A modeling study to investigate the recent trends in the climate of West Africa Sahel

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This study investigates the new trends in the climate of West Africa with an emphasis on the Sahel region. The regional climate model RegCM, developed by the International Center for Theoretical Physics (ICTP), is used to perform high resolution simulations (40km) over a region covering West Africa from 1999 to 2009. Inter annual and seasonal variation studies of the monsoon, a key component of West Africa climate system characterized by many scale interactions is carried out.

- **Model design**

RegCM3 forced with R2 datasets : simulation period 1997 to 2009 with a spin up time of 2 years

Domain covering West Africa.

- **Investigated the new trend in Sahel climate characterized by a slight recovery; understand dynamic behind the new through various diagnostics.**

Model assessment on key parameters and features

Model bias (precipitation and temperature)

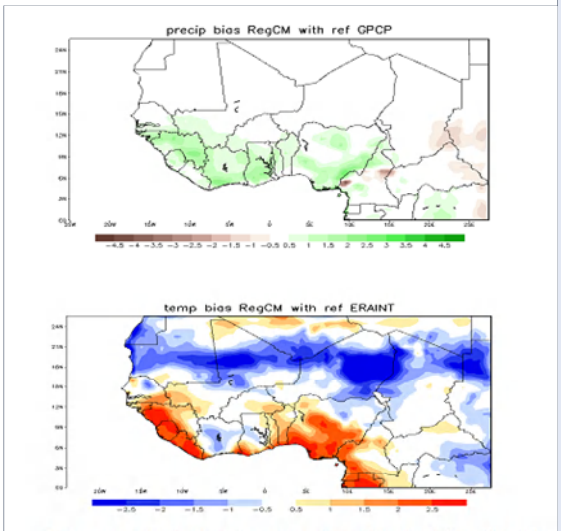
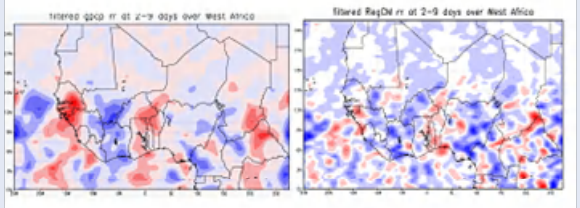


Fig.1 : mean precipitation (top)and temperature (bottom) bias of RegCM3 over West Africa with reference respectively to GPCP datasets and ERAINT.



ig.2 : Structures from filtered precip between 2 to9 days representing main high fre
vaves 3-5 and 6-9 days for GPCP (left) and regcm(right).

Other Key dynamic features (winds and Jets)

African Easterly Jet and wind seasonality controlling monsoon and precip

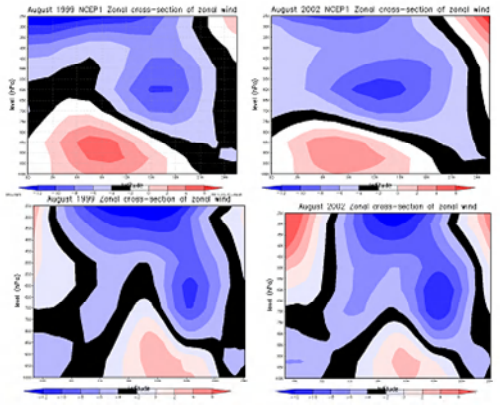


Fig. 3 : Tropospheric Jets (AEJ and TEJ) over West Africa from NCEP R1 (top) and RegCM simulation (bottom) for august of two contrasting years 1999(wet) and 2002 (dry).

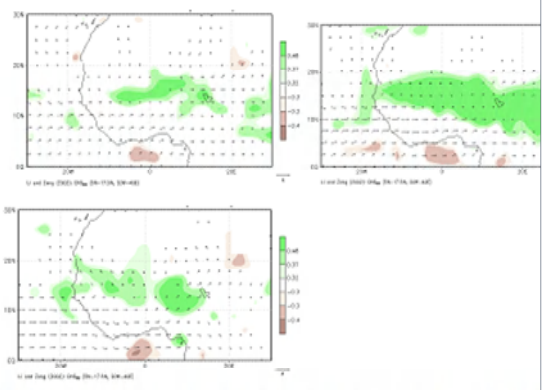


Fig.4: correlation/regression 95% confidence interval cmap precip and meridional wir
850 R1 reanalysis hPa using a normalized index (Li and Zeng 2002)

With fairly good representation by the model in key features modulating rain producing systems, the main objective of the remain work will be to understand dynamic associated with the new rainfall trend in West Africa.

Reference & acknowledgement

Li, J. and Q. Zeng, 2005: a new monsoon index , its interannual variability and relation with monsoon precipitation. Climatic and Environmental Research, 10 (3):351-365.

Li. J., and Q Zeing, 2000: Significance of the normalized seasonality of wind field and its rationality for characterizing the monsoon, Science in China(D), 43(6):647-653.

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