

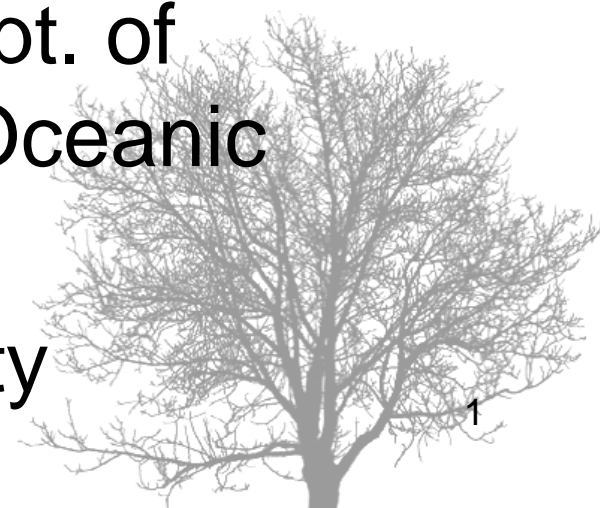


ClimDev-Africa

Climate change signals at local scale over Ethiopia: Insights from high resolution gauge and satellite rainfalls

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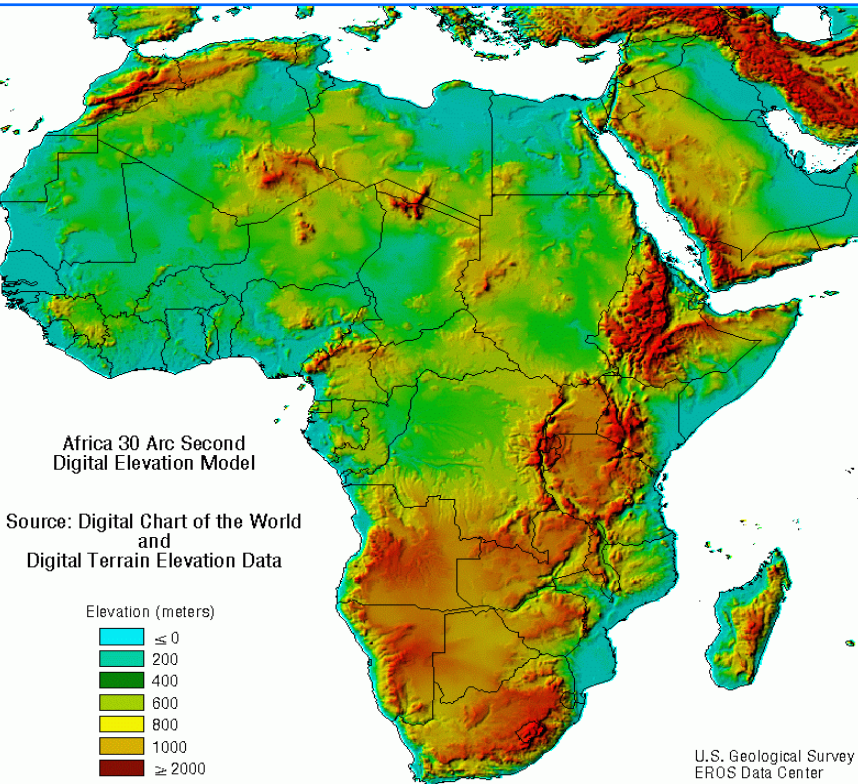


Outline

- Introduction
- Data and Methods
- Climate Change Signal
 1. Dominant Seasonal Components and Timing of Peak Rainfalls
 2. Inter-Comparison with other data sets
 3. historical Rainfall Trend
- Conclusion and policy issues



Introduction



- Complex topography
- Climate is characterized by high rainfall and temperature variability in both spatial and temporal scales.
- The Indian Ocean, the Atlantic Ocean and both the African and the Asian landmasses

