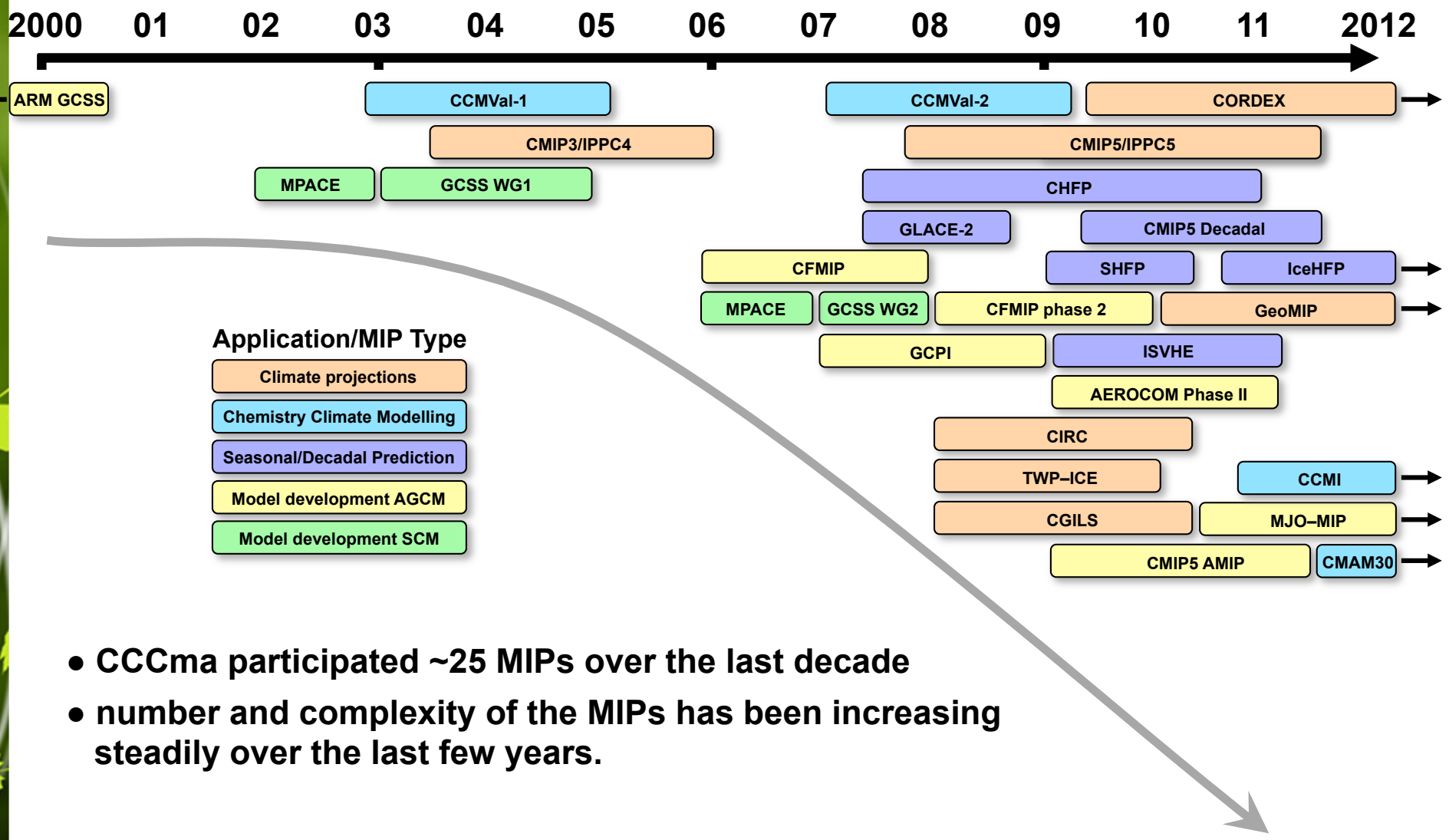
