Quantifying Weather & Climate Impacts



Changes in precipitation over Ghana for last 50 years: Assessment of the ability of various dataset to reproduce the observed variability and changes

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Introduction



An idealized general circulation patterns of winds, pressure and convergence over Africa, with focus on West Africa. Dotted lines indicate the ITCZ

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Rainfall Climatology for Ghana



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Data source and Methodology

Data Source

- Gmet rain gauge data (1960-2010) for 13 stations
- Reanalysis data: ERA-40, ERA-interim, NCEP
- Gridded data: VASclimO and GPCP

Methodology

- Mann Kendall trend analysis was carried out on each station data at 1% and 5% significant levels
- Reanalysis and grided datasets were bi-linearly
- interpolated to GMet guage sites
- The rainfall trend were calculated from monthly accumulated precipitation and anomaly index other datasets at 1% and 5% significant levels
- The correlation coefficient, the relative mean bias and RMSE of the biases determined.

Results



Mann Kendal trend analysis no standard anomaly index (SAI) (*) trend at 95% confidence level and (**) trend at 99% confidence level

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(*) trend at 95% confidence level (**) trend at 99% confidence level



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Conclusions

- Generally, there is a decreasing trend in rainfall in the South of the country but weaker trend in the North over the period 1960 – 2000
- Reanalysis dataset mostly showed positive trend for the period 1979 – 2010
- VASClimO and GPCP dataset had very good and consistent agreement with GMet with Spearman correlation in the range of 0.7 1.0, bias in the range of -0.5 and +0.5
- Poor correlation, with larger bias and RMSE are observed for Reanalysis data (NCEP, ERA-40, and ERA-Interim) comparisons.
- Gridded datasets are more reliable for impact studies