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Projections of extreme weather events in the Lake Victoria basin under climate change

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Extreme rainfall events have large and sometimes devastating effects on communities especially those living in developing countries. Floods, infrastructure damage, loss of lives and destruction crops are some of the adverse effects associated with extreme rainfall. There is a general consensus that changes in frequency and intensity of extreme weather and climate events will increase under climate change and have adverse effects on both humanity and nature. The Lake Victoria basin, East Africa has been identified as one of the most vulnerable regions to changes in extreme events. Using Coupled Model Inter-comparison Project Phase (CMIP3) General Circulation Model (GCM) projection data, three least biased GCMs were selected and extreme event indices for 2045-2065 studied. Under the Special Report on Emissions Scenarios (SRESA1B) scenario, the number of wet days exceeding the 90% percentile of 1981-2000 is likely to increase by 20-40% in the whole region. An increase of about 5-20% is projected to occur in the Lake Victoria basin and Congo basins with the highest changes of about more than 30% being projected for the Kenyan-Somali coast. This is also reflected in the number of wet days exceeding the 99% threshold with about 1-8% projected increase. This is accompanied by more than 100% increase on days with rainfall over 40mm/day east of Lake Victoria and central Kenya and 10% increase in the simple daily intensity index. Meteorological analysis of thirty selected events suggests abundant moisture influx into the region with Indian and Atlantic Oceans contributing the bulk in the October-December season. Anomalously strong North East monsoons and Somali jet as well as stronger pressure gradients are suggested to dominate the circulations. The walker circulation cell that develops during the main seasons in the region is projected to experience weakened surface westerlies which have been shown to be strongly correlated to precipitation anomalies in the region.