



Update on Climate downscaling with RegCM3-4

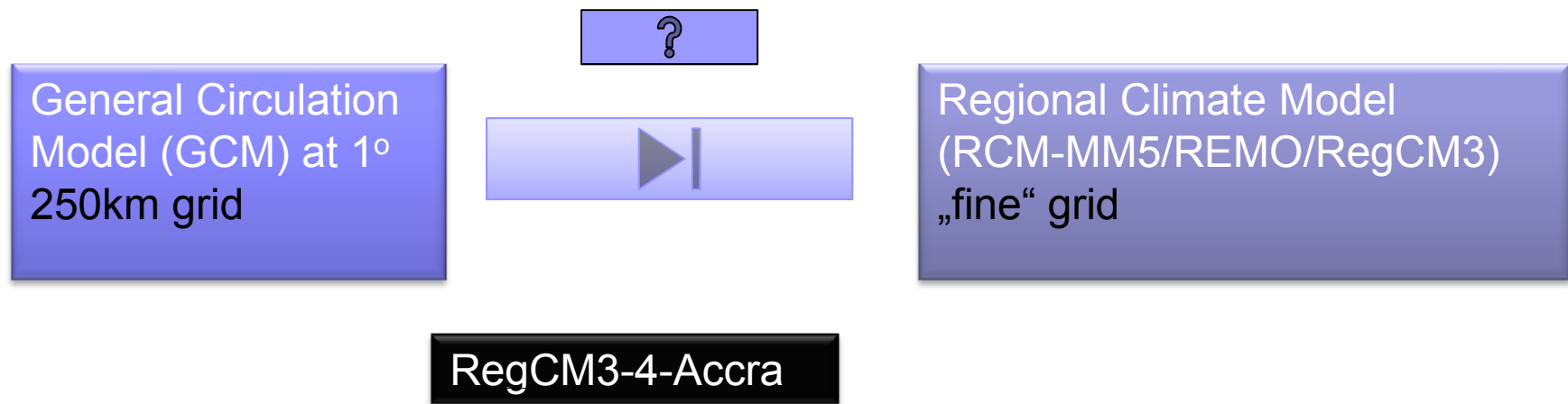
Raymond Kasei
Coconut Grove Hotel, Accra, Ghana
January 18, 2011

Outline of Presentation:

- 1) Introduction
- 2) Challenges
 - RegCM3-4
- 3) Outputs
 - Trends?
- 4) Deliverables



GCM & RCM



- ✓ GCM coupled climate model simulations of ECHAM5/CRU
- ✓ A1B and B1 scenarios
- ✓ IPCC projection for the region-4th AR
- ✓ 55km simulation grid



Objectives

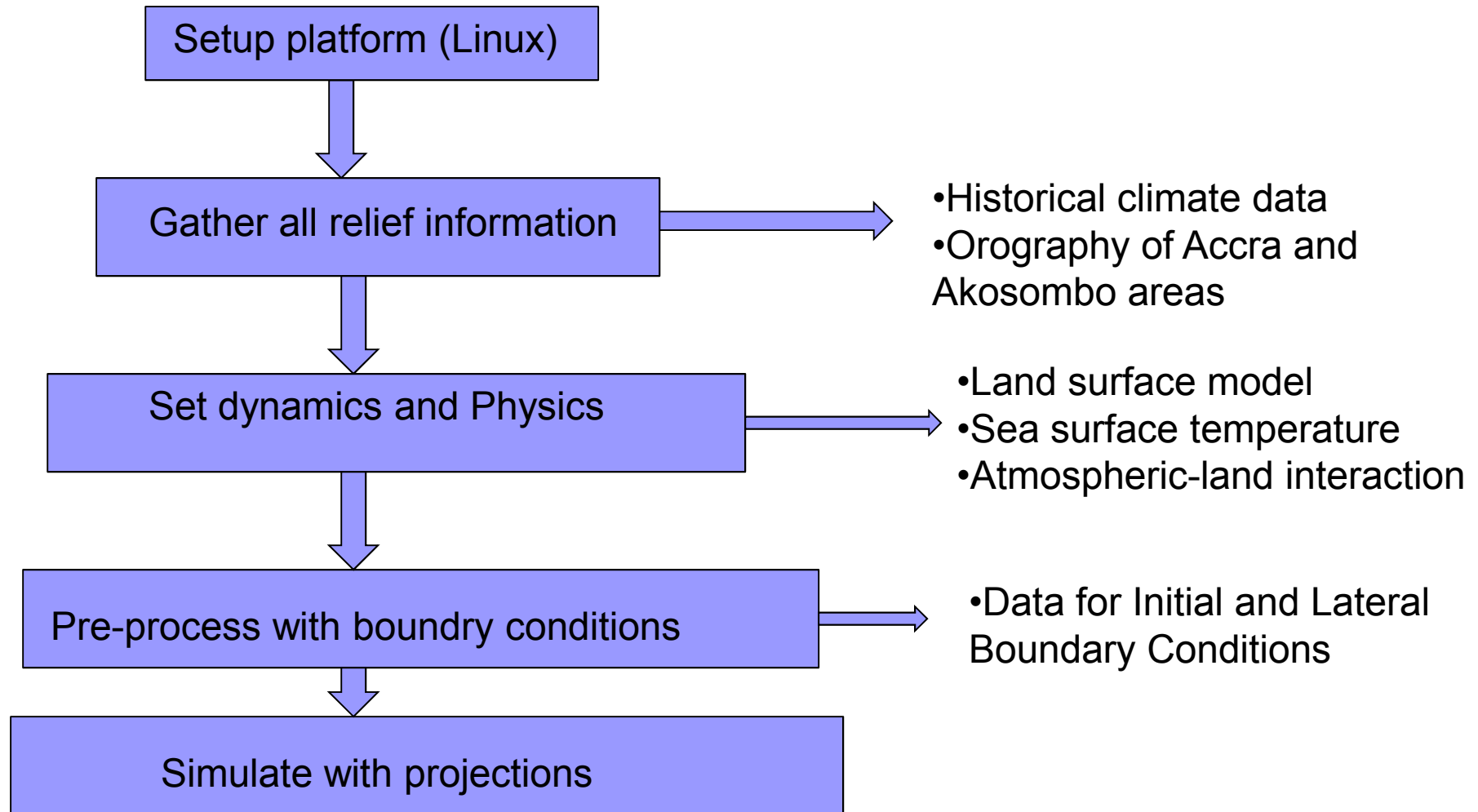
Nest fine-grid Accra area atmospheric model within GCM's coarse-grid global model

