Extreme precipitations related to circulation types in the eastern Mediterranean

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In this study an attempt is made to examine the relationship between precipitation extremes and circulation types over the eastern Mediterranean, as well as to identify the synoptic conditions connected with theses extremes.

Daily precipitation series for stations over the study area have been employed, for the second half of the 20th century. Geopotential heights at the 500hPa level, on a grid size of 2.5° x2.5°, from the National Center for Environmental Prediction - National Center of Atmospheric Research (NCEP-NCAR) reanalysis project, have been used for the construction of a daily circulation type calendar. Each of the circulation types has a distinct underlying synoptic pattern that produces the expected type and direction flow over the study area.

Two extreme rainfall thresholds have been selected, defining two precipitation indices: Pq90 (90th percentile) and Pq95 (95th percentile), using appropriate extreme indices software. The choice of these indices makes them transferable and comparable across regions with different local precipitations regimes. Due to the fact that during the summer period, eastern Mediterranean is characterized by very low precipitation totals or even absence of rainfall, the present study focused only the cold - wet period.

On a first step indices trends were computed and they have been tested at a level of significant a = 0.05. From the first results it seems that extreme precipitation values present a trend for most of the stations under study, while their significance vary. On a second step the relationship between these extreme rainfall conditions (indices) and the circulation types is investigated on a daily basis, in order to define which specific synoptic circulation conditions cause these extremes in the study region of eastern Mediterranean.