



Reliability of regional climate model trends

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A necessary condition for a good probabilistic forecast is that the forecast system is shown to be reliable: forecast probabilities should equal observed probabilities verified over a large number of cases. As climate change trends are now emerging from the natural variability, we can apply this concept to climate predictions and compute the reliability of simulated local and regional temperature and precipitation trends (1950–2011) in a recent multi-model ensemble of climate model simulations prepared for the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5). With only a single verification time, the verification is over the spatial dimension. The local temperature trends appear reliable. However, when the global mean climate response is factored out, the ensemble is overconfident: the observed trend is outside the range of modelled trends in many more regions than would be expected by natural variability and model spread. Precipitation trends are overconfident for all trend definitions. This implies that for near-term local climate forecasts the CMIP5 ensemble cannot simply be used as a reliable probabilistic forecast.