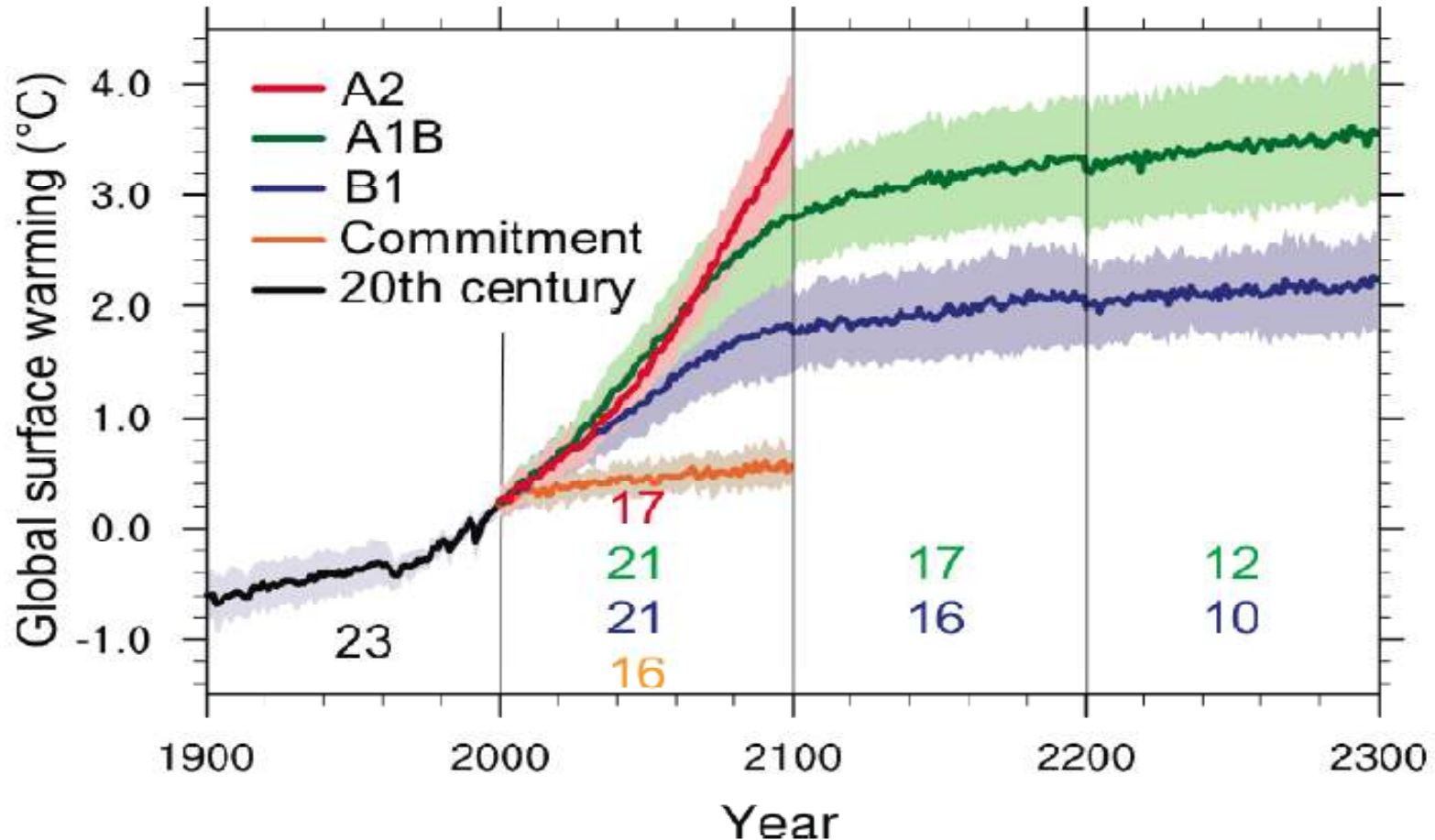
Use current-generation physics and numerics