Data and Methods

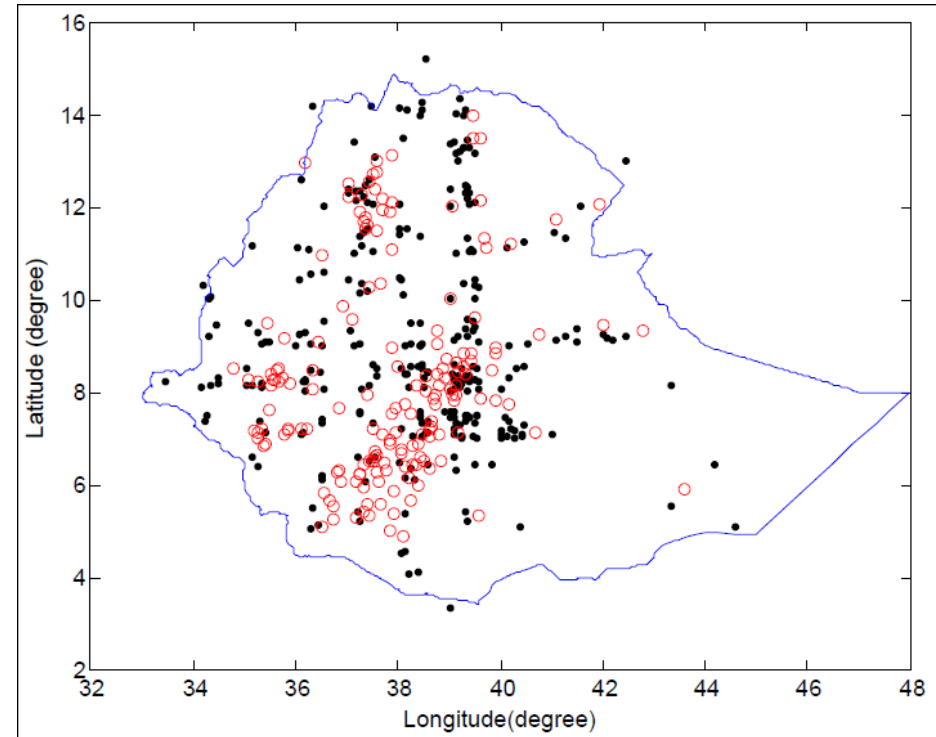
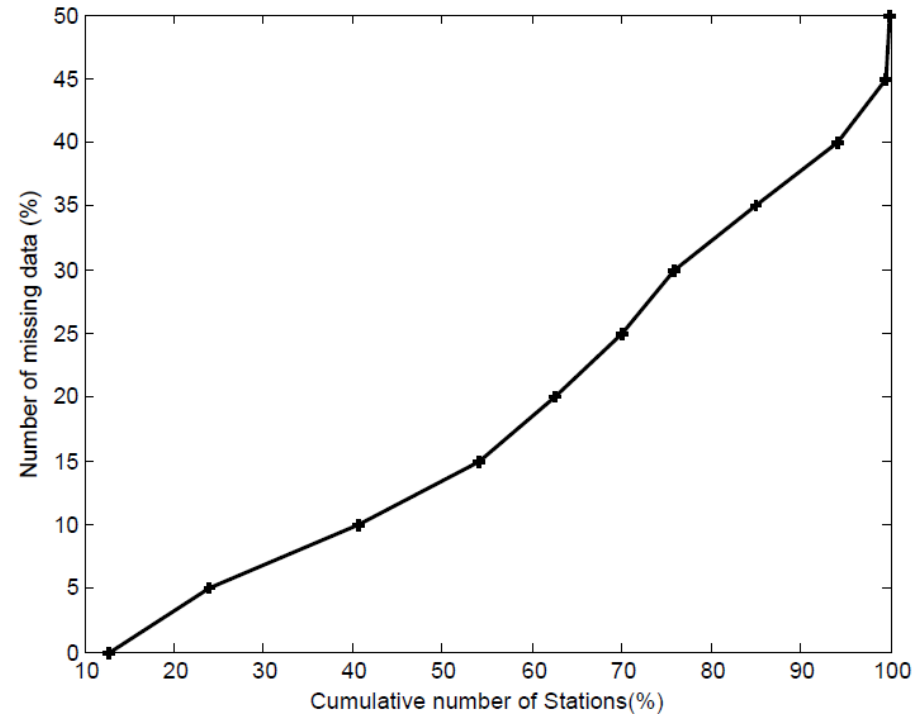
Data set

