CMIP immediate future?

CMIP6+, input4MIPs and obs4MIPs

Some steps toward an “operational” CMIP from the WGCM Infrastructure Panel (WIP)

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and the WIP membership

WGCM-24
Thursday 9th December 2021 - Virtual

LLNL-PRES-829833
This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC

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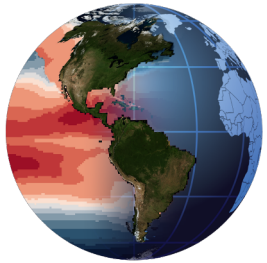
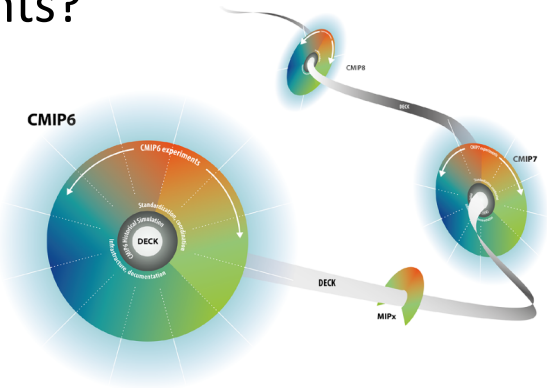
CMIP6+



CMIP6+
Coupled Model Intercomparison Project next phase

How can we leverage existing infrastructure investments?

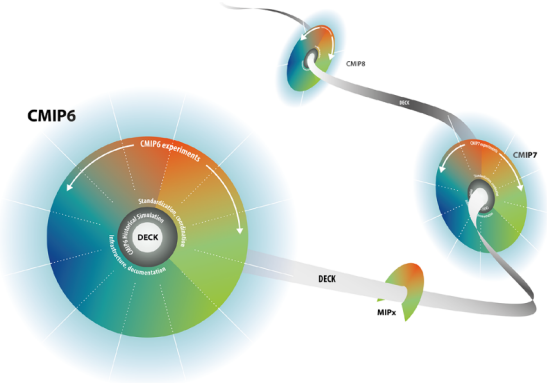


- Agile, responsive evolution
  - Continuous DECK is a start
  - Facilitate, respond and enable science opportunities
    - COVIDMIP, ZECMIP/C4MIP
- Allow CMIP to evolve and “operationalize”
  - Incremental change (e.g. maintain ESGF dependence)
  - Next gen forcings and obs
  - Change little, increment, allowing modeling groups to focus on science
- Best prepare CMIP for exascale and the AI/ML onslaught

CMIP6+

How can we leverage existing communities?

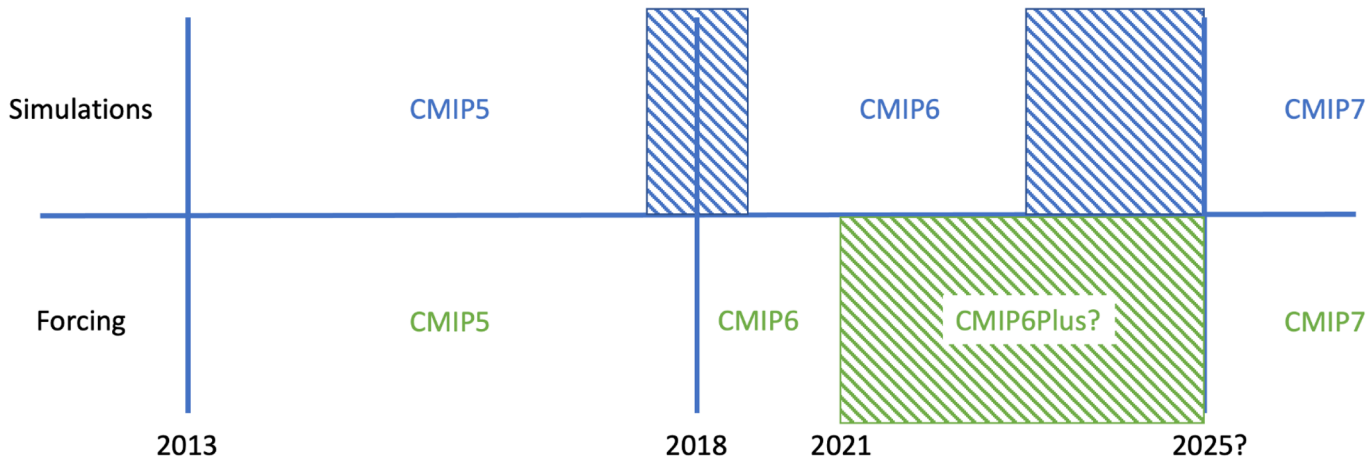
- Continue beyond CMIP6, few changes as CMIP7 is discussed and planned
  - Reduce time pressures - loosen CMIP*x* - IPCC AR*x* linkage
  - Continuous “CMIP science” - not monolithic phases every ~7 years



- Facilitate and recognize contributors
  - Ensure ALL contributions are recognized
  - How can we aid forcing data providers?
    - Funding? (“CMIP endorsed” data provider)
    - Infrastructure support?