Simplify the task of climatic input data for modellers

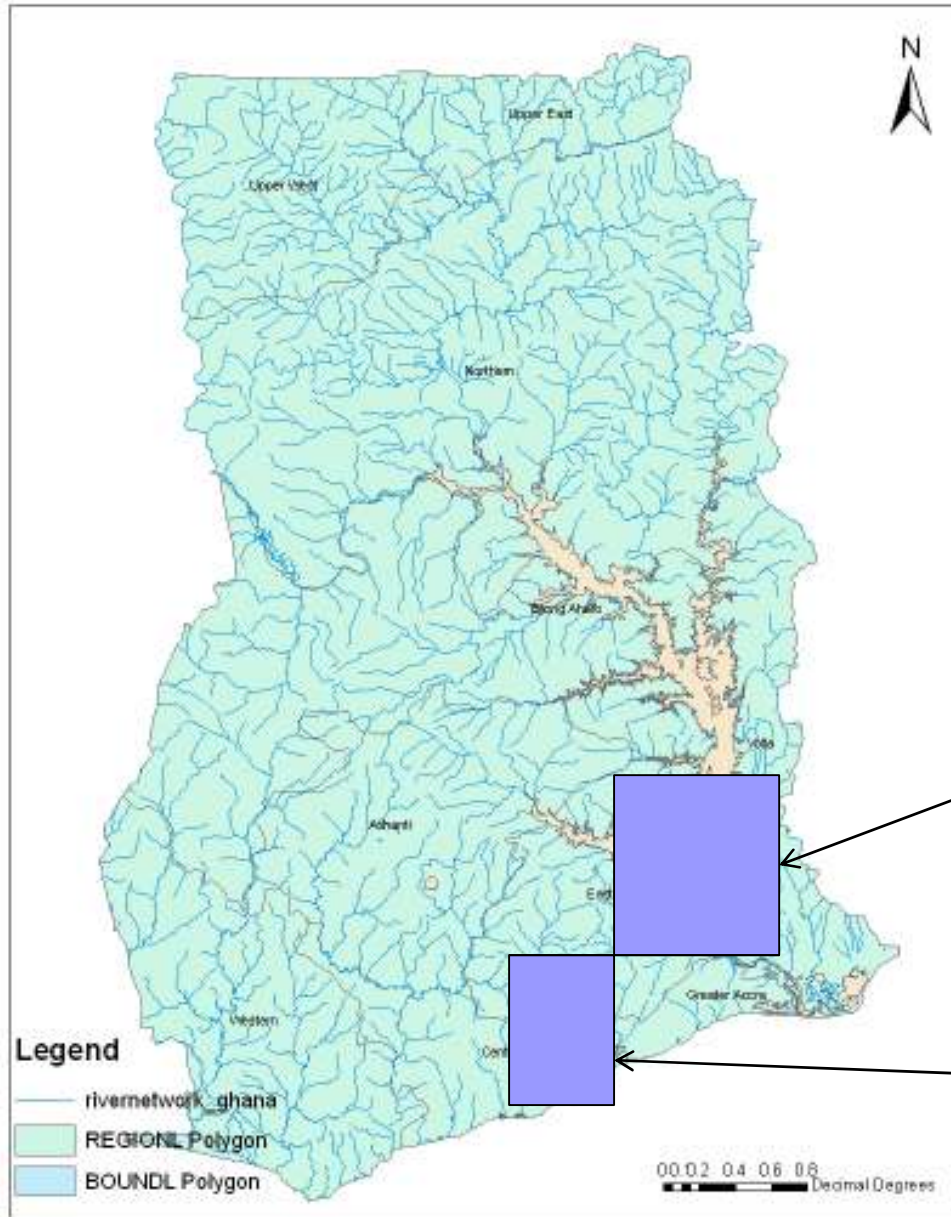
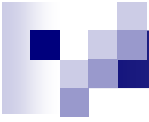
Generate outputs flexible across platforms

