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The use of normalized climatological anomalies to rank synoptic-scale events and their relation to Weather Types

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Several methods have been developed to rank meteorological events in terms of severity, social impact or economic impacts. These classifications are not always objective since they depend of several factors, for instance, the observation network is biased towards the densely populated urban areas against rural or oceanic areas. It is also very important to note that not all rare synoptic-scale meteorological events attract significant media attention.
In this work we use a comprehensive method of classifying synoptic-scale events adapted from Hart and Grumm, 2001, to the European region (30N-60N, 30W-15E). The main motivation behind this method is that the more unusual the event (a cold outbreak, a heat wave, or a flood), for a given region, the higher ranked it must be. To do so, we use four basic meteorological variables (Height, Temperature, Wind and Specific Humidity) from NCEP reanalysis dataset over the range of 1000hPa to 200hPa at a daily basis from 1948 to 2004. The climatology used embraces the 1961-1990 period. For each variable, the analysis of raking climatological anomalies was computed taking into account the daily normalized departure from climatology at different levels. For each day (from 1948 to 2004) we have four anomaly measures, one for each variable, and another, a combined where the anomaly (total anomaly) is the average of the anomaly of the four variables.
Results will be analyzed on a monthly, seasonal and annual basis. Seasonal trends and variability will also be shown. In addition, and given the extent of the database, the expected return periods associated with the anomalies are revealed.
Moreover, we also use an automated version of the Lamb weather type (WT) classification scheme (Jones et al, 1993) adapted for the Galicia area (Northwestern corner of the Iberian Peninsula) by Lorenzo et al (2008) in order to compute the daily local circulation regimes in this area. By combining the corresponding daily WT with the five anomaly measures we can evaluate if there is any preferable WT responsible for high or low values of anomalies.

Hart, R.E and R.H. Grumm (2001) Using normalized climatological anomalies to rank synoptic-scale events objectivily. Monthly Weather Review, 129, 2426-2442.

Jones, P. D., M. Hulme, K. R. Briffa (1993) A comparison of Lamb circulation types with anobjective classification scheme. International Journal of Climatology, 13: 655- 663.

Lorenzo M.N., J.J. Taboada and L.Gimeno (2008). Links between circulation weather types and teleconnection patterns and their influence on precipitation patterns in Galicia (NW Spain). International Journal of Climatology 28(11): 1493:1505 DOI: 10.1002/joc.1646.