- Rain guage
- Rain guage & satellite blended: CMAP, GPCP
- TRMM

Methods

- Change point detection & homogeneity adjustment:
Quantile matching
- Data gap filling: Regularized Expectation maximazation,
Multichannel Singular Spectrum Analysis
- Gridded data set: Kriging
- Trend detection & significance test: Harmonic Analysis,
Singular Spectrum Analysis, Mann-Kendal test

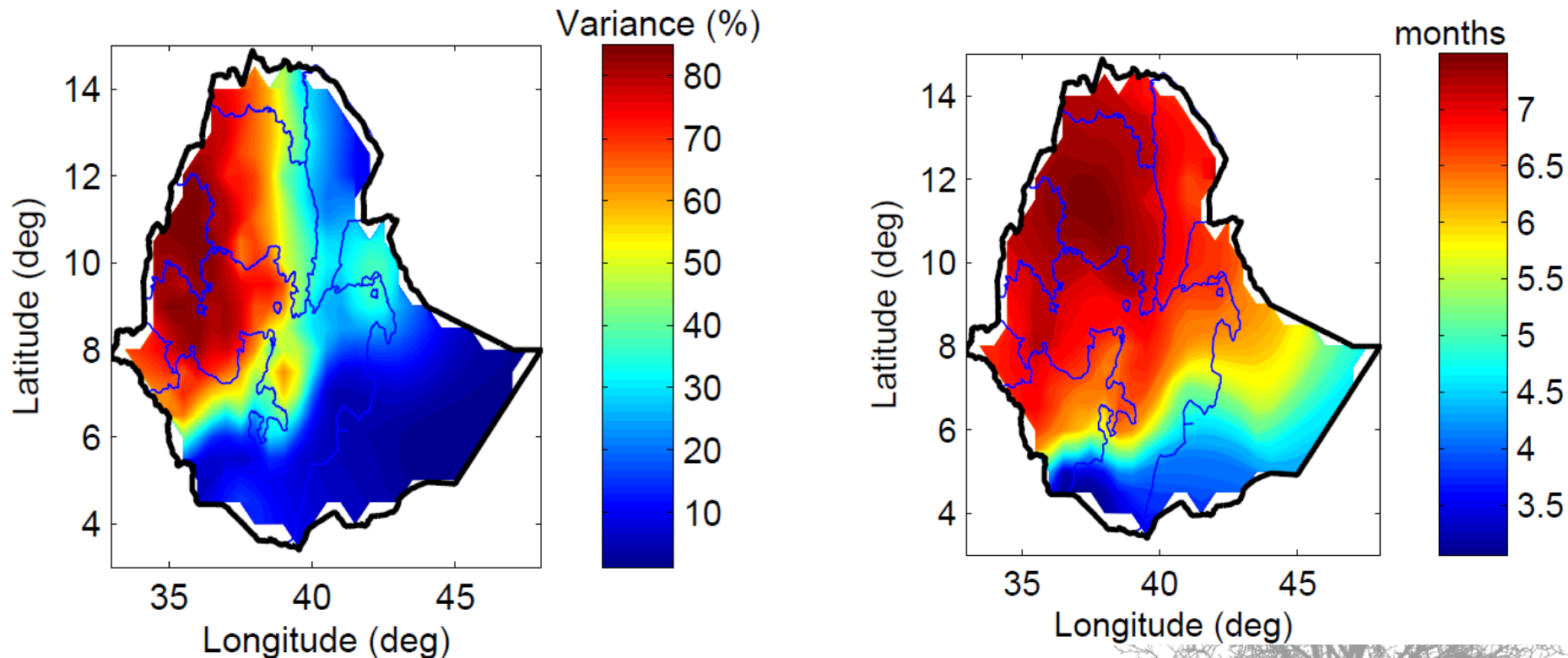
Data and Methods: Data status



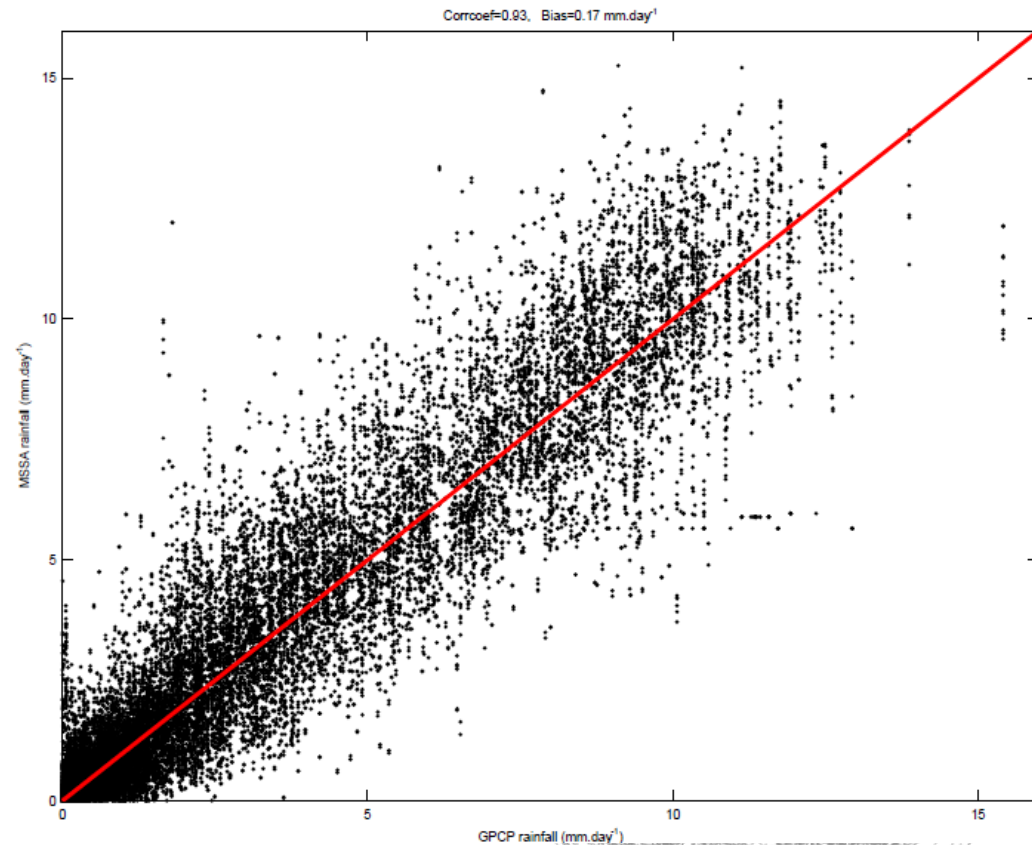
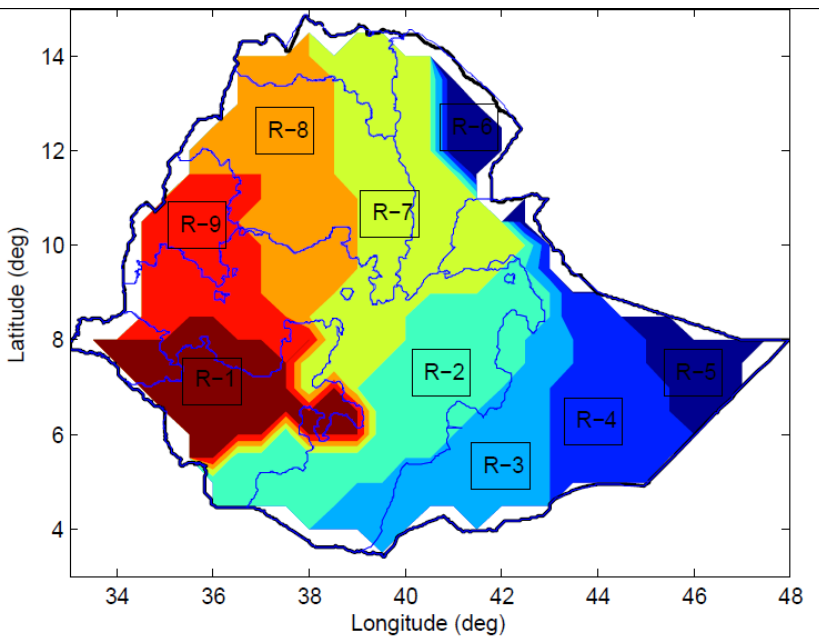
- Left: Percentage of stations with missing data
- Right: stations used in this study (Red) and with records < 15years (black, not used)

