General Instructions for CORDEX integrations (July 3 2009)

Included on this web page are 2 documents that :

1. Detail the agreed upon limited area domains for CORDEX

2. Detail the agreed upon archiving procedure for CORDEX.

In this document I add a few general points in relation to the design and procedures for CORDEX.

1. General Aims
The general aim is, for a range of limited-area regions, to downscale a number of GCM climate scenarios/predictions derived from the CMIP5 set of integrations. Within the CMIP5 data archive list a request was made for GCM groups to save 6 hourly, global data on model levels, covering the following variables: *Temperature, eastward and northward wind velocity, specific humidity and surface pressure.* Daily and/or monthly values of *sea surface temperature, sea-ice fraction, soil moisture and soil temperature* were also requested.

This data should be saved for the following GCM runs and periods:

a. Historical runs for the period Jan 1950 – Dec 2005
b. RCP4.5 and RCP8.5 scenario runs for the period Jan 2006 – Dec 2100
c. AMIP integrations : All years.
d. Decadal hindcasts/forecasts : A minimum of 3 members/GCM for the 3 integration periods initialized at the first date and run to the second date: (i) 1980-2010, (ii) 1990-2000, (iii) 2005-2035

We expect this data will to start to be available through CMIP5 early summer of 2010.

The second general aim is to perform equivalent domain downscaling of ERA-interim data, for the period 1989-2008. Such RCM integrations and statistical downscaled data, for regions subsequently forced by CMIP5 GCM data, will be used to evaluate the downscaled results across different methods, models and regions of the world.

N.B. Groups are encouraged to perform as many of the limited-area integrations as possible with the ERA-interim forcing data.

N.B. Please recall that it was agreed the Africa domain would be a focus region over the coming few years, especially with respect to supporting the IPCC AR5 process. We would therefore like to remind you to prioritize the Africa domain when you select regions for integration beyond your 'home domain'.

2. Domains

The file describing the CORDEX domains provides a visualization of the proposed domains plus descriptions for both rotated and unrotated coordinates. Please be aware that the intention with the CORDEX domain is that it should be a common analysis region. In this sense the CORDEX domain should be **fully** inside your model domain and **not** include any of the boundary relaxation zone. We appreciate that domains will not be identical and for various reasons groups will choose to modify their actual domains somewhat. *We ask that the CORDEX domain be fully within your interior model domain and you try to deviate as little as possible from the requested domain, while still satisfying your own interests.*

As detailed in the document, the base resolution of each domain is assumed to be 0.44°x0.44° for an equatorial rotated coordinate system, resulting in a quasi-regular resolution of ~50km. We request that groups submit integrations using the base resolution before they submit supplementary integrations at higher resolution.

No formal decision has been taken regarding the grid structure of higher resolution integrations, but one possibility is to use the same geographical domain and just increase the number of grid points by 2x2 (0.22°x0.22° resolution) and 4x4 (0.11°x0.11° resolution). This should be discussed further.

After some discussion it was decided that the base resolution for the Europe domain should be 0.11°, due to lower resolutions having been sampled extensively in earlier projects. It is suggested that the Europe domain follows the same geographical structure as listed in the domain document and groups have a 4x4 grid point matrix within each 0.44x0.44 grid box. If groups cannot afford the 0.11° resolution for Europe but would still like to integrate over this domain please use either 0.22°x0.22° and/or 0.44°x0.44° grids.

Some groups have suggested coupled RCM simulations for a few domains (these might include any or all of the following couplings : ocean, atmosphere, sea-ice, dynamic vegetation). We request that the initial (base) CORDEX integrations are run with prescribed SSTs, sea-ice fraction and land-use/vegetation maps. We welcome more advanced coupled runs **in addition** to the standard runs.

There has been no extensive discussion on the use or not of large-scale spectral nudging. At this stage we view it easiest for groups to run their RCMs in the mode they prefer. We will soon develop a short questionnaire for each modeling group that submits CORDEX data, asking for details of things such as; vertical resolution, physics packages etc. Within this questionnaire we will also ask if the RCM used spectral nudging or not.

3. Diagnostics and Archiving.

The archival document details the levels of priority of variables to be saved. Please note that there is still an ongoing discussion as to whether 3-hourly values of 2-metre temperature and precipitation should also be stored at the central CORDEX archive.

At present a number of institutes are offering to act as a central archiving facility for CORDEX. This issue will be sorted out before the end of 2009. For now we ask groups that make ERA-interim runs to arrange their own local storage until further details are available.

4. CORDEX mail list

Cordex mail list: cordex@iastate.edu

You can subscribe to this list at: http://mailman.iastate.edu/mailman/listinfo/cordex

5. Evaluation of downscaled data and future projects using CORDEX data.

One intention is to use the CORDEX framework to develop a range of science projects that would benefit from a large coordinated set of downscaled data. One immediate aim is to try and develop a set of 'climate metrics' or diagnostic analyses for each limited-area domain, that could serve as a common benchmark by which the evaluation of (predominantly) analysis driven downscaling methodologies can be done. To get this process started the Task Force on Regional Climate Downscaling (TFRCD) welcomes volunteers to coordinate analysis of CORDEX downscaled data on various domains. If you are interested please contact ipoc@cordex.org.

An important part of developing such a diagnostic framework will be the collation and quality-control of suitable observation data. As CORDEX develops we will endeavour to include an observation portal within the archival system and will encourage scientists local to each region to investigate suitable observational data.