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Forecasting the weather
- ensemble techniques
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Characterization of the Circulation Types associated with extreme heat events in Spain

J.A. García-Valero (1), E. Rodríguez (1), M.J. Casado (1), R. Lorente-Plazas (2), P. Jiménez-Guerrero (2), and J.P. Montávez (2)

(1) Agencia Estatal de Meteorología (AEMET), Spain, (2) Depatamento de Física, Universidad de Murcia, Spain

The projected increase of the frequency of extreme events related to high temperatures in southern Europe and the Mediterranean area (AR4 IPCC 2007) could be related to an increase of the frequency of some specific Circulation Types (CTs). Therefore a characterization of the CTs related to such extreme events is necessary in order to better understand future climate changes. On the other hand, the definition of an extreme event index and the local features of the observational series play an important role when characterizing extreme events. In this work a characterization study of the CTs associated with the summer (from 16th June to 15th September) heat events in the peninsular Spain and Balearic islands is presented.

In order to reduce local effects, we propose a definition of extreme heat event based on a previous regionalization process applied to the SPAIN02 daily maximun temperature data base (Herrera et al 2010). The regionalization was performed through a Kmeans cluster analysis. Once the regional series are obtained, values over the 95th percentile are defined as extremes. The meteorological situations of the selected days, characterized by several combinations of atmospheric fields (SLP, T850, Z500, SLP-Z500, SLP-T850, Z500-T850), are classified by a clustering procedure similar to the regionalization. Each classification is analyzed taking into account a proposed index based on the influence of the CTs in each of the regions.

Finally, eight regions were obtained and the best characterization was achieved with six CTs using the combination of fields Z500-T850. An study of the frequency trends was also performed, showing significant positive trends in most of the CTs related to extreme temperature events.