Order of activities





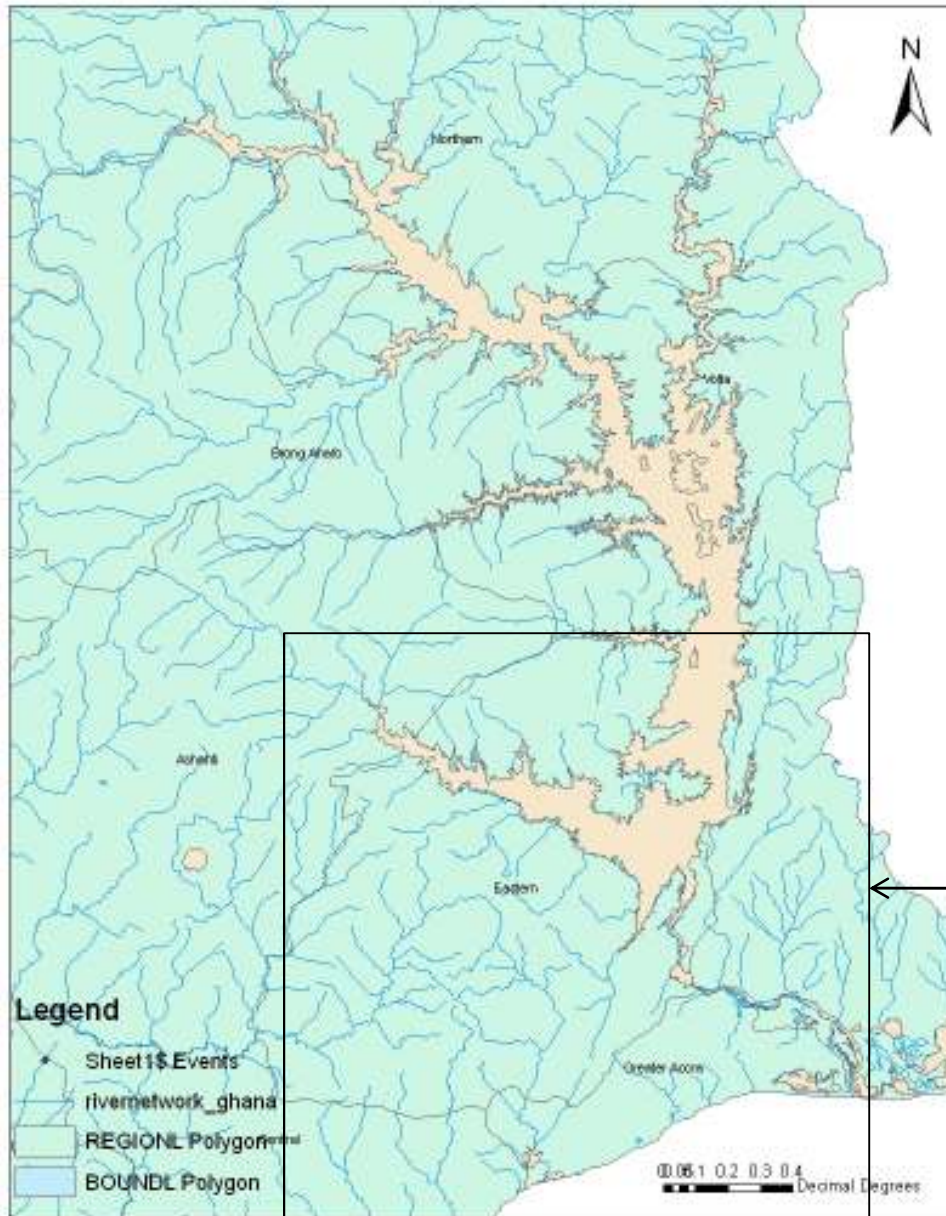
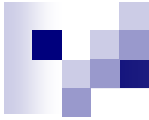
Multi-model means of surface warming for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulation. Lines show the multi model means, shading denotes the plus minus one standard deviation range. (Source: <http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>)



