Weatherathome.net - Large ensemble regional climate modelling using volunteer computing

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Since its launch in 2003, climateprediction.net (CPDN) has harnessed computer time donated by hundreds of thousands of volunteers to explore the uncertainties in global climate predictions using large perturbed physics ensembles. Weatherathome.net is a new CPDN experiment that aims to investigate the effect future climate change will have on patterns and extremes of regional weather. A regional climate model (HadRM3P), with a resolution between 25 and 50 km, is embedded in a coarser resolution global model (HadAM3P). This finer resolution improves the modelling of local weather features such as precipitation, temperature and wind. Multi-thousand member ensembles of the model are then calculated using a time slice and automatic continuation approach which enables the effect of the climate on weather to be studied on decadal, and even centennial timescales, all via the volunteer computing network of climateprediction.net. The weatherathome system allows for different regions and a number of experimental designs to be modelled. Initially, the regional model has been set up for three target regions: Europe, Southern Africa and the Western US. The first experiment to be performed using the system is a simulation of the period from 1960 to 2010, for all three regions, using observed changes in sea-surface temperatures, sea ice, atmospheric greenhouse gases and aerosols. Two multi-thousand member ensembles are created: a perturbed initial condition ensemble and a perturbed physics ensemble. The initial condition ensemble is evaluated using techniques from forecast verification to compare the statistics of simulated and observed weather, with a particular focus on extreme events. This lends confidence to using the weatherathome system for Detection and Attribution studies as well as decadal-scale prediction of extreme weather under a climate change scenario, as the bias in the model of predicting extreme weather events will be determined. The perturbed physics ensemble is used to assess the uncertainty of the extreme weather statistics and to explore the dependence of these extremes on physical parameterisations. This poster will discuss the project design and present initial validation results, along with plans for future experiments, including a near future decadal-scale prediction for the years 2010-2030 and a large scale Detection and Attribution study of the climate of the past 50 years.