EXPERIMENTAL DOWNSCALING SEASONAL FORECASTS OVER AFRICA

1: MOTIVATION

The Regional Spectral Model (RSM) is used to downscale a climate forecast from a coarse resolution general circulation model (GCM) over a domain that covers most of Tropical Africa.

The GCM used is NCEP GSM run at Experimental Climate Prediction Centre (ECPC) at Scripts Institution of Oceanography, University of California, San Diego.

The experimental forecast and dynamical downscaling is done for a three month season March-May 2008. The GSM is driven by boundary forcing consisting of persisted Sea Surface temperature.

The objective of this experiment is enable us as potential users of the Regional Climate model in operational climate forecasts hand-on experience on running a downscaled forecast using the RSM, preparing the forecast products and interpretation of results.

In particular, hand-on experience is acquired on:
- How to configure routines and utilities necessary to run the RSM on a given computer environment.
- How to set up the model domain and RSM experiment over the region.
- How to make the regional model forecast run (including monitoring of run, cautionary steps to ensure job completion, and re-start of job should it be necessary).
- Post-processing of the downscaled forecasts.
- Forecast analysis and verification, including comparison of RSM with GCM to determine if RSM improves the GCM.

What is the RSM

The RSM can be described as a perturbation filter model that attempts to improve the regional scale details of a climate forecast from a GCM. GCMs miss many useful details of regional climate due to factors including:

- Course resolution (Resolution in GCMs is typically 200~300km).
- In sufficiency in representation and numerical solution involving physics, surface processes and features that amplify the regional climate.

The original RSM was developed by Juang and Kanamitsu at NCEP and current version for this study is the ECPC CVS. All user materials and tutorials on the RSM are freely available at   http://g-rsm.wikispaces.com/Short+Courses

The GCM

The GCM is used to provide the large scale field forcing for the RSM. The GCM forecasts used in the RSM experiments are based on predicted global SST scenarios for the season March to May 2008.

This GCM is also one of the seven forecast models used at the International Research Institute for Climate and Society (IRI). IRI has evaluated the various skill scores for these GCMs for seasonal applications. For the ECPC GCM that used, skill maps for precipitation and temperature during March-May season are shown below.

→ See maps in .ppt file: For_Group_Presentations_ECPC_GSM_Skill_Maps.ppt