Climate Change Signal

- Dominant Seasonal Components and Timing of Peak Rainfalls: Annual Cycle

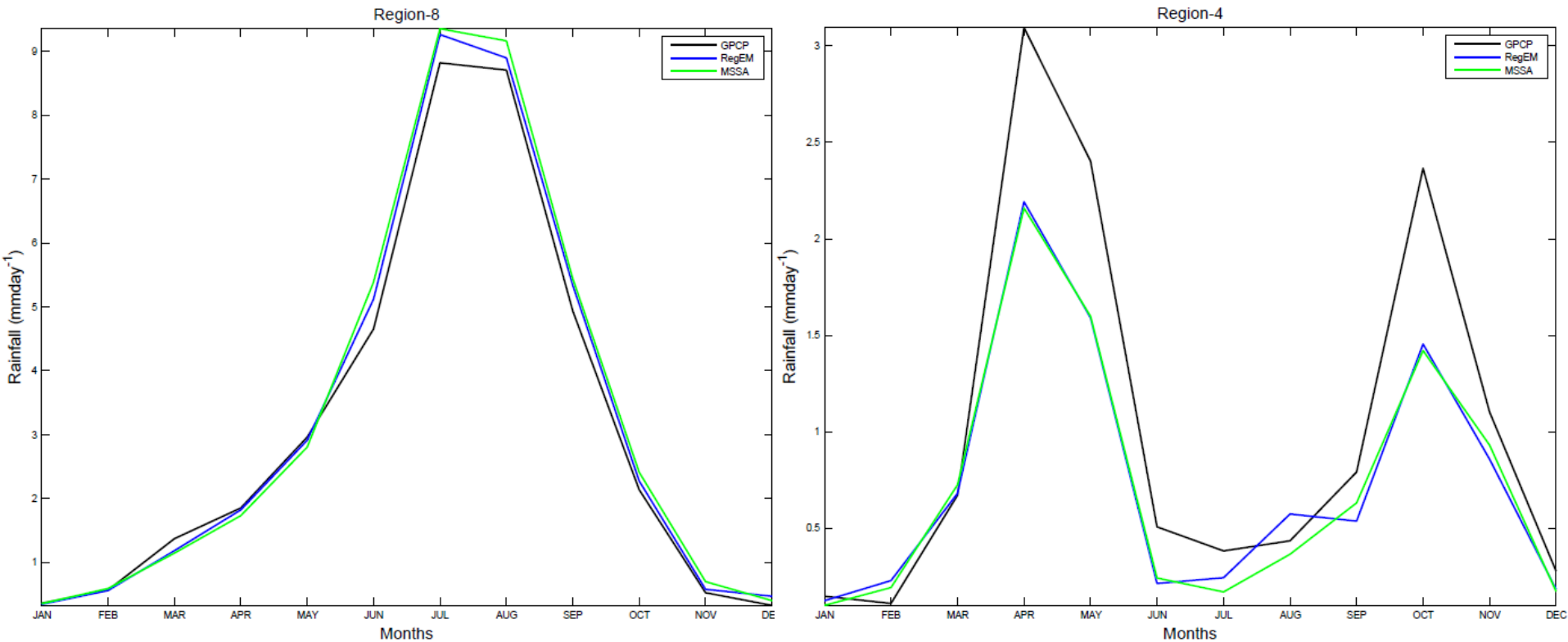


Intercomparison: Homogeneous regions

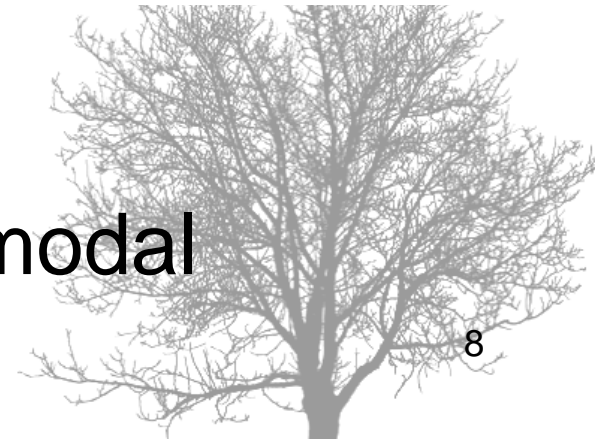


Left (top): Clustering is based on self organizing map (SOM) using new gridded data:- 9 regions;
Right (top):for R-8 based on MSSA

