



WGCM

40th Session of the WCRP Joint Scientific Committee

Catherine Senior, WGCM co-chair

May 2019

Geneva, Switzerland



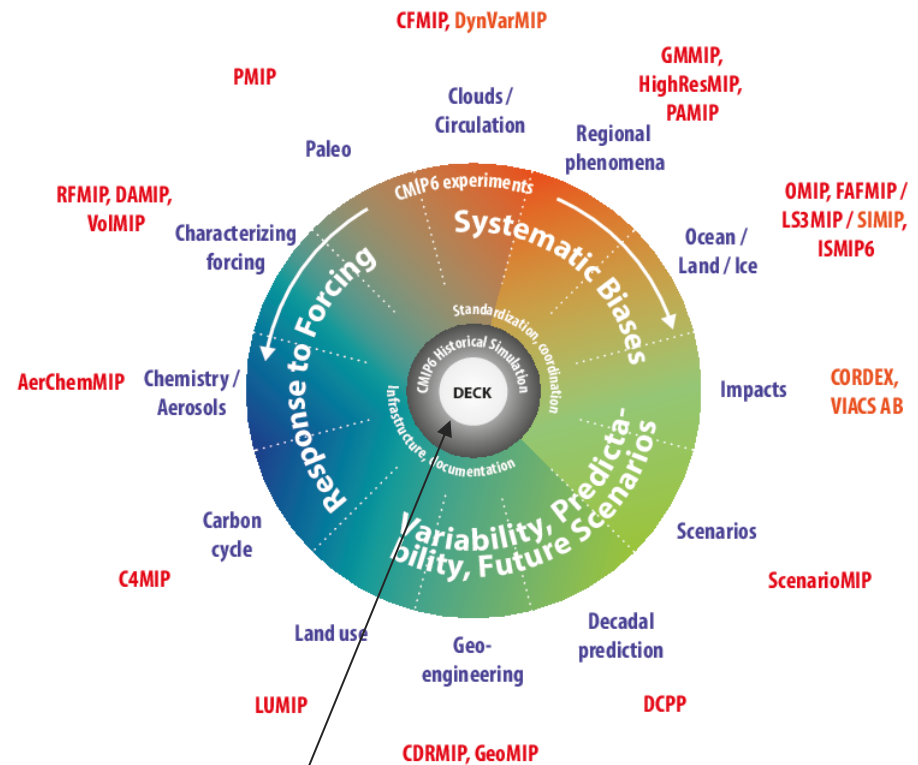
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Progress and achievements

CMIP

- CMIP is organized and coordinated by the CMIP panel (chaired by Veronika Eyring) within WGCM
- Models from 42 worldwide institutions are participating in 23 CMIP6-endorsed MIPs



DECK (entry card for CMIP)

- AMIP simulation (~1979-2014)
- Pre-industrial control simulation
- 1%/yr CO₂ increase
- Abrupt 4xCO₂ run

CMIP6 Historical Simulation (entry card for CMIP6)

- Historical simulation using CMIP6 forcings (1850-2014)

Progress and achievements

- Model simulations for CMIP6 are now progressing with rapid activity over the next few months as the AR6 timelines approach
- Model output now being served by ESGF from 14 institutions (19 models)
- Much output will be made available over the coming months

https://pcmdi.llnl.gov/CMIP6/ArchiveStatistics/esgf_data_holdings/

model	# of activities	Aer	Che	mMI	C4MIP	CFMIP	CMIP	DAMIP	DCPP	FAFMIP	GeoMIP	HighRes MIP	LS3MIP	LUMIP	OMIP	PMIP	RFMIP	Scenario MIP
# of models	61	5	2	3	19	5	1	1	1	1	10	1	2	1	1	3	6	
BCC-CSM2-MR	2						1732											39
BCC-ESM1	1						671											
CESM2	4				706		11252						196	953				
CESM2-WACCM	1						4958											
CMCC-CM2-HR4	1											40						
CMCC-CM2-VHR4	1											40						
CNRM-CM6-1	4	433					7062	5161										1518
CNRM-ESM2-1	5	400	724				9061										591	3120
CanESM5	5	124	585				3994	10493										7305
E3SM-1-0	1						17											
EC-Earth3	1						336											
ECMWF-IFS-HR	1											40						
ECMWF-IFS-LR	1											40						
FGOALS-f3-L	1						1											
GFDL-AM4	1						69											
GFDL-CM4	1						479											
GISS-E2-1-G	4				166		2884	4150						830				
GISS-E2-1-H	1						1439											
HadGEM3-GC31-HM	1											45						
HadGEM3-GC31-LM	1											46						
HadGEM3-GC31-MM	1											46						
IPSL-CM6A-ATM-HR	1											250						
IPSL-CM6A-LR	11	949	4		3397	36605	19586	116015			1156	271			642	1628	5054	15160
MIROC6	2						2347			545								
MRI-ESM2-0	5	162					1242	486									324	648
NICAM16-75	1											41						
SAM0-UNICON	1						1											
UKESM1-0	1						772											



Progress and achievements

- 249 participants from 26 countries with a high representation of ECRs
- Representatives from at least 20 CMIP6-Endorsed Model Intercomparison Projects (MIPs) and 25 modelling groups
- IPCC CLA/LAs from all AR6 chapters
- Many parallel scientific meetings (WGCM-22, WMAC, GC on Carbon cycle).

