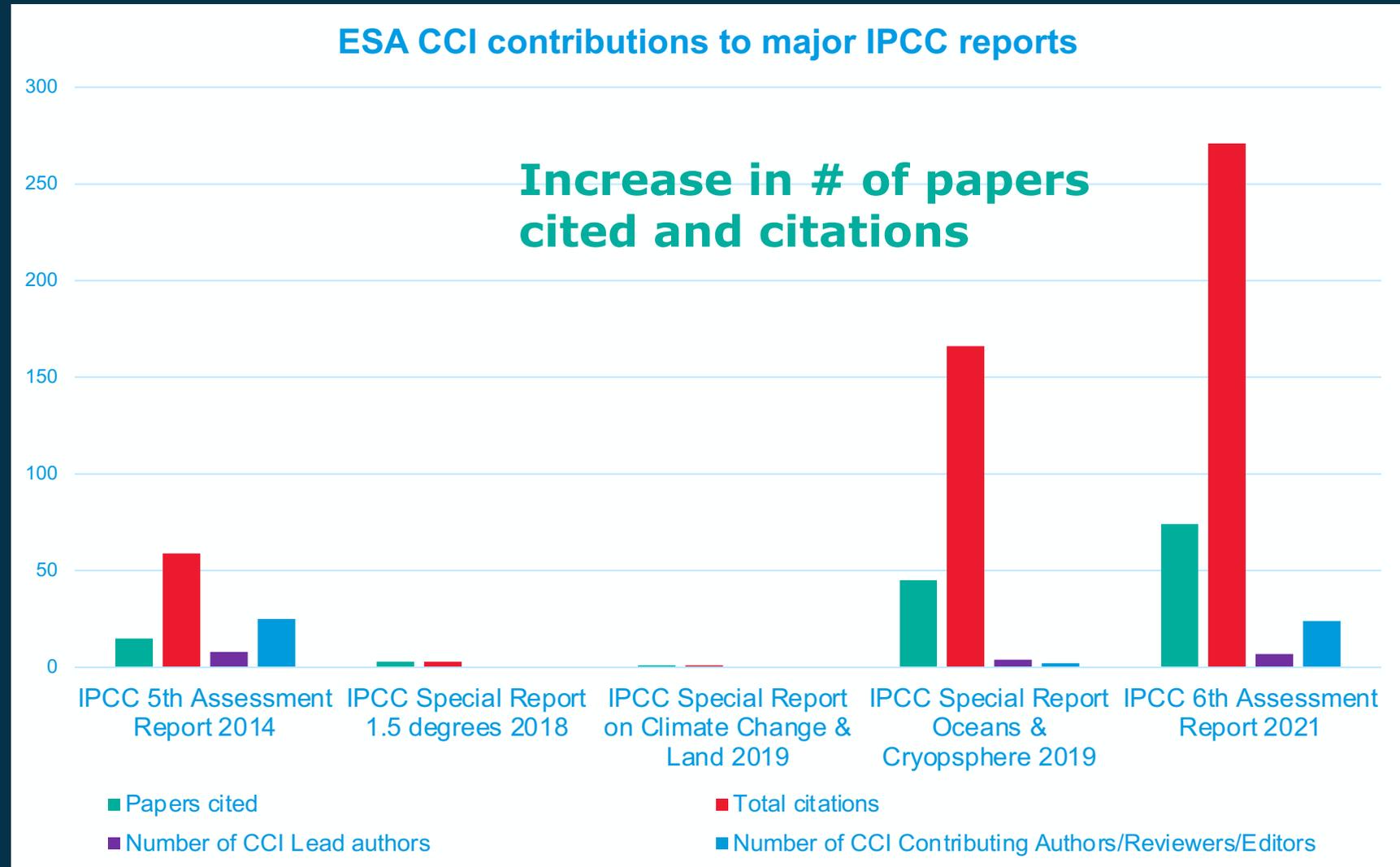
AR6 WG1 report:
7 lead/coordinating authors

