



Climate change in West Africa: a time-of-emergence approach

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Climate change is projected to amplify existing climate-related risks and create new risks for natural and human systems. The Time of Emergence (ToE) of climate change is defined as the first time when the climate change signal exceeds the natural climate variability. Evidences show that climate change has already emerged from natural variability on a global basis for temperature, but regional and seasonal changes are still discussed. Assessing the ToE of climate change at regional scale is of prominent importance, because changes in regional patterns of temperature and precipitation are the main drivers controlling impacts on human populations and ecosystem's sustainability. This aspect is particularly relevant in West Africa, where populations largely relying on rain fed agriculture are highly threatened by climate change. Deciphering between natural climate variability and climate change is then crucial to anticipate and mitigate climate impacts on agriculture and societies.

In this work, we assess the ToE of climate change in hydrological metrics associated with the West African monsoon dynamics (seasonal precipitation, monsoon onset and duration, wet and dry spells) for a set of CMIP5 climate projections for the 21st century. Different ToE methodologies and definitions are compared, and robustness and limitations are discussed, with a particular focus on the inter-model uncertainty in the ToE detection.