WCRP Planning for CMIP6

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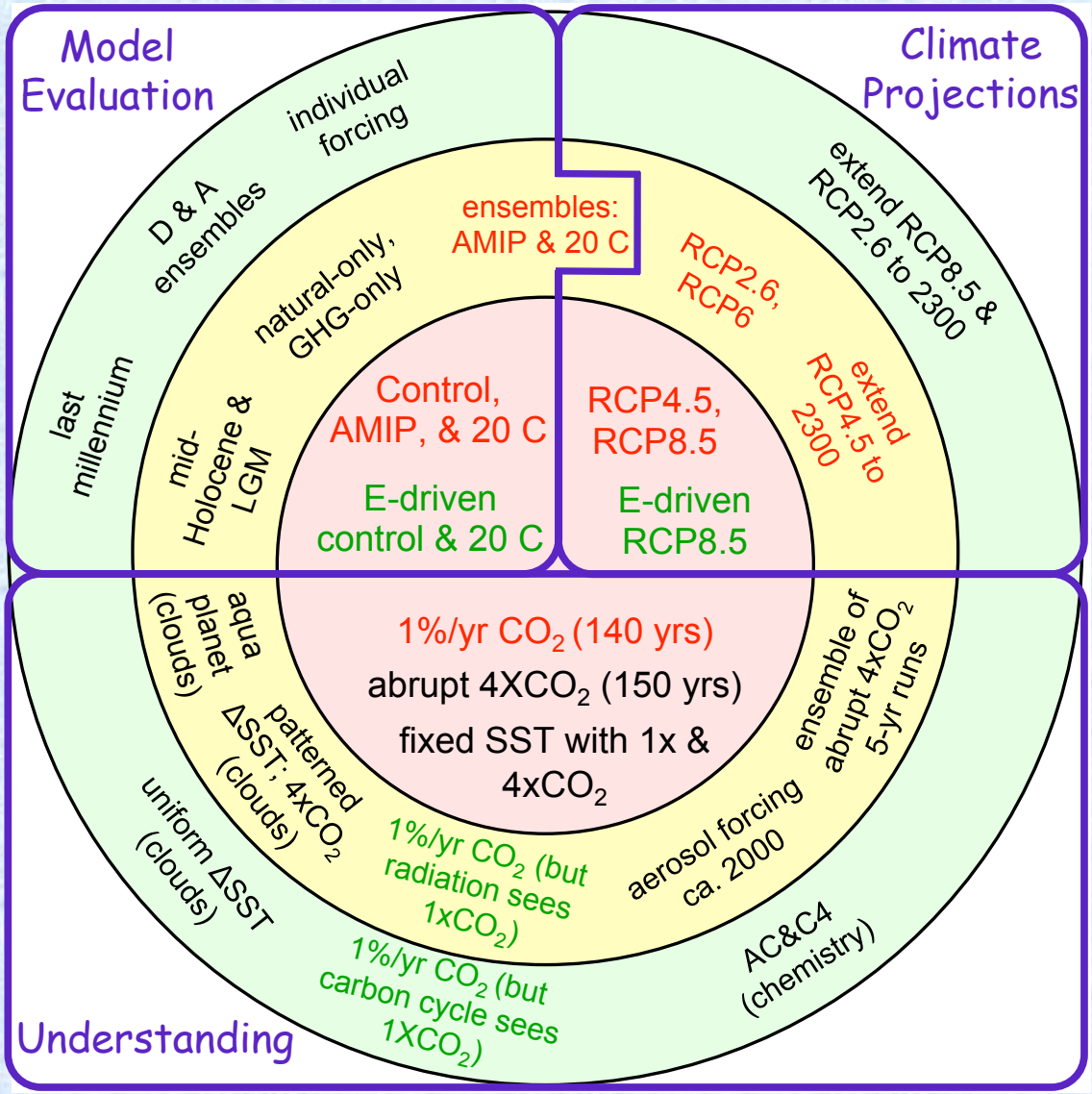
PIAMDDI Project Meeting
Palo Alto, CA
13 December 2013

