

Using multi-model ensembles to characterize uncertainty in projections of future climate change

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The organization of open access archives like PCMDI's CMIP3 (and soon to become available CMIP5) is facilitating the use of ensembles of Global Circulation Models to characterize future projections and their uncertainty. Comparison of different models' output has made clear that different models have different strengths and weaknesses and together they can help to characterize a range of likely future outcomes, a range originating from the intrinsic structural uncertainties of climate modelling efforts.

I'm going to provide a quick overview of approaches taken to multi-model synthesis for future projections, trying to categorize them along important dimensions like

a) are the models given equal vote in the final answer or are they somehow weighted differently?

b) are the models treated each as a possible realization of the future trajectory, or are they seen as a noisy realization of a single underlying "truth"?

I am then going to focus most of the talk on raising awareness of the challenges this sample presents to the statistical analysis, together with the aspects that still justify taking the multi-model route. I will conclude with a very descriptive example of a statistical model that tries to tackle some of these data quirks, but is far from being 'the' solution. I see the problem of multi-model evaluation and synthesis as a still very open issue, with no unique answer at this time and the goal of this talk is mainly to point that out, in the hope of stimulating discussion, ideas and research directions. This is not of course just an abstract methodological area that needs development but has some very important consequences on the way we approach the assessment of impacts of future climate change.