Multi-model synthesis and associated uncertainties

- We started with two thought-provoking presentations kindly provided by Karl and Ciao.
  - Karl Taylor talked about multi-model ensemble issues based on the CMIP experience
  - Ciao Coelho talked about issues related to synthesizing information to produce seasonal climate outlooks

- We provided a set of questions to help focus the discussion, and had lively exchanges in both sessions, with somewhat different focus in each.

- On the next slide we briefly summarize some of the highlights or recurring themes that arose in this discussion.

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Discussion notes

- Multi-model ensembles are widely used in seasonal and decadal prediction, in climate projection, and in regional downscaling.
  - Often what we have are 'ensembles of opportunity'
- Ensemble provides information about uncertainty (or at least 'spread', which is not the same), and can be used to provide probabilistic information, but what is the adequate level of uncertainty is not easy to estimate.
- There are many issues related to ensemble size and properties: how many models are necessary? how/if they should be weighted? how can lack of independence be accounted for?
  - Literature is developing on this, and a weighting scheme has been used in US climate-change assessment, while for climate prediction weighting has been tested in many different contexts

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Geoscientific
Model Development

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Skill and independence weighting for multi-model assessments

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- There is a need to better synthesize results from multi-model ensembles, deriving and communicating information relevant to different users.
    - Can we take advantage of communication experience in different areas (e.g. IPCC language)?
    - How much of this is WCRP issue versus climate service providers?
- For some purposes (e.g. providing climate information to end users) multi-model synthesis is essential; however for other purposes (e.g. boundary conditions for regional downscaling) there is a need for a representative subset.
- We have not yet taken full advantage of applying insights from evaluating prediction skill to long-term projection and vice-versa.

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New vigour involving statisticians to overcome ensemble fatigue

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