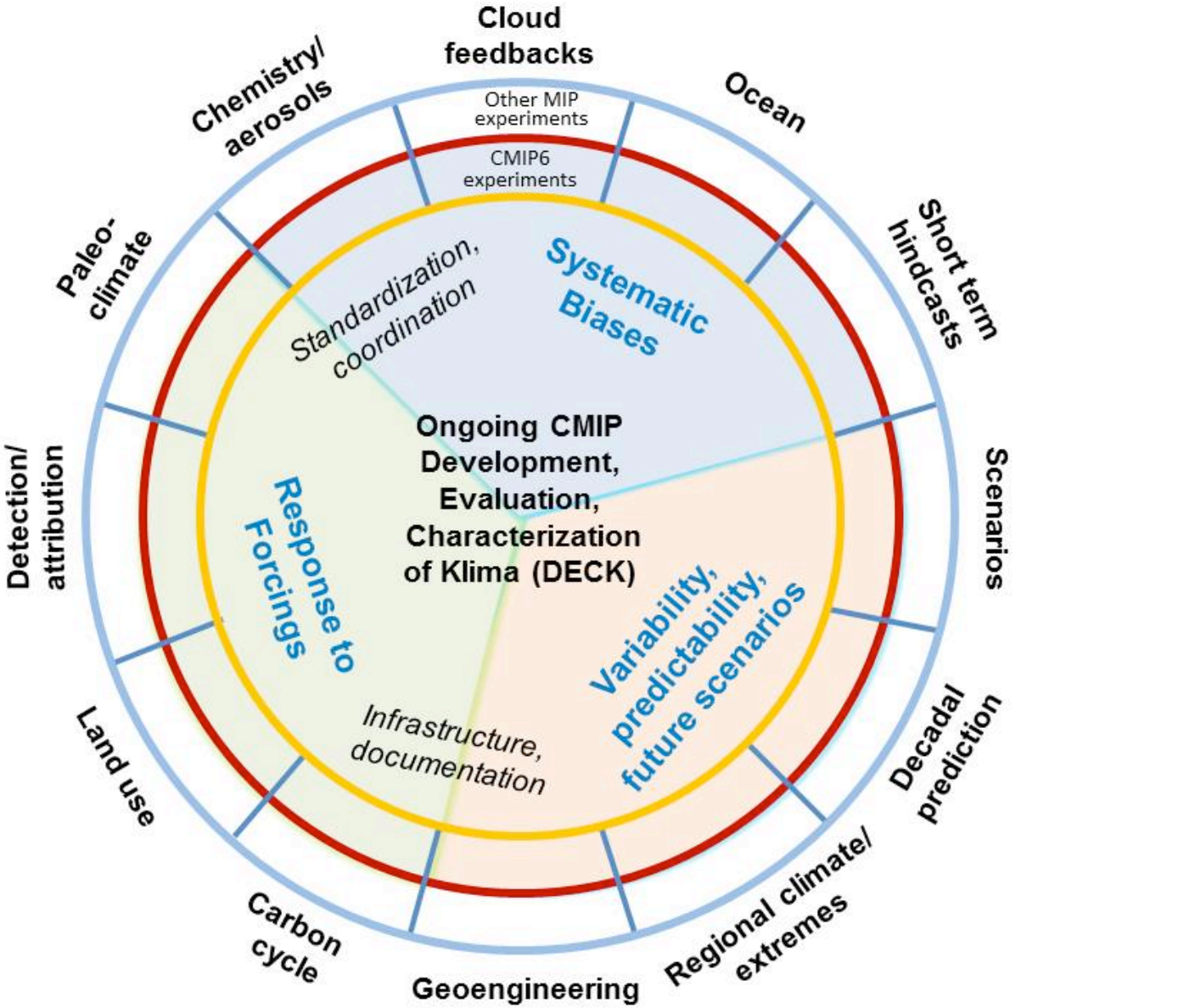
Preface

- New framework for coordinated global model simulations (the MIPs)
- Preliminary plans for CMIP6
- ScenarioMIP
- Timeline

Recall CMIP5 framework



Proposed new framework for CMIP



CMIP Development, Evaluation, and Characterization (DECK) experiments

- Ongoing with few changes
- Modeling groups would run these with each new model version
- Would likely include:
  - AMIP
  - Pre-industrial control
  - 1%/yr CO_2 to quadrupling
  - Instantaneous 4xCO2
  - Historical simulation
  - RCP8.5 ?

