Update on Climate downscaling with RegCM3-4

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Outline of Presentation:

1) Introduction
2) Challenges
   • RegCM3-4
3) Outputs
   • Trends?
4) Deliverables
General Circulation Model (GCM) at 1° 250km grid

Regional Climate Model (RCM-MM5/REMO/RegCM3) „fine“ grid

RegCM3-4-Accra

✓ GCM coupled climate model simulations of ECHAM5/CRU

✓ A1B and B1 scenarios

✓ IPCC projection for the region-4th AR

✓ 55km simulation grid
**Objectives**

Nest fine-grid Accra area atmospheric model within GCM’s coarse-grid global model

Use current-generation physics and numerics

Simplify the task of climatic input data for modellers

Generate outputs flexible across platforms
Order of activities

1. Setup platform (Linux)
2. Gather all relief information
   - Historical climate data
   - Orography of Accra and Akosombo areas
3. Set dynamics and Physics
   - Land surface model
   - Sea surface temperature
   - Atmospheric-land interaction
4. Pre-process with boundary conditions
   - Data for Initial and Lateral Boundary Conditions
5. Simulate with projections
Multi-model means of surface warming for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulation. Lines show the multi model means, shading denotes the plus minus one standard deviation range. (Source: http://ipcc-wg1.ucar.edu/wg1/wg1-report.html)
Expansion of simulation area

Akosombo Grid

Densu-Accra Grid
Area for Coarse Grid simulation

Area of interest for URAdapt
Available climate data for URAdapt areas
Regional Downscaling for selected station

Densu basin to be used for Validation
Average of 1961-1990 with Average rainfall of 1991-2000

Annual rainfall average for three ensemble model runs of IPCC climate scenarios A2, A1B and B1 for present (1961-2000) and future (2001-2050) with standard deviations at 5oN -2.50W south of the basin.
MM5-simulated (mean over 7 years) and RegCM-simulated (mean over 7 years) compared to observed (mean over 7 years) rainfall including standard deviation (error bars) rainfall at Ejura catchment of the Volta Basin
Analysis now on statistical downscaling for the URAAdapt areas
TRENDS?

RegCM-simulated rainfall compared to average observed past rainfall
Comparison of climate occurrences of past (1961-2005 gauged) with future (2006-2050 RegCM A1B-simulated) for the URAdapt region.
Deliverables

Identification and documentation of secondary data, including meteorology datasets in each of the two selected catchments of Accra and Akosombo.

Regional synthesis paper detailing list of datasets, data availability, and accessibility and procurement details.

55km Gridded meteorological dataset simulated for the period 1961-2000. The meteorological parameters will include, Rainfall (mm) Temperature at 2m (°C), Windspeed (m/s), Radiation (W/m2), Relative humidity (%)

55km Gridded meteorological dataset simulated using IPCC –A1B & B1 scenario for the period 2001-2050. The meteorological parameters will include, Rainfall (mm) Temperature at 2m (°C), Windspeed (m/s), Radiation (W/m2), Relative humidity (%)

Finer gridded meteorological dataset simulated using IPCC –A1B & B1 scenario for the period 2001-2050. The meteorological parameters will include, Rainfall (mm) Temperature at 2m (°C), Windspeed (m/s), Radiation (W/m2), Relative humidity (%)
Reporting and Timeframe

Final deliverables will be submitted to the URAdapt project leader (Accra) not later than 15th March 2011
Thank you

„when the wells and streams are dry we know the worth of water“ – Bejamin Franklin (1706-1790)