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Influence of synoptic scale in the generation of extremely hot days and extremely cold days in Europe

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An homogenized data base of maximum and minimum temperatures from 119 and 135 European observatories respectively has been analysed in order to estimate trends and determine the synoptic situations that contribute to a day of maximum and minimum temperatures . An Extremely Hot Day (EHD) or Extremely Cold Day (ECD) is based on the percentile 95 and 5 of the daily temperature series of each observatory, which coincides with intense effects on health matters. The time period from January 1^{st} of 1955 to December 31^{st} of 1998 has been chosen for this analysis as it presents the highest amount of measuring stations with complete series. The catalogue of microcirculation types over Europe (the Hess-Brezowsky classification) is applied to investigate the connection between EHD-ECD and large-scale circulation through statistic analysis, obtaining an Efficacy Coefficient (EC) for each synoptic patter; this coefficient expresses the probability of a certain synoptic pattern in a certain region and is directly related with the measuring stations. In order to examine the synoptic situations that contribute most during the EHDs, the total period of study has been divided into two sub-periods; from the difference between these two sub-periods the most frequent synoptic situations of the past 22 years have been determined. In parallel, a mechanism has been developed in order to identify the stations presenting significant positive trends of EHDs in Europe. To detect the synoptic patters relate to ECD a rotated principal components (RPC) analysis have been carried out. Five synoptic situations have been identified like most potential to the occurrence of a EHD and ECD over Europe. In parallel, a study of the persistence trends for each synoptic pattern was done in order to examine the relationship between synoptic situations and EHDs/ECDs. The trends of EHD and ECD over Europe have been verified.