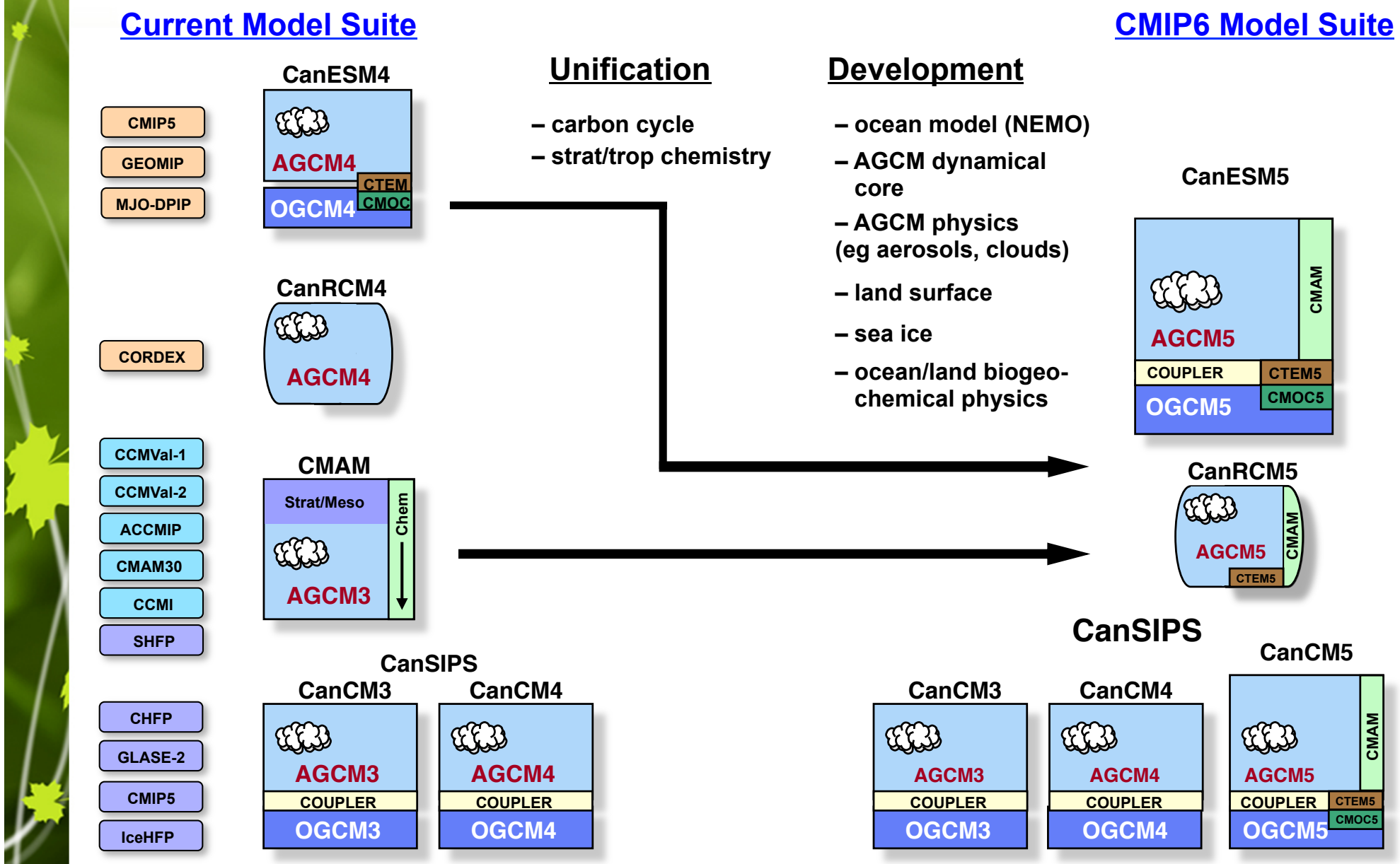
Model Intercomparison Projects (MIPs)

