Lessons from CMIP5

- Model uncertainty even more relevant than previously thought for D&A analyses

- Aerosols response still the source of large uncertainty

- Importance of internal variability esp. for the "now" period (e.g., hiatus)

20C experiments, some miscellaneous thoughts (overall CMIP5 OK)

Continue to produce sizeable Initial Condition ensembles of 1850-present.

In addition, focus on the "now" period, say 1970-2030, with many initial condition members by the modeling centers that can afford it.

Extend historical as close to the present as possible (in fact one could even think of extending to 2020 since forcings do not matter much unless one does something radical) and that would allow to compare to latest observations available). RCPs should then start at 2020 with homogenized first few years.

Need greater clarity from individual models on exactly which forcings are included in which runs. Ideally all the same!

Start even earlier than 1850 if possible (or simply make last millennium and historical better mesh).

Single Forcings, some miscellaneous thoughts (CMIP5 better than before)

Good to have initial condition ensembles so think carefully about trade-off between type of experiment prioritized and ensemble size. Maybe CMIP6 should establish a minimum size (3?) for IC ensembles applicable to all experiments (historical/scenarios/single forcings for past and future)?

Good to have Aerosol-only, NAT-only by as many models as possible

(additional miscellaneous single forcings could be provided as pointers not to overload the archive – we need to address model uncertainty. There are however additional single forcings that some modeling groups may be able to explore (Black Carbon/Land Use/ Ozone/CO2)

Aerosol effects are still a big unknown and difficult to explore on the basis of CMIP5 because of the mixing with other forcings (and because of the heterogeneity of the treatment by different models).

Running single-forcings in the future (NAT and Aerosols only) useful for observationally constrained projections (see Ch11).

Recommended Experiments

Higher priority (with IC ensemble)
- ALL (aka historical) including aerosols, ozone, land-use
- NAT-only as highest priority
- Aerosols-only

Lower priority
- Solar-only (or VOLC-only)
- GHG-only

Even Lower
- Black Carbon
- Ozone
- GHG+Ozone+Land Use
- CO2
- Land Use (coordinate with LUMIP)

Run single forcings into future as well.
As for the present, extend them as much as possible (to 2020?).

Model uncertainty contribution to Detection & Attribution results based on CMIP5 appears larger than previously thought. So, many models contributing single-forcing experiment should be a priority, even if with small Initial Condition Ensemble size.

Aerosol response is still a source of large uncertainty (within model and across models) hence we shift the priority from GreenHouseGas-only to Aerosol-only experiments.

Initial Condition Ensembles are important, for single-forcings and historical, so we propose that CMIP requires a minimum size (3?)