Expansion of
simulation area

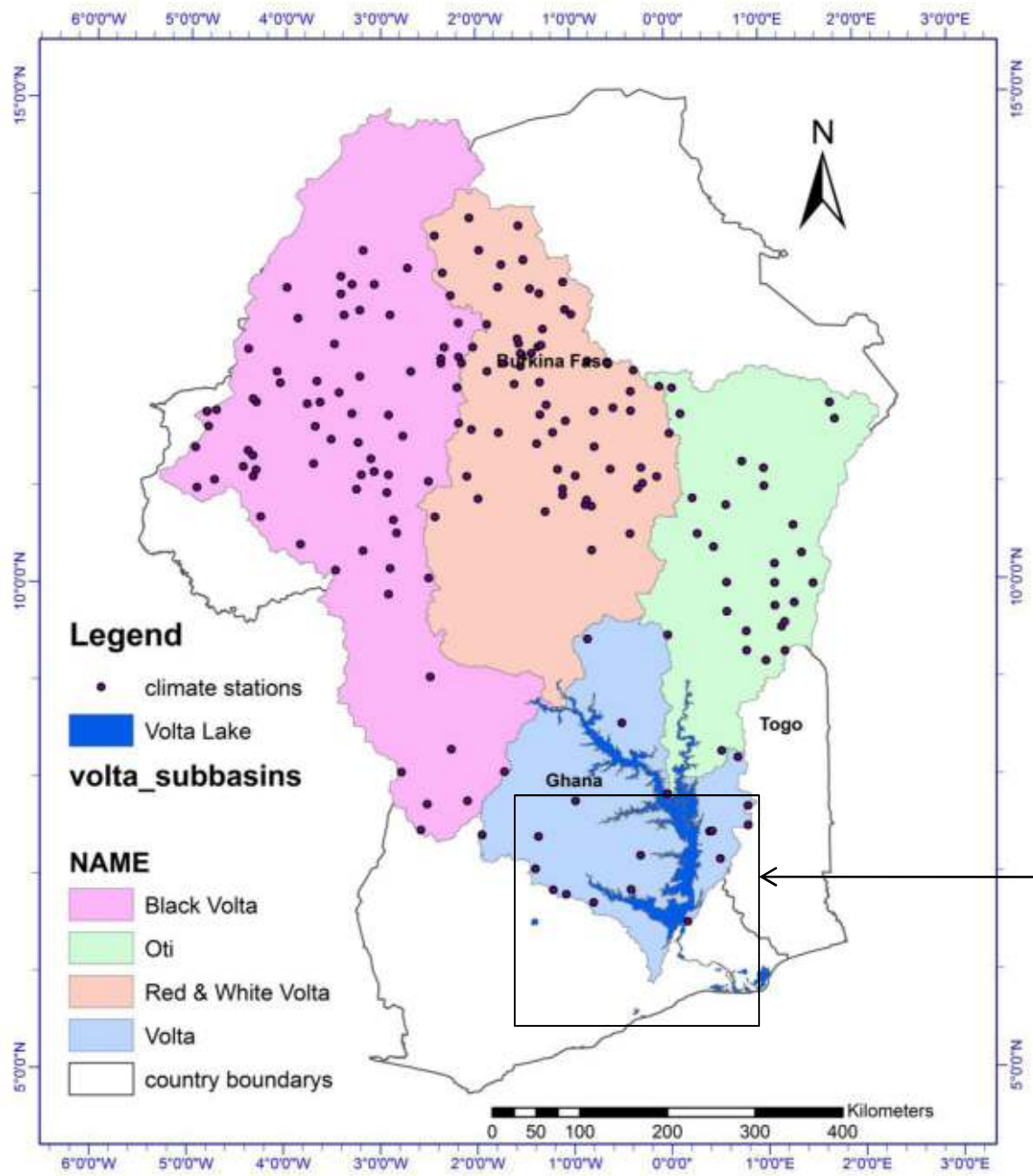
Akosombo Grid

Densu-Accra
Grid

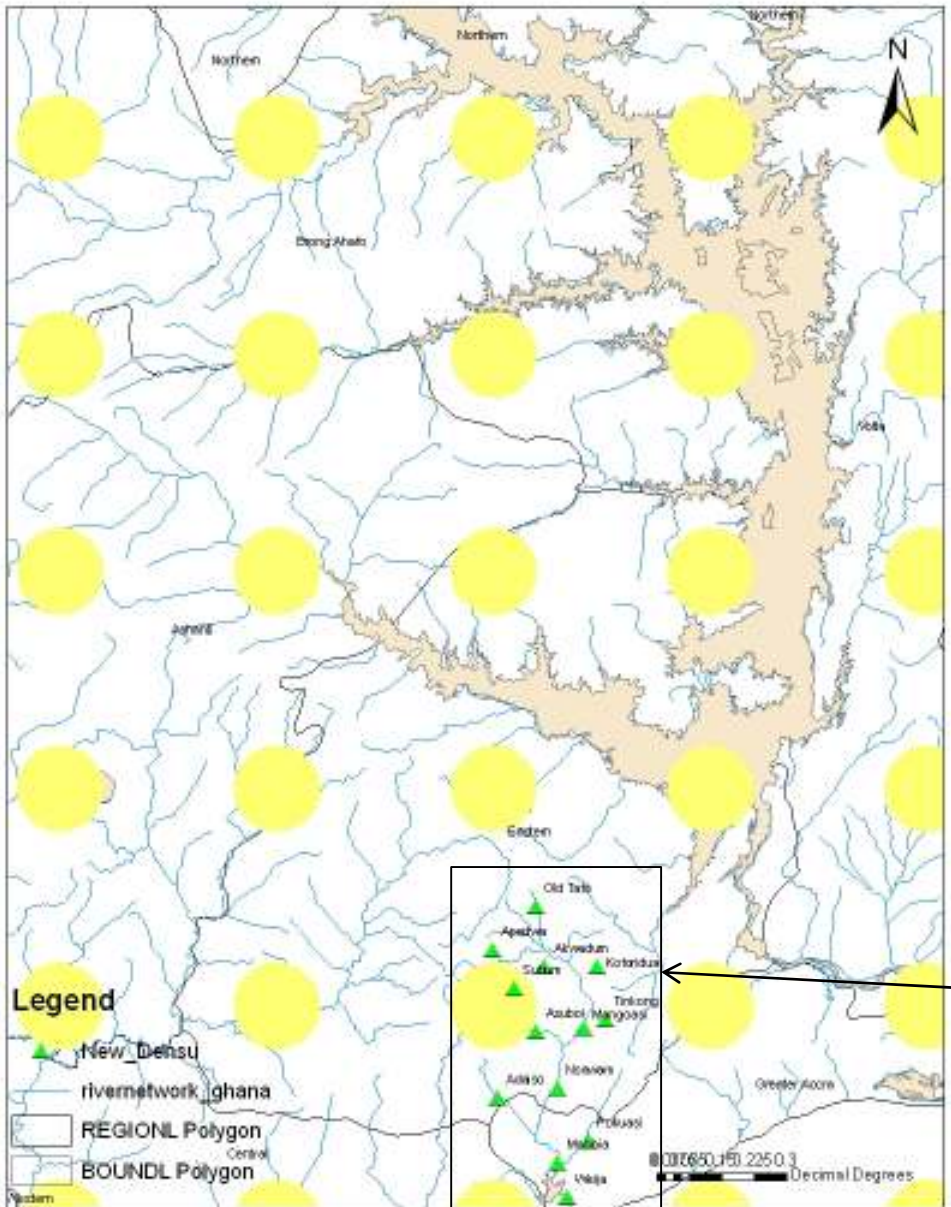


Area for Coarse Grid simulation

Area of interest for URAdapt

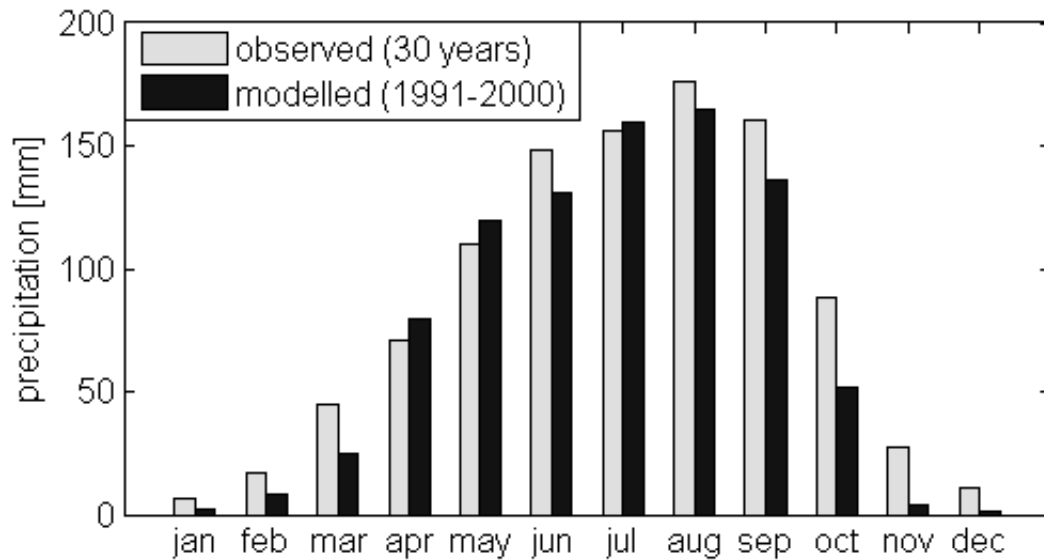


