



## **UERRA Regional Reanalysis systems developments and production for pre-operational Copernicus climate change services**

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The FP7 Project UERRA (Uncertainties in Ensembles of Regional ReAnalyses) has developed three full upper air Regional European Reanalysis systems and two 2-dimensional ones. They are now in production phase and the long reanalyses have been run for several years since 2015. The 4 year project will run through 2017 so all reanalyses will be completed during that year.

The reanalyses cover the period from 1960 until today (2016), for which the global ERA40 and ERA-Interim reanalyses exist and which provide boundary forcing. UERRA has much higher horizontal grid resolution, about 11 km (5 for surface parameters) than the global at 125 or 78 km respectively. This gives much more detail in precipitation, temperature and wind near the surface and statistics of this will be shown.

SMHI has run 2006-2010 with two model versions; Météo-France downscales these in different ways producing precipitation and near surface temperature reanalyses on a 5.5 km grid using all available SYNOP and CLIMATE stations.

The Met Office and University of Bonn are both running 20 ensemble members but their systems are quite different: The Met Office has set up the ensemble of individual but expensive 4-dimensional variational assimilation and at half resolution (24 km) whereas the University of Bonn uses the ensemble nudging assimilation for their ensembles with the COSMO system.

The resulting analysis and forecast fields are stored in a common MARS archive at ECMWF, in GRIB2 format with a common set of parameters. This is a new way of defining the data. Surface, model, pressure and also high vertical resolution height level data will be stored in the lowest 500 m above ground.

Evaluation methods to gauge the quality and uncertainties of reanalyses against independent observations and high resolution national gridded data sets have been developed and tested on some prior existing data.