Regional probabilistic climate forecasts from a multi-thousand, multi-model ensemble of simulations.

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A methodology for constraining climate forecasts, developed for application to the multi thousand member “perturbed physics” ensemble of simulations completed by the distributed computing project climateprediction.net, is here presented in detail. The methodology is extended to produce constrained forecasts of mean surface temperature and precipitation within 21 land-based regions and is validated with climate simulations from other models available from the IPCC (AR4) data set. The mean forecasted values of temperature and precipitation largely confirm prior results for the same regions. In particular, precipitation in the Mediterranean basin is shown to decrease and temperature over northern Europe is shown to increase with comparatively little uncertainty in the forecast (i.e.: with tight constraints). However, in some cases the forecasts show large uncertainty and there are a few cases were the forecasts cannot be constrained at all. These results illustrate the effectiveness of the methodology and it’s applicability to regional climate variables.