



Using the CMIP ensemble for climate prediction

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The collection of GCMs which contribute to CMIP are often described as an ensemble of opportunity, with no specific overall design or sampling strategy. Thus, it is challenging to generate probabilistic predictions from these simulations. A particular issue that has raised much discussion is regarding the independence (or otherwise) of evidence arising both from observational analyses, and different model simulations. Climate models broadly agree on such features as overall CO₂-forced global warming, with amplification of this warming at high latitudes and over land, and an intensified hydrological cycle. Does this large (and growing) ensemble of consistent models justify increased confidence in their results, or are they all merely replicating the same errors? And how should we combine observational evidence arising from the observed period of warming, together with paleoclimate analyses and model simulations? We will show a way forward based on rigorous mathematical definitions and understanding which has been generally lacking in the literature to date.