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An investigation on the potential climate change effects on extreme precipitation in the eastern Mediterranean region

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Precipitation patterns are expected to alter in response to global climate change. Many climate models project declining mean precipitation over much of the Mediterranean region and changes in the seasonal distribution of rainfall and its intensity. In this study, regional climate models have been used to investigate potential future changes in extreme precipitation in the eastern Mediterranean region. An analysis of extreme precipitation climate indices based on daily precipitation has been conducted using output from six regional climate models. The reliability of scenario predictions is evaluated against station data. The models provide estimations for the indices in present and future periods. Among the available rainfall-related indices we have used: (1) the pq90 to estimate precipitation amounts exceeding the 90th percentile threshold, (2) the greatest 5-day total rainfall (px5d) as a measure of heavy or intense rainfall, (3) the number of events exceeding the long-term 90th percentile of raindays, as well as (4) the percentage of total precipitation from events exceeding the long-term 90th percentile. Additionally, we have calculated the consecutive dry days (CDD) index as a measure of dryness, in a region that might face water shortage conditions in the future. Different models have demonstrated different skills in reproducing present–day climate extremes. Overall, comparison of extreme index values between present and future suggests little change in the winter season, with the most extreme precipitation expected to become more intense and frequent along the western coasts. However, in summer the situation is likely to deteriorate, with a general decrease in the frequency of precipitation. Furthermore, some models predict larger dry periods in the future, which seem to be more pronounced in the eastern part of the region.