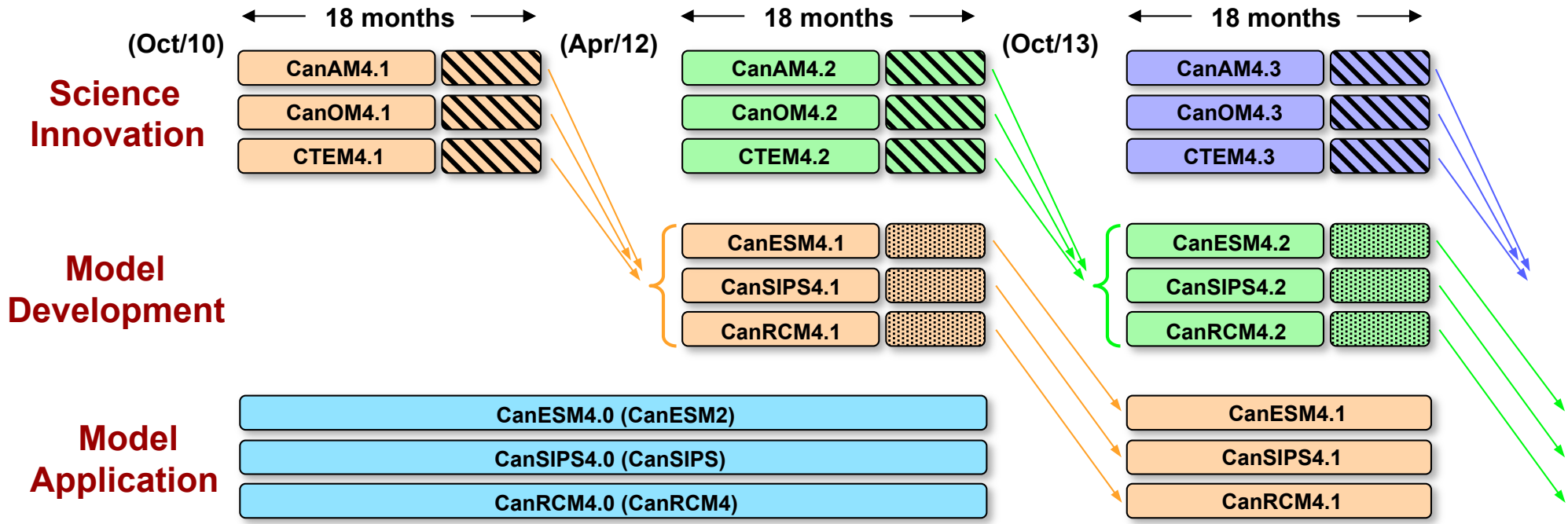


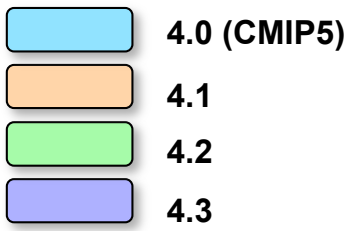
- CCCma participated ~25 MIPs over the last decade
- number and complexity of the MIPs has been increasing steadily over the last few years.

