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OpenIFS@home - Using citizen science to improve our understanding of weather forecasts

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Weather forecasts rely heavily on general circulation models of the atmosphere and other components of the Earth system. National meteorological and hydrological services and intergovernmental organisations, like ECMWF, provide routine operational forecasts on a range of spatio-temporal scales, by running these models on state-of-the-art high-performance computing systems. Such operational forecasts are very demanding in terms of computing resources. To facilitate the use of a weather forecast model for research and training purposes outside the operational environment, ECMWF provides a portable version of its numerical weather forecast model, called OpenIFS, for use by universities and other research institutes on their own computing systems.

In this contribution, we describe a new project (OpenIFS@home) that combines OpenIFS with a citizen science approach to involve the general public in helping conduct scientific experiments. We will be using volunteers from across the world to run OpenIFS on their computers at home. The infrastructure of such distributed computing experiments will be based on our experience and expertise with the climateprediction.net and weather@home systems, that successfully use versions of the Met Office Hadley Centre model for weather and climate change simulations.

In OpenIFS@home, the enormous computing resource by volunteers will be utilised to study the predictability of weather forecasts. Interesting past weather and climate events will be explored by re-running them and testing sensitivities to physical parameter choices in the model. Large ensemble simulations will be possible that will help study probabilistic forecasts in a chaotic atmospheric flow and reduce uncertainties due to nonlinear interactions. It is also planned for a later stage, to adopt the system for performing climate change experiments. It is expected that OpenIFS@home will become a valuable additional contribution to the existing range of distributed computing modelling experiments for weather impacts and climate attribution research.