Intercomparison: Homogeneous regions

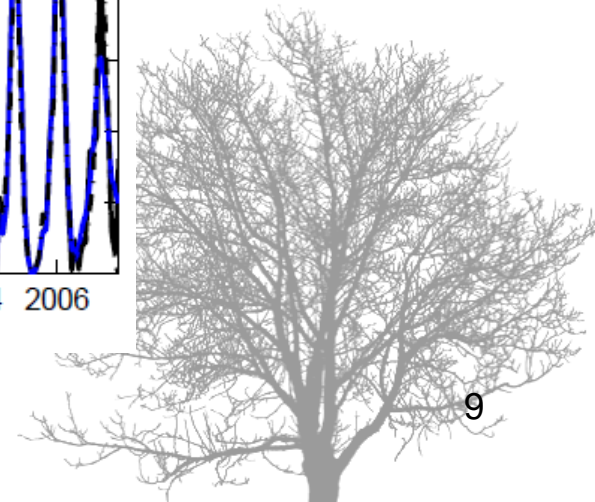
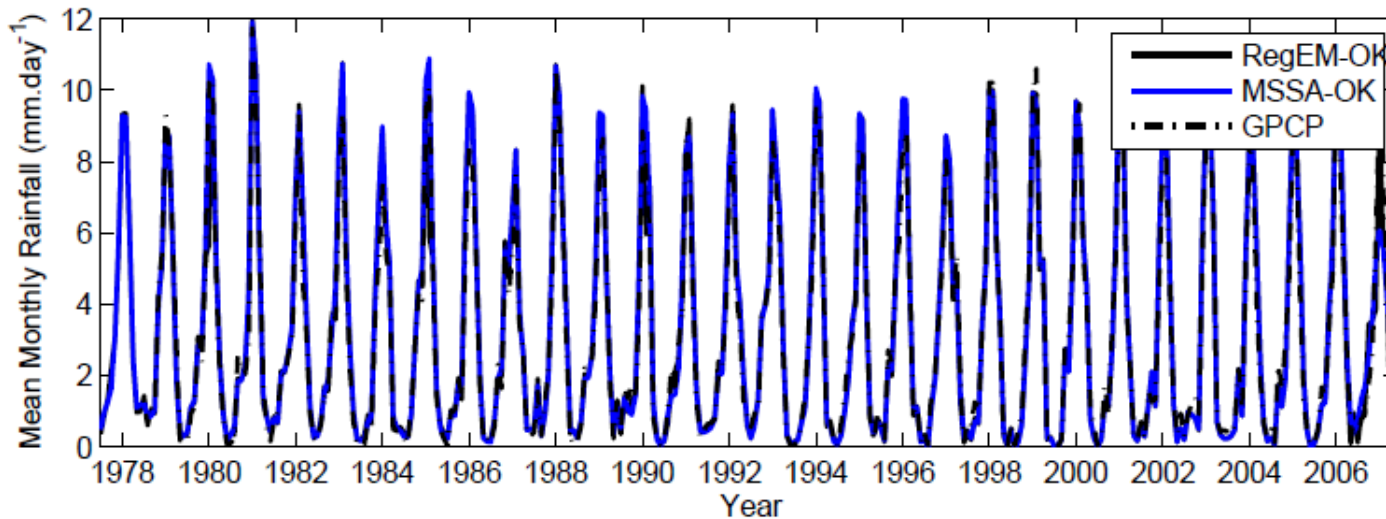
