



Increase of observed record-wet and record-dry months significantly exceeds expectations from a stationary climate

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Extreme rainfall events can lead to severe floodings whereas consecutive months of low rainfall can strongly affect the occurrence of droughts. Climate change alters the hydrological cycle whereby both thermodynamic and dynamic processes are considered important. Generally, it is expected that relatively dry regions become drier and wet regions wetter. The same physical reasoning suggests that wet seasons get wetter and dry seasons get drier. However, limitations in observational records have made it difficult to detect and attribute such changes in either mean or extreme rainfall.

Here, we present analyses of record-breaking wet and dry months in global gridded rainfall observations separately for the regions' wet and dry season. Between 1980 and 2013 the number of these events significantly deviates from that expected in a stationary climate, i.e. in a climate with no anthropogenic and/or natural long-term trend. We show for which regions the above mentioned hypotheses hold and where they do not. One of the key findings is a pronounced increase in record-wet months by up to 37% in the relatively wet northern mid- to high latitudes. In contrast, Central Africa has experienced an increase in record-dry months of more than 40% throughout the year.