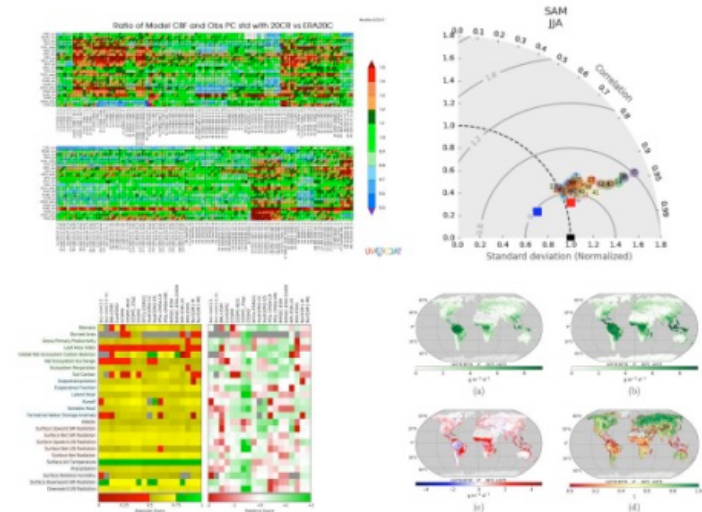
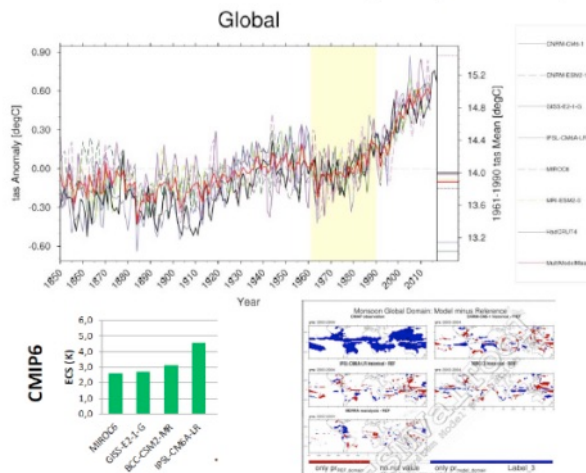
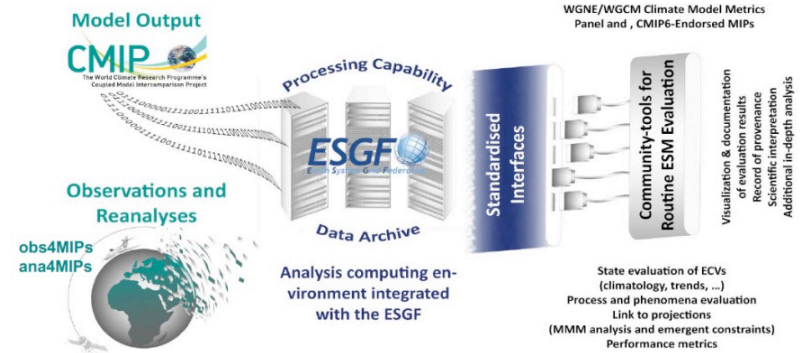
CMIP6 Analysis Workshop, Barcelona, March 24-28th, 2019



Progress and achievements

Routine Evaluation in CMIP

- Results now emerging
- Well established analysis
- Sharing of diagnostic code



Progress and achievements

Grand Challenge on Clouds, circulation and climate sensitivity

Science Question Workshops in 2018

- Storm tracks, monsoons and tropical rainbelts

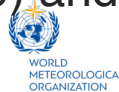


Two WCRP/GC Assessments

- Climate Sensitivity: synthesis across multiple lines of evidence; robust 5-95% ranges
- Aerosol Radiative forcing: synthesizes lines of evidence for weak/strong forcing
=> Both aiming to deliver review papers for AR6

Future Activities

- ICTP summer school: Convection organization and climate sensitivity (July 2019)
- EUREC4A field experiment (2020) and grey-zone project



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Progress and achievements

Grand Challenge on Carbon Cycle

Science Workshops in 2018

- Predictions and predictability of the carbon cycle - September 2018, Boulder , USA
- Extending the Climate-Carbon Cycle Feedback Framework - April 2018, Bern, Switzerland

