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A GEO-SPATIAL ASSESSMENT OF DROUGHT IN NORTHERN NIGERIA USING VEGETATION
INDICES AND LAND SURFACE TEMPERATURE APPROACH.

Abstract

In recent years, drought occurrence has top the agenda discussed at most climate change conferences and panels. This is because drought negatively impacts the natural habitat and livelihood of the occurring region. This study aims at assessing the spatio-temporal variation of drought in Northern Nigeria within the last decade. It employs the use of Moderate Resolution Spectro-radiometer (MODIS) datasets for 2005, 2010 and 2015. Temporal Normalized Difference Vegetation Index (NDVI) and Land Surface Temperature (LST) maps were extracted from MODIS satellite. The spatio-temporal variation of drought in the study area was based on the 3 ecological zones (Guinea, Sudan and Sahel savanna) within Northern Nigeria. NDVI and LST were employed to compute the Water Supplying Vegetation Index (WSVI) and were further classified into three classes (extreme, moderate and mild drought). Analysis of WSVI, NDVI and LST were then carried out with respect to the pixels that fall within each ecological zone. Result revealed that in 2005 about 46% and 35% of the area experienced extreme drought and moderate drought respectively. While in 2010 and 2015, the extreme drought areas were found to have declined to about 25% and 23% respectively, though moderate drought has increased to about 49% and 50% respectively. This revealed that Northern Nigeria has generally undergone wetter conditions and drought-free over the last decade. NDVI-LST correlation coefficient further revealed that over the Sahel region, there was a negative correlation throughout the study period with a declining pattern, ranging from -23.63 to -29.25, while in the Sudan, the correlation coefficient showed an increasing pattern from -5.15 to 7.90. A comparison of vegetation index and surface temperature characteristics of a particular area is useful for drought risk mapping. Hence, this drought risk map could play a vital role in the decision making process for drought monitoring strategies and policies.