Geophysical Research Abstracts
Vol. 20, EGU2018-17176, 2018
EGU General Assembly 2018

Hydrological propagation of ENSO impacts on drought risk across sub-Saharan Africa

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Sub-Saharan Africa is particularly susceptible to the effects of hydrological extremes, such as drought, due to the high dependency of much of the population, and national economies, on agriculture. Increased precipitation variability, as a result of climate change, has made the need for better and more reliable forecasts even more necessary; and to effectively predict drought events, it is crucial to understand the mechanisms that drive such events. Furthermore, drought risk is generally quantified in terms of meteorological anomalies due to better availability of information on precipitation, yet drought impacts are most aligned with soil moisture and hydrological drought, which are more difficult to monitor and forecast. Here we analyse drought risk and drought propagation across SSA using data from the African Flood and Drought Monitor. Initial results have shown that the positive and negative phases of ENSO have a strong impact on regional meteorological drought risk across the continent. As these trends propagate through the hydrological system, they manifest in other biophysical variables (such as soil moisture, stream flow and NDVI), with various time lags and differing spatial patterns. It is this development, of hydrological and agricultural drought, that will lead to a more robust understanding of the risk of future drought events. Compared to other geological and environmental hazards, droughts occur over much greater temporal and spatial extents, making them much more difficult to predict and the costs more difficult to estimate. By understanding which hydrological variables correlate most directly with agricultural impacts, it will be possible to disseminate accurate information to individuals on the ground, and assist decision makers with mitigation and adaptation policies where required.