CMIP6+ a mud map

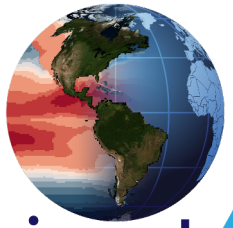
A forcing evolution following the continuous CMIP DECK paradigm



Transition between MIP-era model simulations

Transition between MIP-era forcing datasets (broader, prototype datasets need iteration before "formal" model simulations begin)

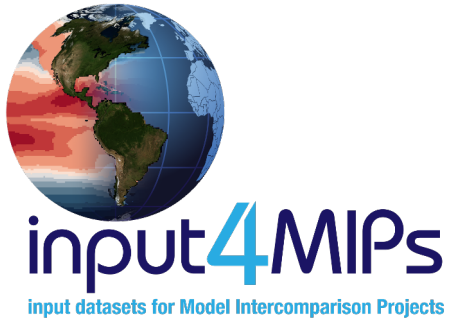
input4MIPs



How can we leverage existing communities and infrastructure?

- Allow the CMIP DECK (and *MIPs?) to evolve
  - CMIP6-era forcings conclude in 2014, but data providers have updates
    - PCMDI AMIP data updated to June 2021, six-monthly updates scheduled
    - PNNL/UMD CEDS/Emissions data updated to near realtime (~May 2021)
    - NASA GloSSAC v2/SAOD updated to December 2018
  - Update CMIP6+ forcing data to near real-time
    - CMIP6-era models re-run with new forcings - piControl, AMIP, historical-ext
      - Be responsive to science opportunities - e.g. Pinatubo 2.0/COVIDMIP
      - Evaluate new forcing datasets before CMIP7 “prime time”
      - Potentially more than a single endorsed forcing can be evaluated
    - “CMIP7” model development aided with latest-generation forcing

input4MIPs



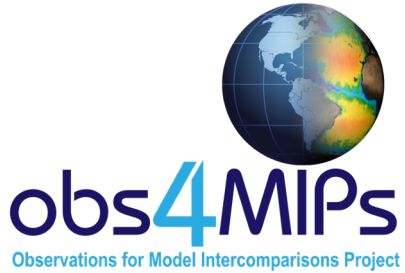
Feedback from modelling groups

- CMORize forcing data
    - Many datasets don't align with single variable CMIP data standard
    - Is data format provided fit for purpose or rewritten?
- Extend ESGF data search capabilities
- Better document/more transparent IAM-generated scenario data
    - Are IAM inconsistencies a problem?

Other ideas

- Missing forcings? (IPSL: N-cycle, water isotopes,)
- Forcing data problems? (Led to 3 CMIP6 releases: 6.0 Dec 2016, 6.1 May '17, 6.2.1 Oct '17)

obs4MIPs update

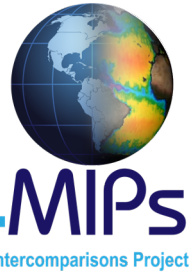


- Limited progress in the last few years has led to a rethink of how to make obs4MIPs more useful. A revitalization of the effort is underway

- A new emphasis strives to streamline how products can be made compliant with CMIP/obs4MIPs

- Prioritize adherence to data standards with a more agnostic approach to data quality

Three tiers of obs4MIPs

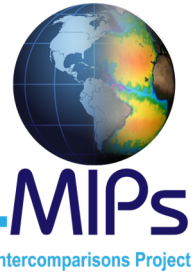


1. Version controlled obs4MIPs compliant datasets

2. Compliant datasets published on ESGF

3. Reviewed ESGF-published datasets (primarily assessing compliance with standards, with quality judgements mostly made elsewhere, e.g., GEWEX/GDAP Assessments)

obs4MIPs in 2022



- Project site to be overhauled and migrated from CoG to WCRP
- 3rd party contributions are being enabled (i.e., not required to be processed by original data curators)
- Codes used to process each dataset to be included in the version control - shared experience via code repo expected to expedite new contributions
- Many new/updated datasets to made available via 3rd party contributions
- Reformulation of a project team underway including new contributors (P. Gleckler, LLNL-ret; S. Pinnock, ESA; N. Caltabiano, WCRP; S. Ames, LLNL; P. Durack, LLNL; R. Ferraro, JPL; G. Elsaesser, GISS). **There are other contributors joining and we welcome the involvement of interested parties.**

CMIP7 some ideas

Can we optimize to meet the science goals, rather than bloat the archive?

- Not just data request - rather *MIPs provide diagnostics/code to implement
    - Rather than requesting data, request the targeted diagnostic
    - Plus, less data; minus, locks out spontaneous science opportunities
- MIPs define diagnostics to implement within models
    - Advance the inclusion of key simulators (ala COSP)
    - Encourage MIP diagnostic team development - move workload to MIP chairs, not modellers
- How best to leverage community diagnostics:
    - ESMValTool and CMEC (Coordinated Model Evaluation Capabilities)
- Can we amalgamate efforts to reduce overheads (input4MIPs, obs4MIPs, …)?

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Work completed by the PCMDI project is funded by the U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research, Regional and Global Model Analysis Program

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