14 contributing authors

~10 expert reviewers

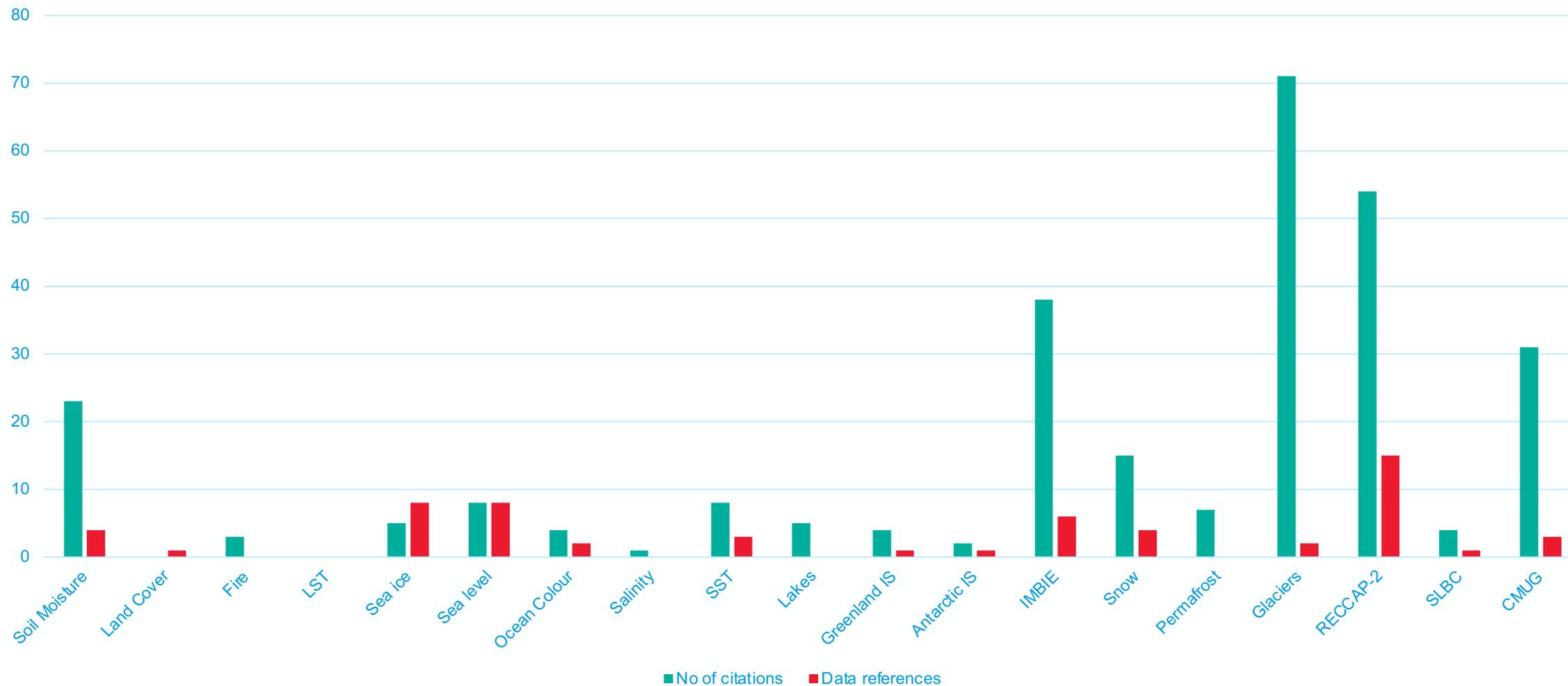
~75 papers cited

~285 in-text citations



CCI projects' contribution

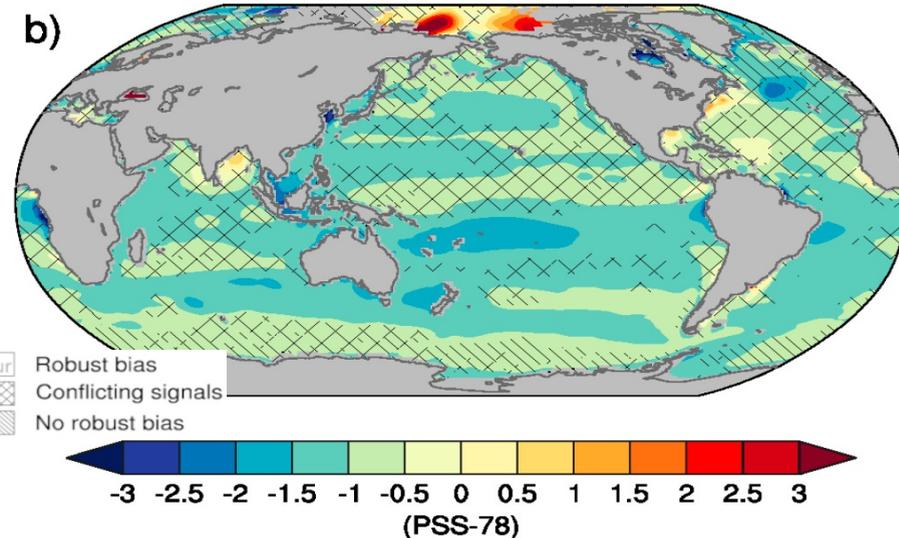
IPCC 6th Assessment Report
Citations and data references by CCI Project





- 4 CMUG lead/coordinating authors
- 4 CMUG contributing authors
- CMUG contributes to the Earth System Model Evaluation Tool (ESMValTool), an open access diagnostics & evaluation tool giving **climate modelers easy access to observational data (including 5 CCI datasets) for easy, fast, traceable and reproducible evaluation of complex Earth System Models**
- CMUG partners are heavily involved in ESMValTool development: DLR & Met Office are Co-PIs, SMHI, IPSL, MPI & BSC developers

CMIP6 Sea Surface Salinity Bias



Chapter 3 on Human Influence on climate change states ESMValTool used to “ensure traceability of the results and provide an additional level of quality control”.

In Technical Summary fig TS.2 & chapter 3 fig 3.42 & 3.43, ESA CCI SM & SST among “primary reference observational datasets” to show progress in climate models.