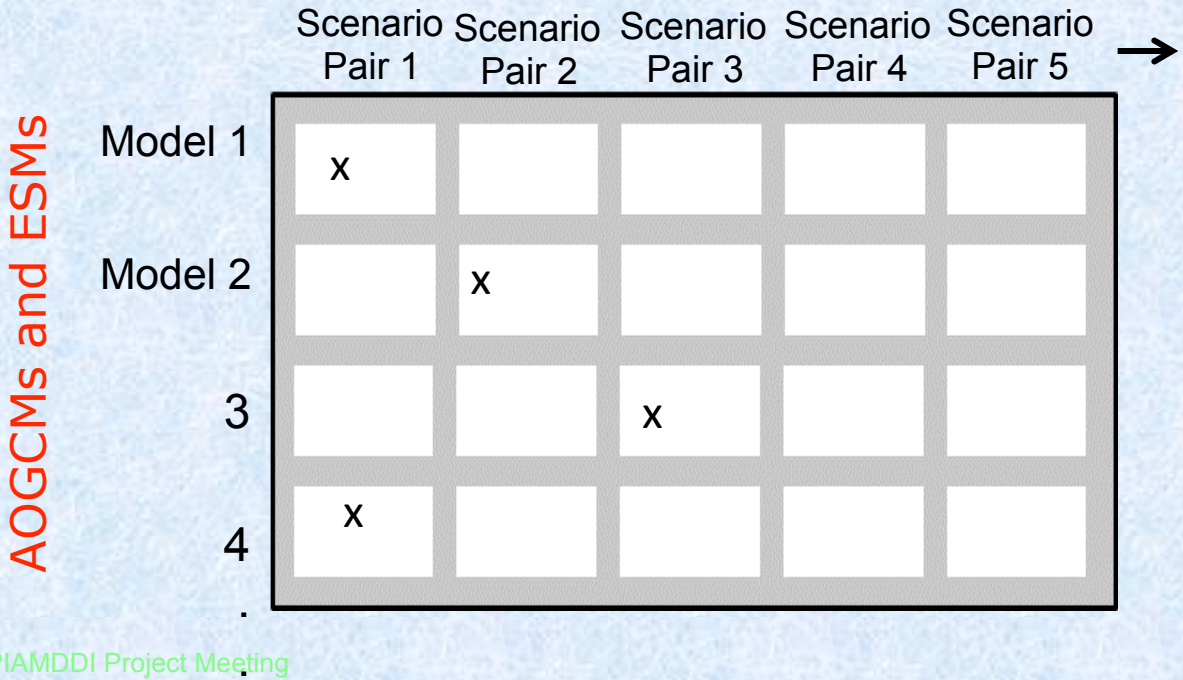
Additional Model Intercomparison Projects (MIPs)

- Address more specific science questions
  - WCRP Grand Challenges
  - AIMES input
  - Science themes identified for CMIP6
    - Systematic biases
    - Response to forcings
    - Variability, predictability and future scenarios
- Build on and help to understand the DECK experiments
- All MIPs would be required to adopt (and evolve) standards and software infrastructure used in CMIP5.

"ScenarioMIP": a strategy for exploring a wider range of future scenarios

Assign models to perform subsets of experiments sampled in an appropriate way (e.g., spanning climate sensitivity and quasi-uniform representation)

Paired non-mitigation/mitigation scenarios



IAM and climate modeling community decides which scenario pairs make most sense:

1. baseline/mitigation scenario pairs for research on benefits of mitigation related to land use change, short lived climate forcers, etc.
2. An overshoot scenario

