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Ensemble regional climate modelling using a global public resource distributed computing network

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Under Articles 4.1 and 4.8 of the UN Framework Convention on Climate Change (UNFCCCC), all parties have the requirement to assess their national vulnerability to climate change and to submit National Communications. Global climate models (GCMs) often do not capture the local detail often needed for impact assessments at national and regional level. One widely applicable method for adding these details is to use a regional climate model (RCM).

The Met Office developed PRECIS (Providing Regional Climates for Impacts Studies) as a practical and flexible RCM which allows scientists to define and run regional simulations on their own PCs. Boundary data from GCMs, such as HadCM3, is supplied by the Met Office on disk. There are regular PRECIS workshops, as a key part of PRECIS is to enable the transfer of knowledge and technology to scientists around the world. The number of scientists from non-Annex I countries who can attend PRECIS workshops, and have the necessary expertise to design, run and analyse simulations is relatively small. Additionally the number of experiments which can be run over a region is limited, both by the lack of computational resources, and the availability of suitable boundary data from driving experiments. This means there is limited opportunity to quantify the uncertainties in any predictions.

Climateprediction.net (CPDN) is developing a atmosphere-ocean coupled model experiment using HadCM3L. This will be run by many tens of thousands of distributed users around the world. The experiment will explore the parameter space of the model using the previously developed CPDN infrastructure. PRECIS will be integrated into this system. The boundary data from the HadCM3L will drive PRECIS, with the mod-

els running alternately on the user's computer. The use of PRECIS will be directed by scientists in developing countries, who will be able to select the region and time period for which they require information. CPDN users will then run this configuration of PRECIS, driven by HadCM3L with about 1000 models distributed for each region and time period. Visualisation software will be provided to monitor the experiments, and this will also provide significant public education sensitising people to the wide geographic variability of climate change. Results will be made available to the countries in the PRECIS regions for analysis. This strategy will allow scientists to participate in the design, verification and analysis of experiments without the need of appropriate local computer resources. As with PRECIS, collaboration between participating countries will be encouraged, and result shared.