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Assessing Future Changes in Extreme Precipitation Conditions over Greece: An Investigation of their Links with Circulation Types.

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The relationship between the extreme precipitation events and the prevailing circulation types during their occurrence is analyzed in the present study, for four of the biggest cities in Greece (Athens, Thessaloniki, Patra and Heraklio). Daily precipitation data covering the time period 1958-2000 are utilized and the extreme rainfall events are defined using the 95% percentile index. A new automatic classification was applied for the computation of the daily calendar of the circulation types. The main improvements of this classification are the number of the circulation types, which are reduced now to twelve (12) and the fact that the scheme is flexible all over the Mediterranean. The 500hPa geopotential data (2.5 o x 2.5o spatial resolution) from the NCEP/NCAR were employed, covering a large spatial window over the whole European region, for the development of the daily circulation type's calendar. From the first results of the study it was found that two cyclonic types were the prevailing ones during extreme rainfall conditions.
Further more grid point daily precipitation data (the ones closer to the four stations) derived from the most updated regional climate models were also applied in the study for a reference period 1961-1990. The simulated extreme precipitation events were evaluated in comparison to the observational data and a new circulation type calendar was computed this time using the RCMs 500hPa data. Overall, changes both in the magnitude and in the frequency of occurrence of the extreme events were detected.
The final goal of the study was to asses the future changes of rainfall extremes as well as the changes of their links with the circulation types as a consequence of the enhanced greenhouse gas concentrations until the end of the 21st century. The aforementioned methodology was applied using the RCM output, both daily precipitation and geopotentials at 500hPa level, (forced by the emission scenario A1B), for the last thirty years of the century (2071-2100).