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An Empirical Prediction of Seasonal Rainfall in Nigeria

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ABSTRACT The need to have quantitative means of probing anticipated rainfall is essential and inevitable for the purposes of planning and policy formulation. This paper attempts to present some results of an ongoing experiment on empirical prediction of seasonal rainfall in Nigeria. Rainfall in Nigeria is characterized by both latitudinal and longitudinal variations. In the southern part of the country, the seasons could be classified as March, April, May (MAM), April, May, June (AMJ) and June, July, August, September, (JJAS) while the northern area has one rainfall season – June, July, August, September, (JJAS). The June, July, August and September, (JJAS) season is common to both the southern and northern parts of the country. In the formulation of this experiment, it was assumed that there exists an empirical relationship between some physical parameters (atmospheric, geophysical and oceanic) and rainfall. Rainfall data from twenty Nigeria stations, Sea Surface Temperature Anomalies (SSTA) and Outgoing Longwave Radiation (OLR) constituted the input data for formulation of the prediction equations. The rainfall data and SSTA indices spanned from 1950 to 2006 while OLR indices were from 1979 to 2007. Principal Component Analysis (PCA) of the rainfall data divided the country into six homogenous rainfall zones. The six zones were correlated with global SSTA (Reynolds SST) and OLR indices from the Central part of Africa and South Atlantic Ocean. Correlation between the area averaged JJAS rainfall and the predictors ranges from 0.32 to 0.62, which suggests some degree of skill. Forecast for JJAS 2006 rainfall over the regions saw the OLR becoming a better Predictant. These zones of (SWR, SER, NR2 and NR3) performed creditably well from the equation results.