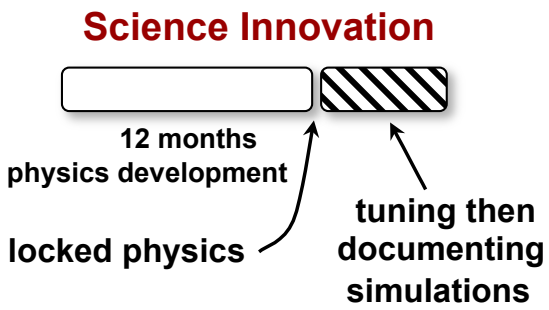
CCCMa Model Development

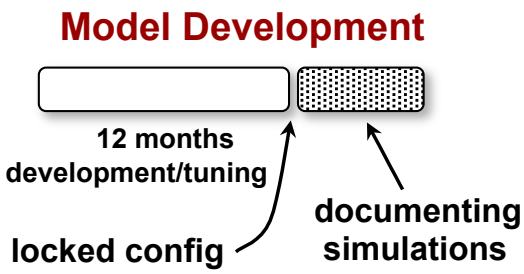


CCCma 18 Month Cycle of Model Version Development

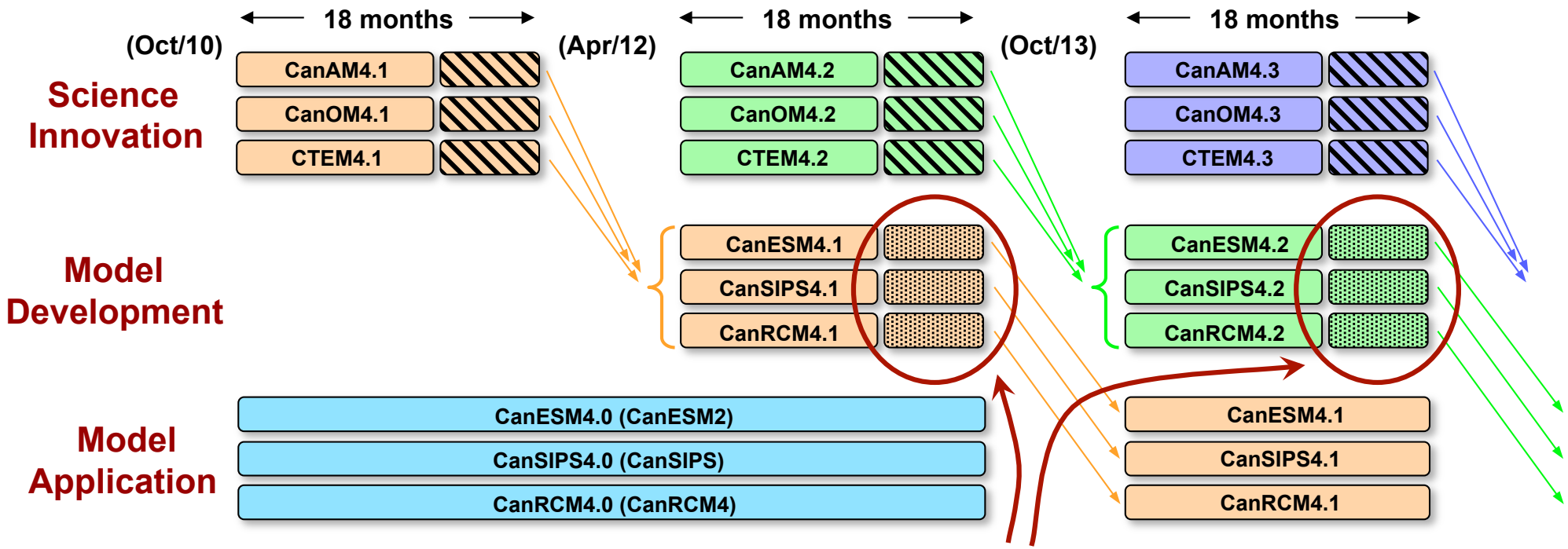








CCCma 18 Month Cycle of Model Version Development



Documenting simulations and their analysis are critical components of development cycle!

– documenting simulations are our internal version of "CMIP dignosis, evaluation and characterization experiments" (AMIP, 1850 control, historical, Hansen, Gregory, RCPs…)

such experiments inform both model development and application

Model-Based Climate Science

- Model "Development" and "Application" are high-profile community activities
- Model "Documentation" has received far less attention but it is critical to both development and application

Development: – what is the impact of model changes on model behaviour and biases?
– are biases model specific or systematic?
– how have biases evolved across model versions?
– where are future development efforts best invested? Have those efforts had the desired impact?

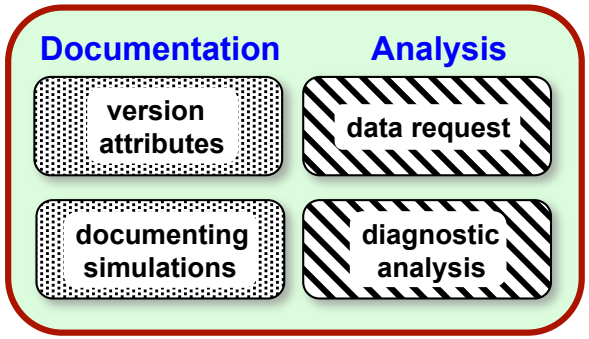
Application: – what is the specific model version used for a particular study?
– what are the basic properties/biases of that model version?
– is there any reason to suspect that the results of that study were adversely affected by the properties/biases of the version used?

- It is arguable that the community's model documentation efforts to date have poorly served the needs of both model development and model applications

There appears to be a real opportunity to fill this vacuum with something that would aid development efforts, improve the credibility and transparency of model-based climate studies, and ease the burden on modelling centers as well as MIPs

Model Version Documentation and Analysis

- Model Version Documentation involves more than performing documenting runs.