Available climate data for URAdapt areas

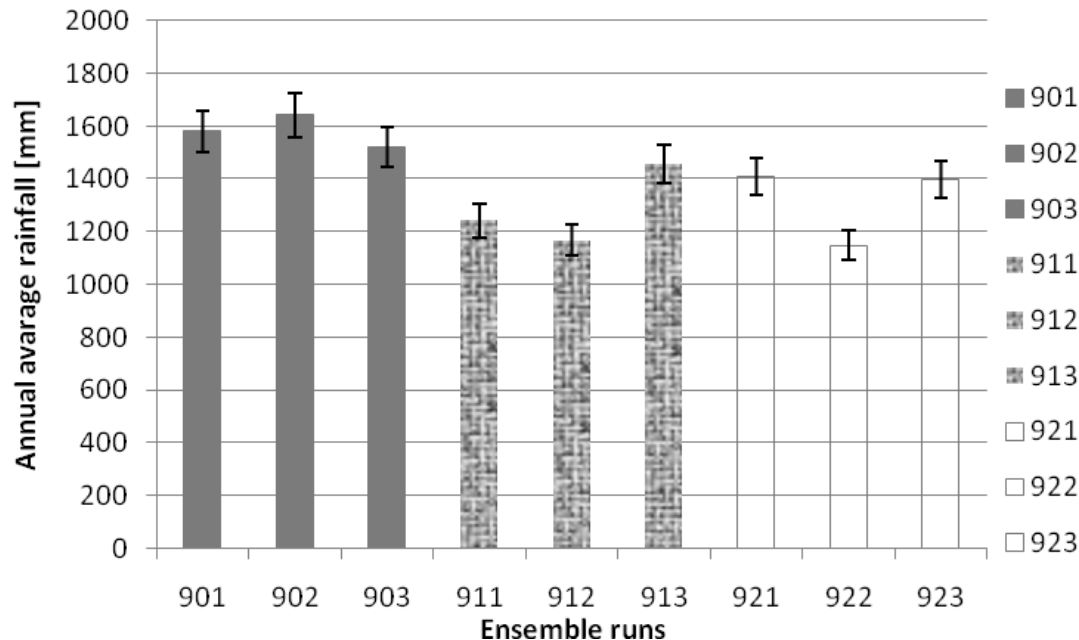


Regional Downscaling for selected station

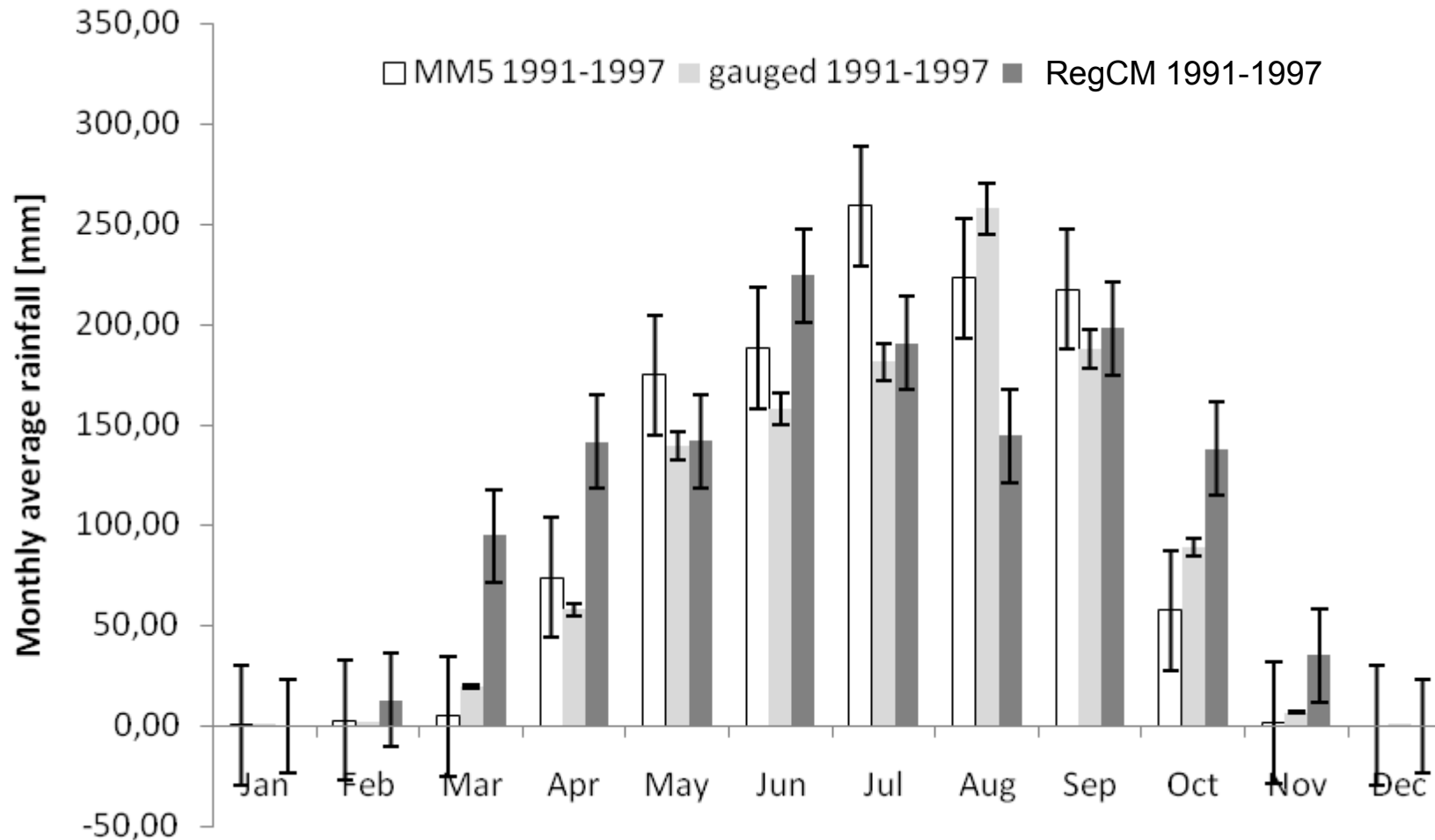
Densu basin to be used for Validation



Average of 1961-1990 with
Average rainfall of 1991-2000



