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## **A contextualization of heavy rainfall events in climate forecasts: A case study for Amman in Jordan**

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Days, when local heavy rainfall occur are often associated with characteristic large scale circulation patterns as a small part of the entire spectrum of the weather variability. To better understand the essence of the synoptical weather variability in observations and simulations, reanalyses, seasonal forecasts and climate projections have been explored in order to identify critical patterns, existing rules and long-term changes. As a study region serves Jordan located in the Eastern Mediterranean region, where heavy rainfall in the winter-half year can trigger flash floods in urban areas (Amman) or wadi systems (Petra). There is a urgent need to better estimate such weather related risks under climate change beyond the mean temperature rise. For this purpose we calculated composite patterns of the synoptical conditions for dates where the local amount of rainfall exceeded the 99th percentile. The results of this study show probably only one side the medal. And this regards a rather intensification of extreme rainfall events associated with critical circulation patterns dependent on the global warming level across models. However, the recurring frequency of such patterns is widely regressive in the scenario simulations of the CMIP6 ensemble against our first expectation. According to the results, such extreme events at that location becoming rarer and stronger. Whether models overestimate the decline in frequency cannot be fully answered. However, retrospective analyses of ERA5 reanalysis data indicate possible discrepancies and limitations of climate model scenarios beyond long-term trends in temperature indicators. A shift in the seasonality of extreme rainfall patterns are highly effected by the prevailing circulation patterns and thus need to be assessed with care.