A scenario MIP planning group* will address several questions

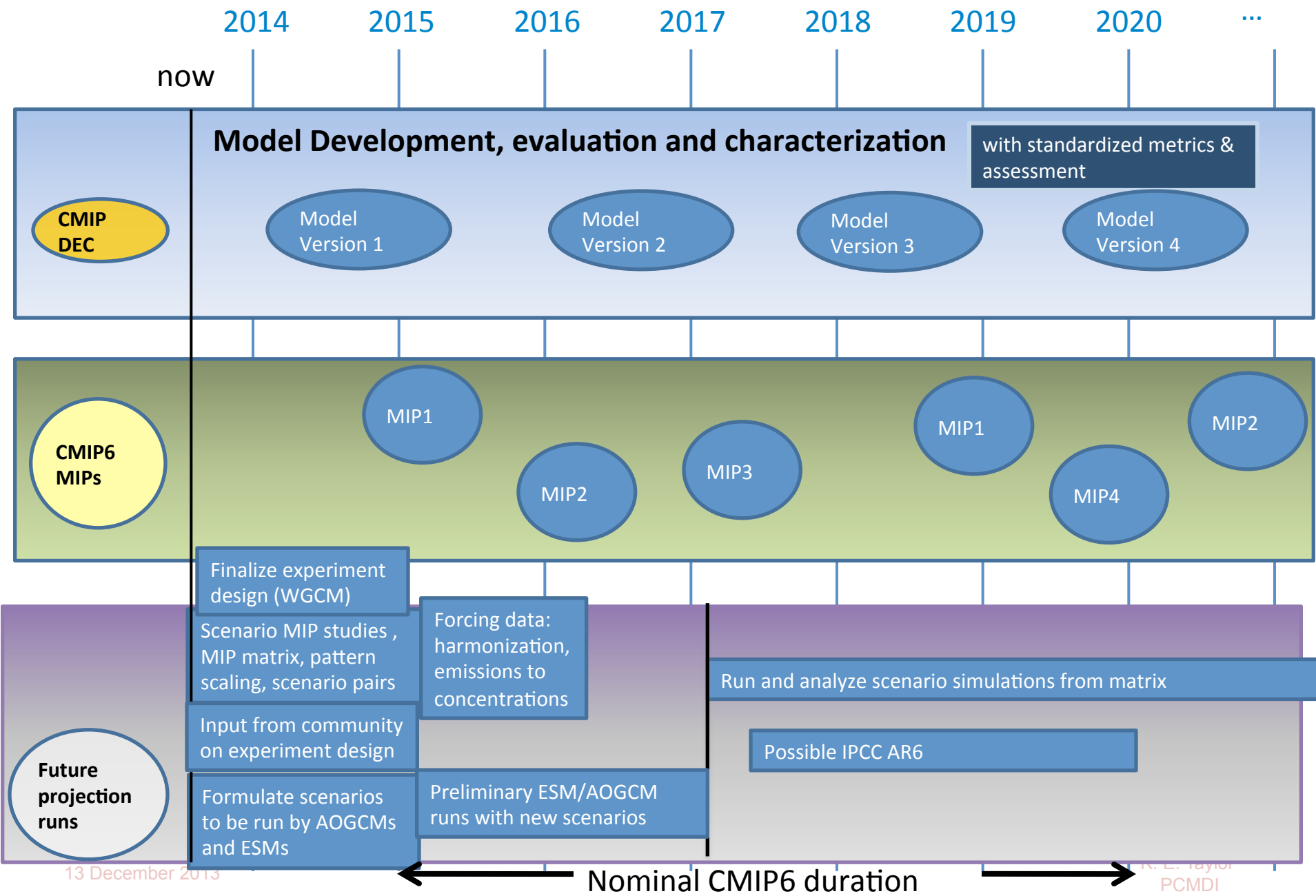
- Can pattern scaling be used to reduce the number of scenarios run by the global models?
  - workshop at NCAR, 23-25 April 2014, organized by Brian O'Neill and Claudia Tebaldi
- How should scenario matrix be populated?
  - Can a subset of carefully sampled models represent a larger multi-model ensemble?
  - What about model performance, sensitivity, complexity, emergent constraints and weighting?
  - Use the existing CMIP5 data set to explore the subsampling issues
- How big does the ensemble need to be for each scenario pair?

* Detlef Van Vuuren, Claudia Tebaldi, and Veronika Eyring co-chairs; Brian O'Neill, Richard Moss, Reto Knutti, Ben Sanderson, Jean-Francois Lamarque, George Hurtt, Wilco Hazeleger

A scenario MIP planning group will address several questions

- What are the science and policy-relevant questions for each scenario pairs? e.g. related to
  - aerosols
  - land use/land cover
  - short-lived forcers
  - overshoot scenario
- What procedure should be used for choosing the scenario pairs?
- What procedure should be used for harmonizing the transition from 20th to 21st century forcings? e.g. related to
  - land use/land cover
  - emissions and concentrations
- How different do the scenarios have to be to make a difference in the climate response with regards to climate impacts?

CMIP6 Timeline



Framing CMIP6 within the WCRP Grand Challenges and AIMES biogeochemistry

- WCRP Grand Challenges
  - Clouds, Circulation and Climate Sensitivity
  - Changes in Cryosphere
  - Climate Extremes
  - Regional Climate Information
  - Regional Sea-level Rise
  - Water Availability
- AIMES theme for collaboration: biospheric forcings and feedback