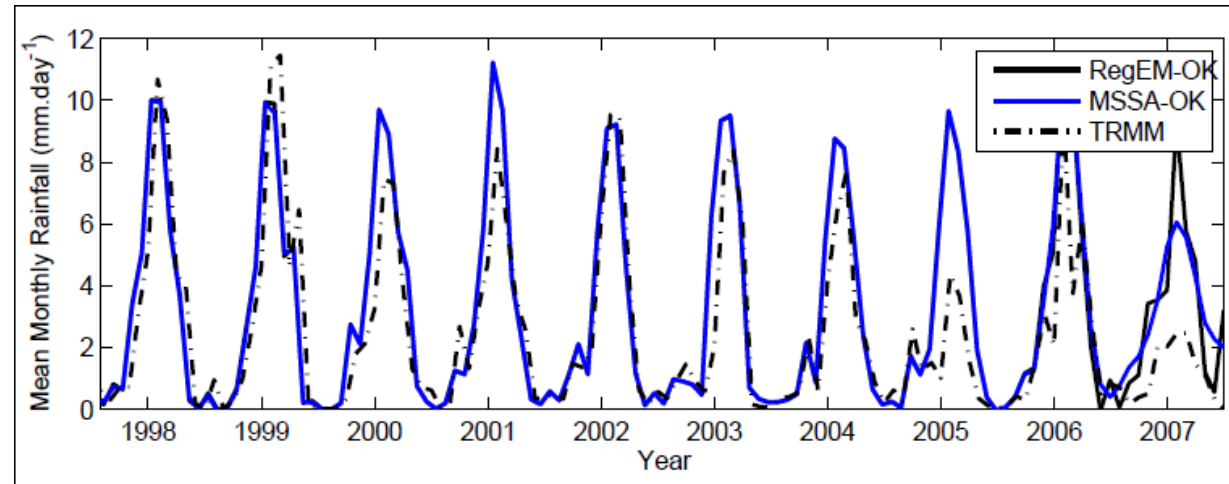


- Right (top): GPCP for R-8 (monomodal region) & R-4 (bimodal region)