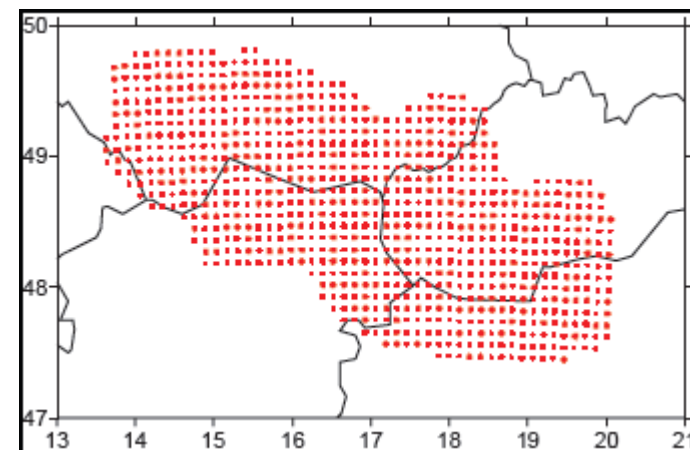
Annual rainfall average for
three ensemble model runs of
IPCC climate
scenarios A2, A1B and B1 for
present (1961-2000) and future
(2001-2050) with standard
deviations at 5oN -2.50W south
of the basin



