Validation of CHIRPS Satellite Rainfall Estimates over East Africa

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Project: Predicting Climatic/Hydrologic Extremes in the Greater Horn of Africa Under Evolving Climate Conditions to Support Mitigation and Adaptation Strategies

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I. Data
II. Results
III. Conclusion
I. Data
Satellite Data

CHIRP/S: Climate Hazard Group Infrared Precipitation with Station

- From University of California, Santa Barbara;
- TIR calibrated with TRMM
- Mean Bias-adjusted;
- 0.05-deg spatial resolution;
- Daily, pentad and dekad totals available;
- Available from 1981 to current.
Satellite Data

Satellite products compared with CHIRP/S

• **ARC** (African Rainfall Climatology) from NOAA-CPC
  - TIR + GTS station data
  - Daily @ 0.1-deg spatial resolution
  - 1983 to current

• **TAMSTA** from University of Reading (UK)
  - TIR calibrated with station
  - Mean bias-adjusted
  - Daily and dekadal @ 0.0375-deg resolution
  - 1983 to current
Station Data

Access to unprecedented number of station because of ENACTS work in Africa:

• Aims at improving availability, access and use of climate information.

• Works with NMHS to quality-control all available station data and combine them with proxies (RFE, Reanalysis)
ENACTS Countries:

Ethiopia
Gambia
Ghana
Kenya
Madagascar
Mali
Rwanda
Senegal
Tanzania
Uganda
Zambia
Station data:

ENACTS and CHIRPS Stations
Station Data

Station data:

The Challenge for CHIRPS: Declining station input

- Ethiopia
- Tanzania
- Kenya
CHIRPS(*) and Validation(+) Stations

- Validation at daily, dekadal (10day), and monthly time scale
- Data from 2006 to 2010 used for validation
II. Results
Dekadal Validation: Correlations
Dekadal Validation: Bias(%)
Dekadal Validation: Skill(Eff)
Dekadal Validation: Ethiopia

<table>
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<th>Eff</th>
<th>Bias</th>
<th>MAE</th>
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### Monthly Validation: Ethiopia

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Dekadal Comparison: Ethiopia

[Map and data visualization showing rainfall comparison over Ethiopia]
Daily Validation: Ethiopia (HSS)

TAMSAT3
Comparison with Reanalysis Products
III. Conclusion

• Both CHIRP and CHIRPS performed better than ARC and slightly better than TAMSAT.

• ARC underestimates RR over mountainous and coastal regions.

• Bias removal improved the products significantly.

• CHIRPS has a slightly better skill than CHIRP
Thank You

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