

On the Prediction of Rainfall Onset and Retreat Dates in Nigeria

Odekunle, T.O^{*}., Balogun E.E. and Ogunkoya O.O.

AIACC Working Paper No.16
August 2005

*Direct correspondence to:
(odeyemitheophilus@yahoo.com)

An electronic publication of the AIACC project available form www.aiaccproject.org

AIACC Working Papers, published on-line by Assessments of Impacts and Adaptations of Climate Change (AIACC), is a series of working papers produced by researchers participating in the AIACC project. Full papers published in *AIACC Working Papers* have been peer reviewed and accepted for publication as being (i) fundamentally sound in their methods and implementation, (ii) informative about the methods and/or findings of new research, and (iii) clearly written for a broad, multi-disciplinary audience. Abstracts of selected papers from the AIACC project that have been published in peer-reviewed journals are also published in the working paper series. The purpose of the series is to circulate results and descriptions of methodologies from the AIACC project and elicit feedback to the authors. Because many of the papers report preliminary results from ongoing research, the corresponding author should be contacted for permission before citing or quoting papers in this series.

The AIACC project is funded primarily by a grant from the Global Environment Facility. The U.S. Agency for International Development, the Canadian International Development Agency and the U.S. Environmental Protection Agency provide additional funding for the project. The project is co-executed on behalf of the United Nations Environment Program by the global change SysTem for Analysis, Research and Training (START) and the Third World Academy of Sciences. AIACC seeks to enhance capabilities in the developing world for responding to climate change by building scientific and technical capacity, advancing scientific knowledge, and linking scientific knowledge to development and adaptation planning. AIACC supports 24 regional assessments in Africa, Asia, Latin America and small island states with funding, mentoring, training and technical support. The assessments are active in 46 developing countries and engage approximately 300 developing country scientists and students, 40 developed country scientists, and institutions in both the developing and developed world.

For more information about the AIACC project, and to obtain copies of other papers published in *AIACC Working Papers*, please visit our website at www.aiaccproject.org.

ABSTRACT

The study examined the rainfall onset and retreat dates between 1962 and 1996 in Nigeria, and generated models for their prediction. The study used the composite of rainfall-promoting factors namely, sea surface temperature of the tropical Atlantic Ocean, land/sea thermal contrast between some selected locations in Nigeria and the tropical Atlantic Ocean, surface location of the Inter-tropical Discontinuity and the land surface temperature in the selected locations in Nigeria. Rainfall and temperature data were collected from Ikeja, Benin, Ibadan, Ilorin, Kaduna and Kano, in Nigeria. Cumulative percentage mean rainfall was employed to generate the rainfall onset and retreat dates series, while the method of stepwise multiple regression analysis was used to construct the required prediction models.

The results obtained showed that the hypothesized rainfall-promoting factors are efficient in predicting rainfall onset and retreat dates in Nigeria. The correlation coefficients (R^2) obtained are in most cases (>75%) higher than 0.50 (with several of them approaching 0.90). Sea surface temperature and land/sea thermal contrast are the most significant predictor variables. The results also indicated that all the areas of the tropical Atlantic Ocean, from the Gulf of Guinea, through St Helena and Ascension Island, up to the Benguela Current region, influence the inter-annual variability in the rainfall onset and retreat dates of Nigeria.

Odekunle, T.O., Balogun E.E. and O.O. Ogunkoya O.O. (2005) "On the Prediction of Rainfall Onset and Retreat Dates in Nigeria", *Theoretical and Applied Climatology*, Vol. 81 (NO.1-2):101-112.

A full copy of the paper may be requested from T. O. Odekunle at odehyemitheophilus@yahoo.com. The paper reports on research supported by grant number AF23 of the AIACC Project.