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Analysis of the 2007 Sahel Flood based on observations and regional climate models

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During the rainy season 2007 international institutions (e.g. WFP) and news agencies reported floods in the Sahel. Especially in August and September some news gave the impression that the whole Sahel was flooded, in contrast to the droughts more frequently reported for that region. But it is well known that the precipitation patterns in the Sahel are characterized by a high spatio-temporal variability and, hence, droughts and floods occur frequently at interannual and decadal time scales. Based on observations and climate models we analyzed the rainy season 2007 in West Africa in order to assess whether the rainfall was extraordinary and what caused the precipitation patterns. The extreme value statistic of the TRMM data was tested with the Pareto distribution and a Monte Carlo Simulation of the Pareto parameters. The result showed that indeed the rainfall was extraordinary in parts of West Africa, mainly in southern Nigeria, Burkina Faso and Northern Ghana. But except for very small areas the maximum return period was 10 to 30 years. The events started in August and abruptly ended mid of September. During the same time of the year the zonal winds in 700 hPa showed strong anomalies indicating intensified African Easterly Waves and the ITCZ over West Africa was shifted further north than normal. The global SST showed a weak La Niña event which started in March. To have an independent test whether the floods were extraordinary we used 250 m MODIS data (MOD09GQ) for a region in Northern Ghana and Southern Burkina Faso and could show that only regions along the Volta River were heavily affected.