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Comparison of spatio-temporal patterns of droughts in Malawi and el Niño Oscillation index

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Agricultural practices in Malawi have shown to be vulnerable to drought events that might be linked to el Niño. There is no clear information about the drought patterns (e.g. duration, extent) in the region. Therefore, new techniques that explore spatial and temporal development of droughts likely will lead to important information for the country. This research examines relationships between spatial temporal information obtained from measurements in Malawi and el Niño oscillation index. The main objective is to assess the ability to forecast spatial patterns of drought for agricultural purposes using the variation of clusters calculated with the contiguous drought area (CDA) approach. In this study, we focus on Malawi which very much relies on seasonal rain fed agriculture and therefore a variable threshold method has been used to identify drought events in daily discharge and precipitation. A 30 moving average of daily precipitation from 1990 to 2000 was applied to generate interpolated gridded data for the region. An analysis of the spatial variation of low or no rainfall periods over Malawi was performed by creating time series of the number of spatial drought events and the percentages of drought area. Time series of el Niño southern oscillation index were correlated for different time windows with different spatial patterns. The drought regions were mapped and a group of typical patterns that relate to el Niño were obtained. It might appear that the information obtained will lead to the possibility of forecasting droughts. Further studies need be done to validate and further explore the appearance of the typical drought patterns found and their correlation with el Niño phenomena.