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Future changes in climate extremes over Equatorial East Africa based on CMIP5 multimodel ensemble

Victor Ongoma[1,2] · Haishan Chen[1] · Chujie Gao[1] · Aston Matwai Nyongesa[1,2] · Francis Polong[1,3]

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Abstract This study investigates the variability of extreme rainfall (temperature) events in the twenty-first century based on 18 (24)-member multimodel simulations of models participating in phase 5 of the Couple Model Intercomparison Project (CMIP5). The study employed extreme indices defined by the WMO's Experts Team on Climate Change Detection Indices, under two radiative forcing scenarios: RCP4.5 and RCP8.5. Two 30-year time periods, mid- (2021–2050) and end (2071–2100) of the twenty-first century, are considered for investigation of extremes, relative to the baseline period (1961–1990). Mann–Kendall test statistic and Sen's slope estimator are used to investigate trend. Temperature shows a remarkable increase with an increase in radiative forcing. A sharp augmentation in temperature is projected towards the end of the twenty-first century. There will be almost zero cool days and cold nights by the end of the century. Very wet and extremely very wet days increase, especially over Uganda and western Kenya. Variation in maximum 1-day precipitation (R × 1 day) and maximum 5-day precipitation amount shows a remarkable increase in variance towards the end of the twenty-first century. Although the results are based on relatively coarse resolution data, they give likely conditions that can be utilized in long-term planning and be relied on in advanced studies.

Keywords Climate change · Climate extremes · CMIP5 · Temperature · Rainfall · ETCCDI · East Africa

✉ Victor Ongoma
victor.ongoma@gmail.com

[1] Key Laboratory of Meteorological Disaster, Ministry of Education (KLME)/International Joint Research Laboratory of Climate and Environment Change (ILCEC)/Collaborative Innovation Center on Forecast and Evaluation of Meteorological Disasters (CIC-FEMD), Nanjing University of Information Science and Technology (NUIST), Nanjing 210044, China

[2] Department of Meteorology, South Eastern Kenya University, P.O. Box 170-90200, Kitui, Kenya

[3] Kenya Industrial Research and Development Institute, P.O. Box 30650-00100, Nairobi, Kenya

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