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The main time-scales of precipitation variability in North Cameroon and associated changes in rainfall distribution

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The Sahel region is recognized as one of the most vulnerable region in the world to climate changes, characterized by an important drought since the late 1960's. Causes of drought are not yet fully established at regional scale. Changes in sea surface temperatures at global scale and changes in regional atmospheric circulation are related to inter-annual and decadal variability of the precipitations in this region, marked by changes in their intra-seasonal distribution. In Cameroon, an area directly affected by positions of the easterly jet streams and the monsoon flow, the majority of works on climate variability were performed at national scale, which does not allow understanding climate variability at smaller scales (i.e. local scale). It is thus important to clarify the links observed between the main climate parameters at regional scale and distribution of rainfall at local scale, but also their evolution over time. Spatial and temporal variability of rainfall distribution in North Cameroon was analyzed through three main stations describing an oriented North-South gradient, using descriptive methods (e.g. rainfall regimes and rainfall index) and continuous wavelet analysis, in order to detect the main time-scales of variability in the rainfall distribution. Results shows a seasonal distribution of rainfall which is varying spatially from South to North, with an increase in the duration of the dry season and a passage in one of two maxima of rain along the rainy season. This distribution also varying temporally: the evolution of precipitation is influenced by various time-scales of variability common to all three stations (fluctuations at annual, inter-annual and decadal scales) which are organized in three major periods corresponding to trends observed both locally and regionally: 1960-1975 (wet period), 1976-1990 (dry period) and 1991-2006 (wet period). These periods are associated with changes in the occurrence of precipitation (amount, intra-seasonal distribution). The distribution of rainfall and its spatial and temporal evolution are finally compared to the main climatic parameters related to the general atmospheric circulation (ITCZ, West African monsoon, Easterly jet streams) affecting this distribution at regional scale. The observed changes in the distribution of precipitation could be related to changes observed in these climate parameters in the three distinguished periods.

Keywords: climate variability, North Cameroon, continuous wavelet transform, West African monsoon

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