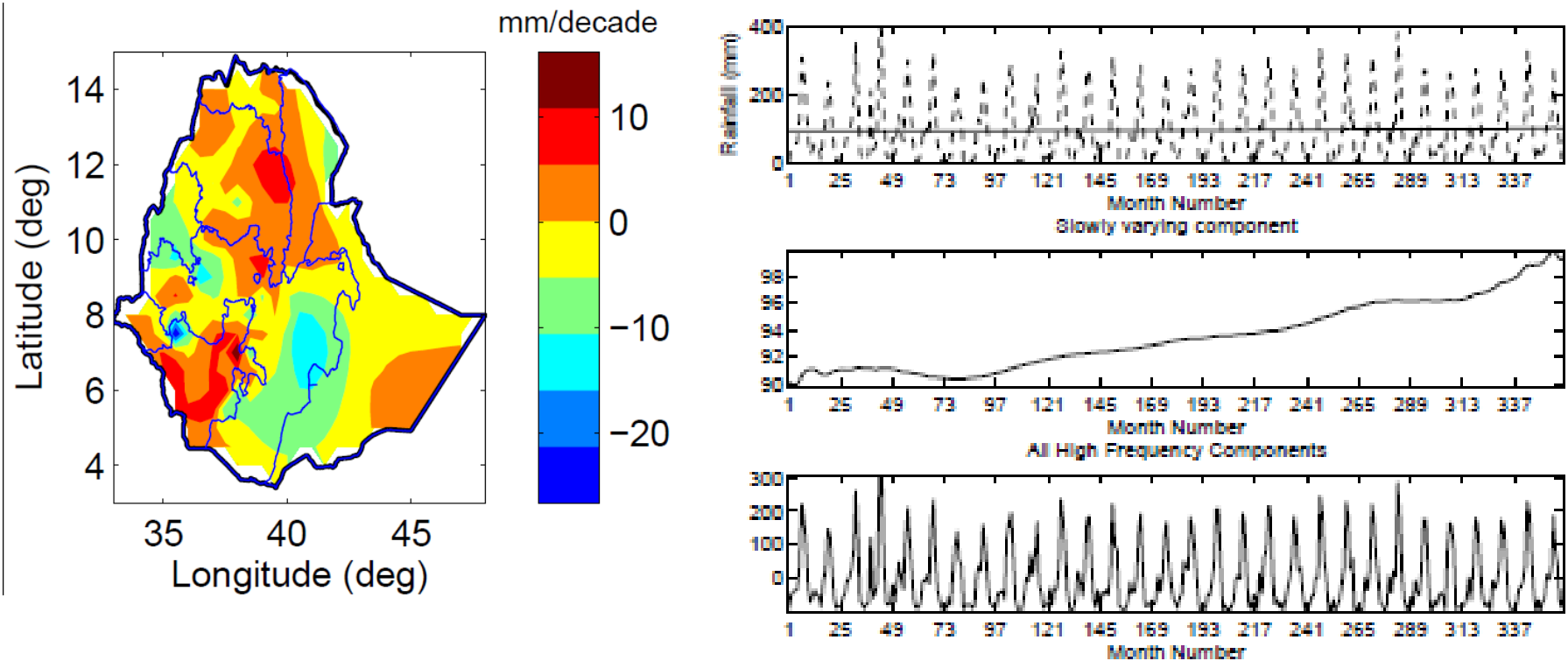


Intercomparison: Homogeneous regions

- TRMM (right);
GPCP(bottom)
time series for
R-8



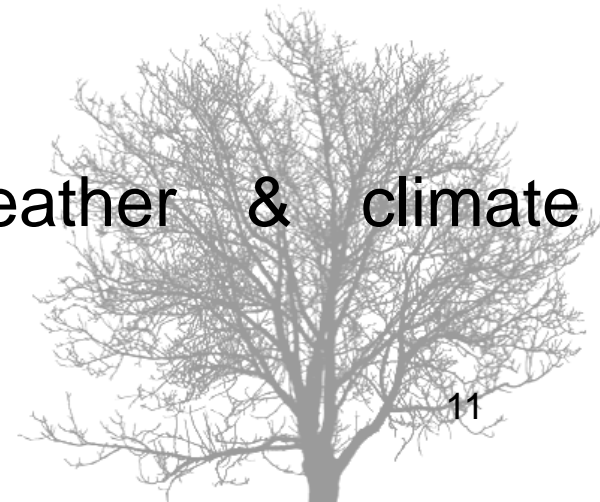
Historical Rainfall Trend



- Rainfall trend from new data set (Left) and SSA technique for trend detection(Right)
- Mixed signals in contrast to IPCC report

Conclusion and policy Issues

- Data on climate variables such as rainfall & temperature over Africa is not useable due to data gaps and inhomogeneity
- Data “rescue” should be given due attention in Africa
- Important information on climate variability & change can be retrieved with sufficient accuracy from quality controlled, homogenized and imputed data set
- African governments should support :
 1. data “rescue” projects in Africa
 2. efforts towards good quality weather & climate observations
 3. climate research and dissemination



Thank you



High Performance Computing Clusters at AAU
for Climate Modelling, (33TB, 128 processors)

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