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Local Climate Forcing and Eco-Climatic Complexes in the Wooded Savannah of Western Nigeria

PDF (Size: 796KB) PP. 155-166 DOI : 10.4236/nr.2011.23021

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ABSTRACT

Many climate impact applications are sensitive to local differentials in the climate system. This study investigates how eco-geographic factors influence the local climate and propagate eco-climatic complexes that vary spatio-temporally. Local geography data including elevation, slope, aspect, rainfall, temperature, vegetation, population density, and soil potential for agriculture were integrated and analyzed using geographic information system and principal component analysis. The result was profiled for local climate drivers and associated spatial structures in present and future climate (2046-2065) scenarios. The results suggest a local climate system driven by the coupling between terrain, rainfall and temperature in all seasons. In the present climate, this coupling creates eco-climatic complexes that extend from the southeast to northwest corridor in all seasons except June-July-August (JJA) when it is shifted to the northeast axis. This pattern is projected to continue in the future climate scenario, but its spatial influence and intensity would weaken around the northwest axis and rainfall will become less significant in the system in JJA. The clustering of rural settlements these complexes suggests the climate-positives produced by the system significantly support rural livelihoods. Thus, these eco-climatic complexes represent climate sensitive natural resource systems that should be targeted as a fulcrum for climate change mitigation and adaptation in the wooded savannah.

KEYWORDS

Climate Change, Geographic Factors, Eco-Climatic Complex, GIS, PCA, Adaptation, Savannah, Nigeria

Cite this paper

M. Fasona, M. Tadross, B. Abiodun and A. Omojola, "Local Climate Forcing and Eco-Climatic Complexes in the Wooded Savannah of Western Nigeria," *Natural Resources*, Vol. 2 No. 3, 2011, pp. 155-166. doi: 10.4236/nr.2011.23021.

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