Future Activities



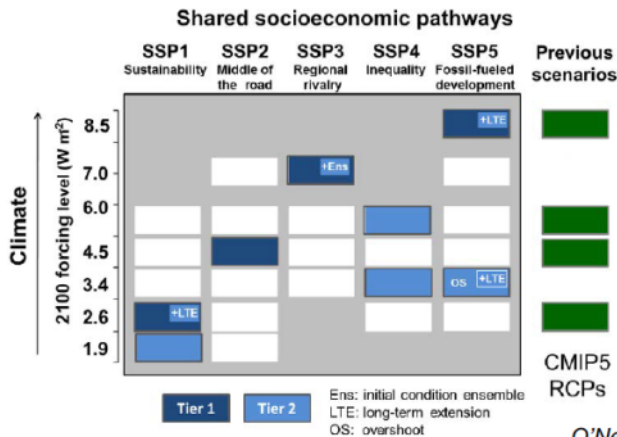
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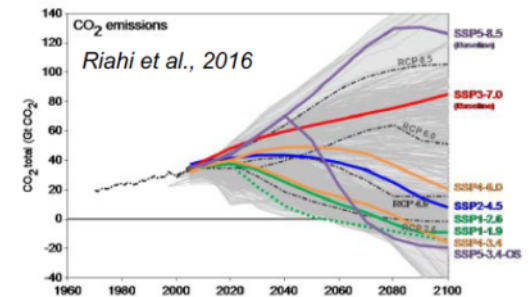
Future plans

Understanding model projections and predictions, climate variability and systematic errors

- Modelling centres will continue to run CMIP6 experiments into 2020 and MIP analysis will continue over many years
- Many papers will be aimed at AR6

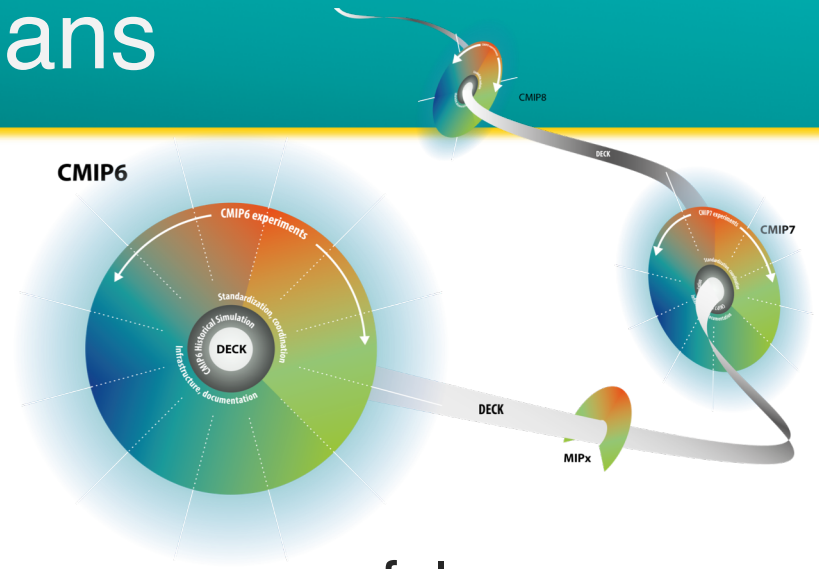


Future in CMIP6: 2015-2100 plus Extensions to 2300



Future plans

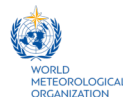
CMIP continuity and way forward



- Distributed CMIP organization proven successful
- Separation of the timescales e.g.
 - DECK, historical + scenarios?) go on faster timescales; more automatic infrastructure in place, smaller burden on modelling centres
 - Science questions planned in CMIP6-Endorsed MIPs to continue over next phase (CMIP7) on longer timescales. More robust Infrastructure also needed.
- Enough experiments and research questions in CMIP6 to fuel research over the next phase
- Further discussion will engage all modelling centres

Links to the WCRP Strategic and Implementation Plans

- WGCM and the CMIP Panel are well situated within the WCRP structure at the moment.
- WGCM and CMIP produce some of the most visible and influential outcomes of WCRP, and leverage a huge investment by many countries.
- Our concerns related to the Strategic Plan relate to maintaining (ideally improving) this visibility and effectiveness.
- We believe that WGCM has played a crucial role in both fundamental model development and coordinated intercomparison projects, providing high-profile input to climate assessments and policy development. These activities should remain core features of the new Strategic Plan, the Implementation Plan, and any revision to the WCRP structure.



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Emerging issues

- CMIP essential infrastructure is currently delivered by volunteer efforts by the WGCM members, the CMIP Panel, and the individual scientists in often unfunded effort.
- Infrastructure includes;
 - ‘forcing data’ for climate model simulations
 - development of data formats and standards
 - documentation and software to contribute model output to the ESGF and allows users from around the world to access this massive multi-model data set.
- WGCM under the guidance of WCRP Csc (Pavel Kabat) are asking WMO for financial and project support for CMIP infrastructure to put (at least) parts of CMIP on a more operational footing