Documentation

– attribution (eg CMIP5 METAFORE questionnaire)

– diagnosis, evaluation and characterization exp

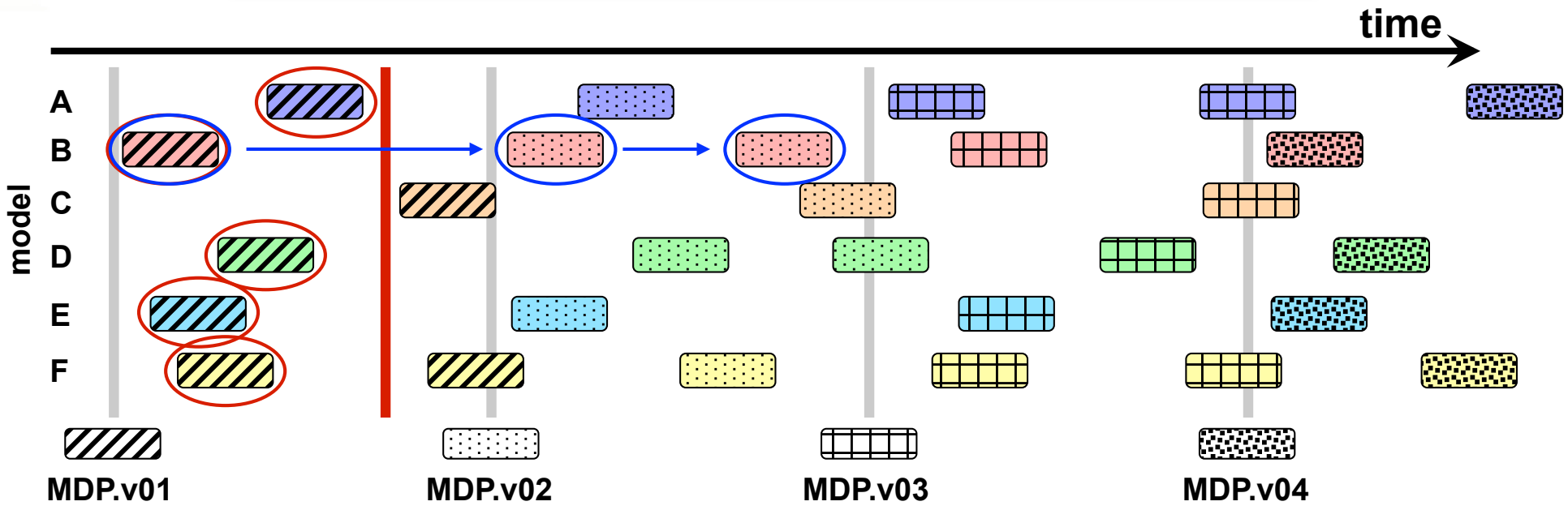
Analysis

– data request (time-series' variables and frequencies)

– analysis (suite of diagnostics to document model behaviour an properties, validation, metrics…)

- enormous advantages to creating an ongoing, community-led, Model Version Documentation and Analysis Project (MVDAP) - essentially an ongoing MIP
  - following CMIP5, MVDAP output could be served up freely in an online database
  - simulations, data requests, diagnostic analyses periodically reviewed and updated
  - The goal is to coordinate the interests of both model development and model application to serviced the communities interest in both (enormous efficiency)
  - the MVDAP database would provide a rich archive for research into systematic model biases, model validation, metrics, etc.
  - MVDAP would connect model development, model analysis, and model application efforts across modelling centers and its transparency would greatly enhance the credibility of climate modelling science.

Potential Evolution of MVDAP Archive Over Time



– versions of model documentation packages (i.e. model attributes, documenting runs, associated data request, and diagnostic analyses)

– colours represent 6 different models (A-F), with model versions increasing from left to right

– such model documentation packages would contain an enormous amount valuable information about:

the state of climate modeling at any given time

the evolution of any one model's properties over time (across versions)

– over time the archive would document a transparent history of climate models and their properties improving the traceability and credibility of their applications