Project no. GOCE-CT-2003-505539

Project acronym: ENSEMBLES

Project title: ENSEMBLE-based Predictions of Climate Changes and their Impacts

Instrument: Integrated Project

Thematic Priority: Global Change and Ecosystems

D2B.36 Final version of the statistical downscaling web service (Task 2B.2.9)

Due date of deliverable: 30-Aug-2009
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Start date of project: 1 September 2004 Duration: 60 Months

Organisation name of lead contractor for this deliverable:
Partner 62 UNIVERSITY OF CANTABRIA (UC)

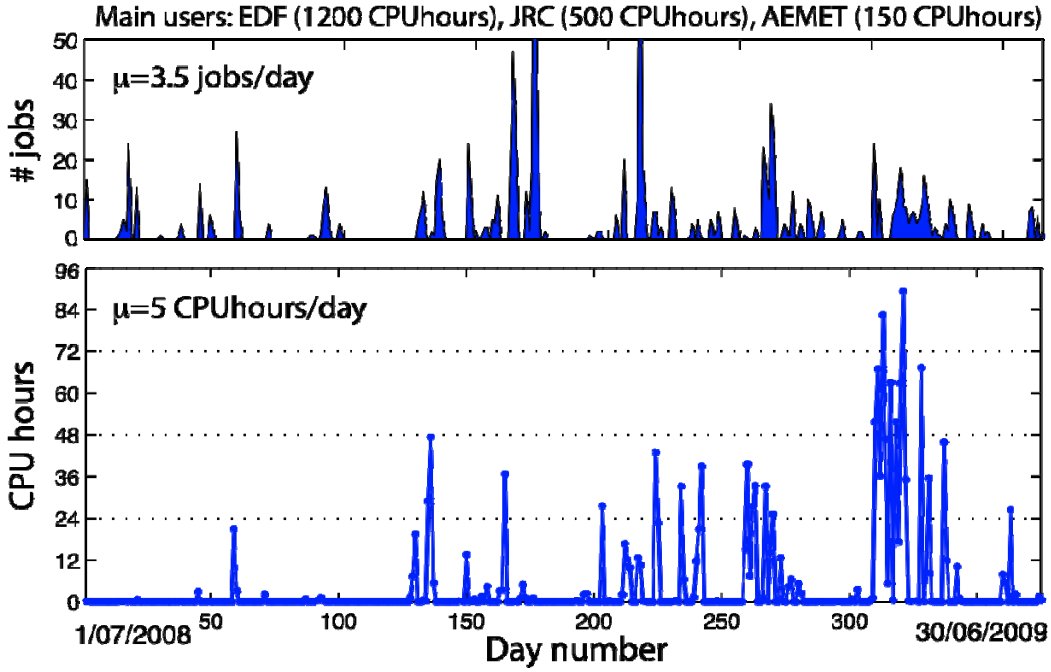
Revision [Version 1]

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

1. Introduction

The ENSEMBLES downscaling portal (www.meteo.unican.es/ensembles) provides user-friendly homogeneous access to a subset of ENSEMBLES GCM (both seasonal predictions and climate change projections) and RCM outputs, allowing local interpolation or downscaling to the region/location of interest and bias removal. Users can also upload their own observed grids or networks and interactively downscale the model outputs testing several statistical downscaling methods (including regression, neural networks, analogues and weather typing). Development of the portal is described in a number of earlier ENSEMBLES deliverables (D2B.4, D2B.19 and D2B.23) and by San Martin et al. (2009)[1]. A description of the portal is included in the ENSEMBLES final report[2] (section 6.5.2) and an illustration of the different applications is described in Sec. 6.5.3 and 6.6.2.

Since June 2008 the portal has been working in production mode, using the computational infrastructure of the Santander Meteorology Group (a cluster with 128 cores, see http://www.meteo.unican.es/ganglia for more details). Figure 1 shows the number of jobs executed daily by the downscaling portal and the daily CPU-time (in hours) consumed. During particular periods of intense production, the downscaling portal achieved running over 50 daily downscaling jobs lasting for over 48 CPU-hours with more than 10 simultaneous users connected. The main users have been EDF (with a total of 1200 CPU hours), JRC (with a total of 500 CPU hours) and INM/AEMET (with a total of 150 hours).



[1] San-Martín, D., Cofiño, A.S., Herrera, S. and Gutiérrez, J.M., 2009: The ENSEMBLES statistical downscaling portal. An end-to-end tool for regional impact studies. *Environmental Modelling and Software*, submitted.