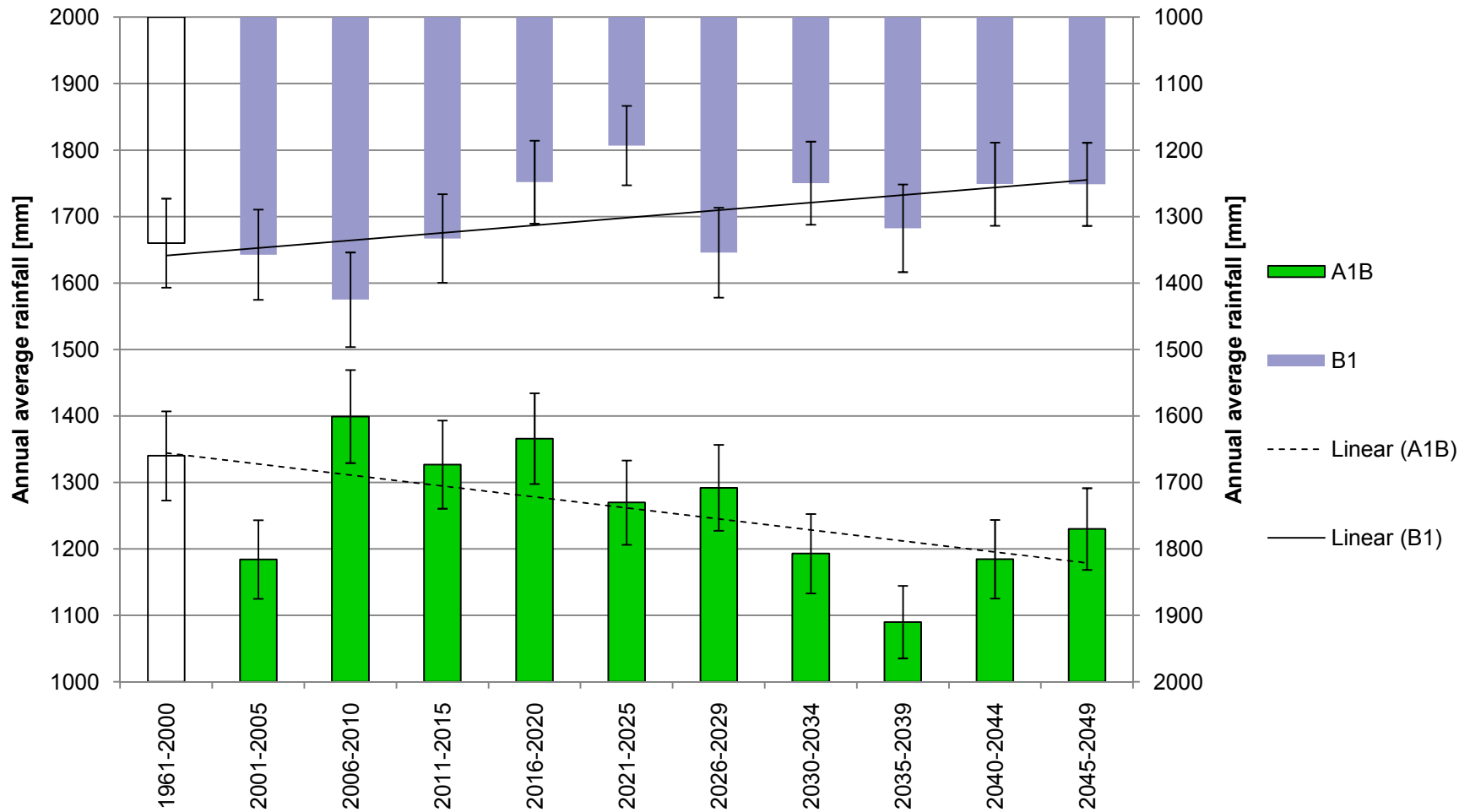
MM5-simulated (mean over 7 years) and RegCM-simulated (mean over 7 years) compared to observed (mean over 7 years) rainfall including standard deviation (error bars) rainfall at Ejura catchment of the Volta Basin



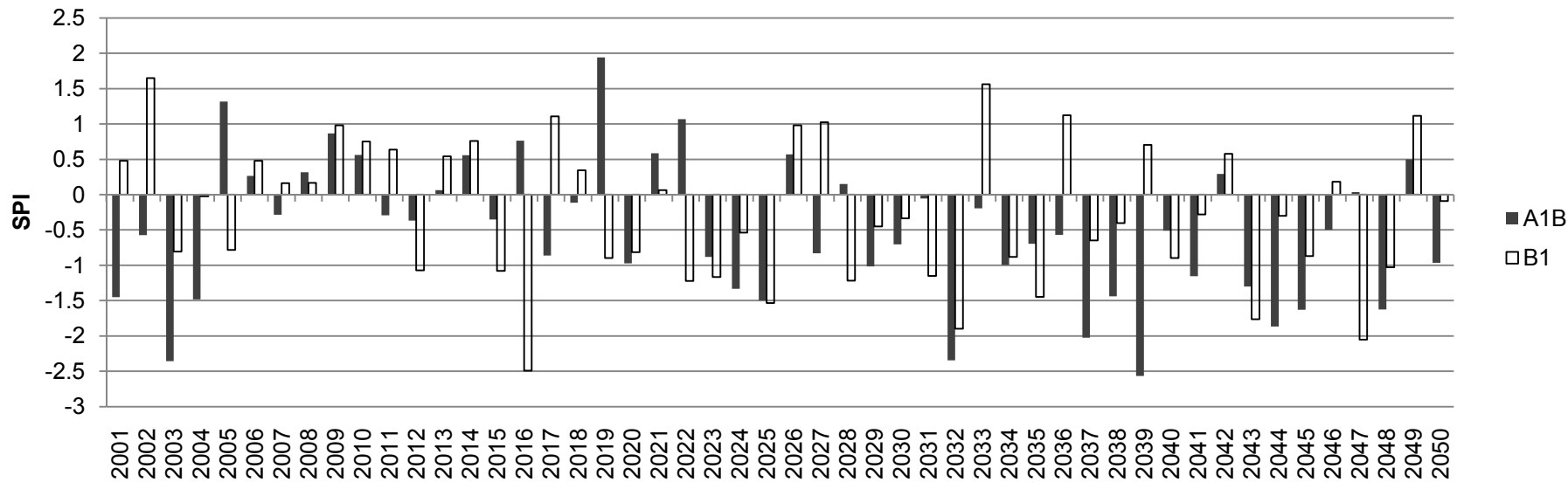
Analysis now on statistical downscaling for the URAdapt areas



TRENDS?



RegCM-simulated rainfall compared to average observed past rainfall



| SPI Classification | Past (gauged) | Future (RegCM A1B-simulated) |
|------------------------|-------------------|------------------------------|
| | 1961-2005 | 2006-2050 |
| | No. of occurrence | No. of occurrences |
| Severely-extremely wet | 5 | 5 |
| Moderate wet | 5 | 5 |
| Normal year | 17 | 11 |
| Moderate dry | 11 | 6 |
| Severely dry | 4 | 12 |
| Severely-extremely dry | 3 | 6 |

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“ – Benjamin Franklin
(1706-1790)