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The UPSCALE project: a large simulation campaign

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The development of a traceable hierarchy of HadGEM3 global climate models, based upon the Met Office Unified Model, at resolutions from 135 km to 25 km, now allows the impact of resolution on the mean state, variability and extremes of climate to be studied in a robust fashion.

In 2011 we successfully obtained a single-year grant of 144 million core hours of supercomputing time from the PRACE organization to run ensembles of 27 year atmosphere-only (HadGEM3-A GA3.0) climate simulations at 25km resolution, as used in present global weather forecasting, on HERMIT at HLRS. Through 2012 the UPSCALE project (UK on PRACE: weather-resolving Simulations of Climate for globAL Environmental risk) ran over 650 years of simulation at resolutions of 25 km (N512), 60 km (N216) and 135 km (N96) to look at the value of high resolution climate models in the study of both present climate and a potential future climate scenario based on RCP8.5.

Over 400 TB of data was produced using HERMIT, with additional simulations run on HECToR (UK supercomputer) and MONSooN (Met Office NERC Supercomputing Node). The data generated was transferred to the JASMIN super-data cluster, hosted by STFC CEDA in the UK, where analysis facilities are allowing rapid scientific exploitation of the data set. Many groups across the UK and Europe are already taking advantage of these facilities and we welcome approaches from other interested scientists.

This presentation will briefly cover the following points;

- Purpose and requirements of the UPSCALE project and facilities used.
- Technical implementation and hurdles (model porting and optimisation, automation, numerical failures, data transfer).
- Ensemble specification.
- Current analysis projects and access to the data set.

A full description of UPSCALE and the data set generated has been submitted to Geoscientific Model development, with overview information available from http://proj.badc.rl.ac.uk/upscale .