[2] Van der Linden P., and J.F.B. Mitchell (eds.) 2009: ENSEMBLES: Climate Change and its Impacts: Summary of research and results from the ENSEMBLES project. Met Office Hadley Centre, FitzRoy Road, Exeter EX1 3PB, UK. 160pp.

Figure 1. Resources consumption of the downscaling portal: daily number of jobs executed and CPU hours from July 2008 to June 2009.

These figures show that the portal has been intensively tested and has been running in stable conditions for over one year.

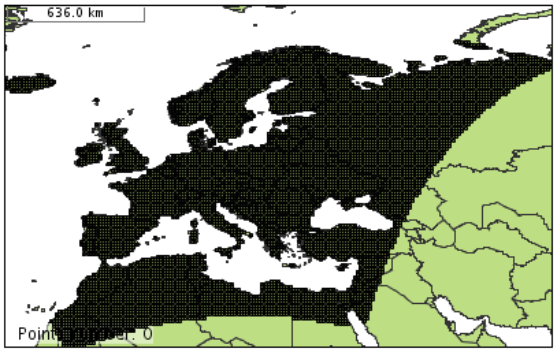
2. Services of the Downscaling Portal

The final version of the downscaling portal provides the following services:

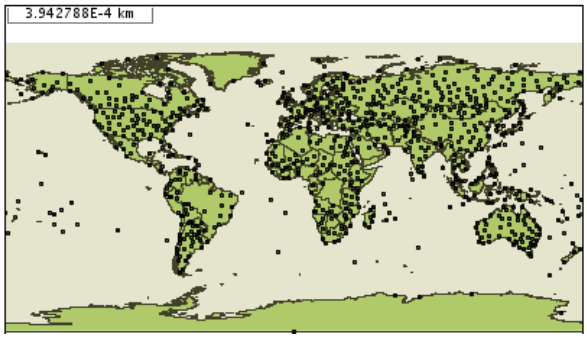
1. Data access/interpolation facility: Access to time series of observations and model outputs interpolated over particular locations or grid points. NOTE that this service is intended for regional applications and thus does not allow massive data downscaling over big domains. Thus only a few stations or grid points can be downloaded simultaneously. For retrieving larger regions, the users should directly contact the local providers (each dataset included in the portal has an information sheet with all the details of data usage restrictions and contact persons). Currently the following datasets are available through this service:

Observations:

- The ENSEMBLES 50km gridded data (precipitation and maximum/minimum temperature) over the European domain.



- The Global Stations Network (GSN) with data of over 800 global stations worldwide.



Reanalysis data (global models):

- ERA40 reanalysis with 6-hourly global fields from 1-Sep-1957 to 31-Aug-2002 with 1.125º resolution.

- NCEP/NCAR reanalysis with 6-hourly global fields from 1-Jan-1948 to 30-Apr-2006 with 2.5º resolution.

Seasonal forecasts (global models, GCMs):
- Demeter models: Daily fields for the European domain.
- ENSEMBLES S2 multi-model: Daily fields from the seasonal multi-model ensemble integrations produced in the Stream 2 hindcast experiment with 5 models, 4 start dates per year, 7 month hindcasts with 9-member ensembles for every start date, for the common period 1960-2005.

Climate change projections (global models, GCMs):
- ECHAM5. Daily fields for 20c3m run3 (control), and A1B, B1 and A2 (future) scenarios.
- CNRM-CM3. Daily fields for 20c3m (control), and A1B, B1 and A2 (future) scenarios.
- HADGEM1. Daily fields for 20c3m (control), and A1B (future) scenario.

Climate change projections (regional models, RCMs):
- Daily fields for surface precipitation and maximum and minimum temperature from the ENSEMBLES ensemble of regional models (ERA40 and GCM A1B forcings).

The updated list of common outputs for the GCM datasets is available in:
http://www.meteo.unican.es/ensembles/listOfVariables.htm

2. Statistical downscaling service: This service provides access to a variety of statistical downscaling methods (including regression, neural networks, analogues and weather typing) using the above mentioned GCM outputs (both reanalysis and predictions/projections) and observations. Users can also upload their own observed grids or networks and interactively downscale the model outputs - testing and validating several methods online.

3. Future Maintenance

Beyond the life of the ENSEMBLES project, the downscaling portal will continue in operations for at least two years (2010 and 2011) providing service to the general scientific community through users with basic profiles (with limitations in the daily consumption of resources). Upon request, some particular users/groups with skills/support in statistical downscaling methods pursuing interesting projects from a social or economical perspective will be provided with advanced profiles to use the portal in production mode (with almost unlimited resources available).