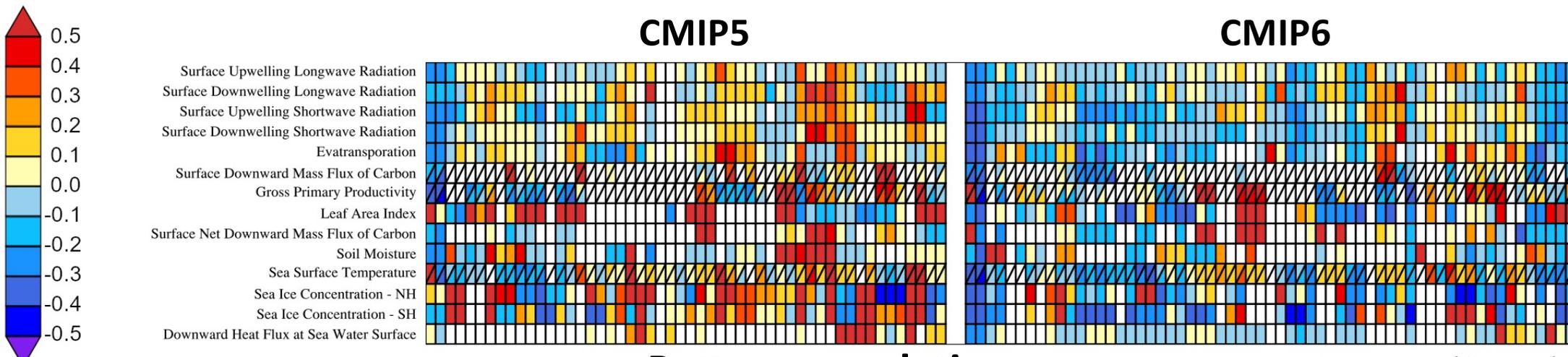




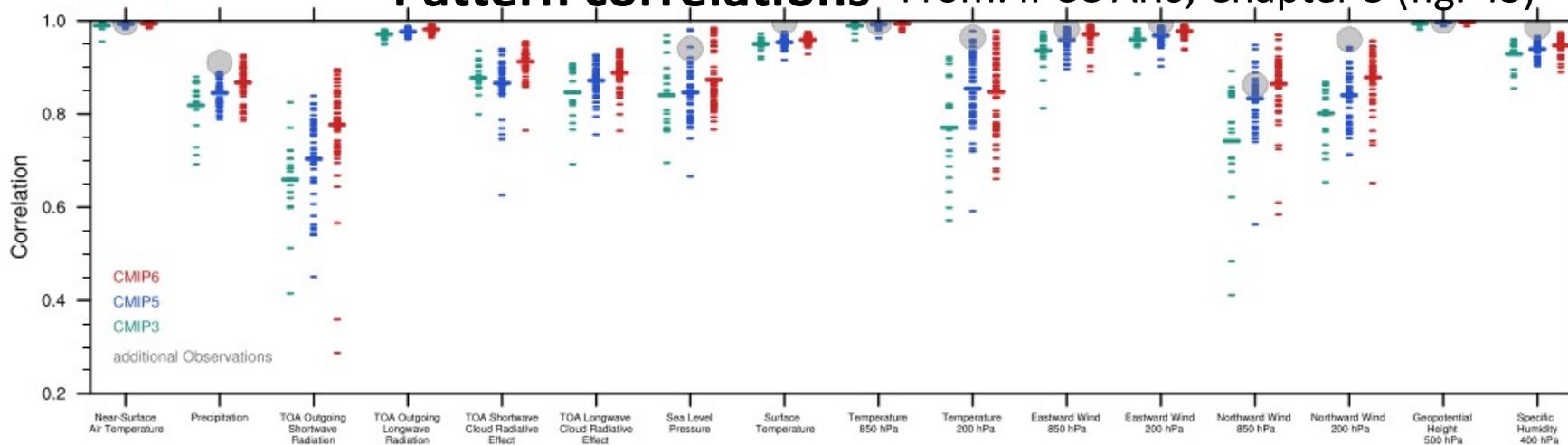
Evaluation of CMIP6 models with ESMValTool



Relative model performance (RMSD) From: IPCC AR6, Chapter 3 (fig. 42)



Pattern correlations From: IPCC AR6, Chapter 3 (fig. 43)



Break-out room discussions on ideas for future ESA climate research activities relevant to IPCC



- After ECV project highlights attendees assigned randomly to six break-out rooms
- Self-organize a chair to facilitate the discussion and a rapporteur to capture ideas
- Focus on two questions:
 - What significant new contribution(s) could future CCI activities make in the IPCC AR7 reports?
 - What work in CCI+ phase 2 and the follow-on programme is required for these contributions?
- Complete power-point with list of ideas from each question
- Present 3-minute report back to plenary



What significant new contribution(s) could future CCI activities make in the IPCC AR7 reports?

- Idea 1



What work in CCI+ phase 2 and the follow-on programme is required for these contributions?

- Idea 1

