



## **Torrential Rainfall in Catalonia: Synoptic patterns and WeMO influence**

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This study shows a synoptic patterns catalogue of torrential rainfalls in Catalonia (north-eastern part of the Iberian Peninsula). These circulation patterns were obtained by applying a T-mode Principal Component Analysis (PCA) to a daily data grid (NCEP/NCAR reanalysis) at sea level pressure (SLP). The analysis was carried out using the 304 days which recorded  $\geq 100$  mm in one or more stations over Catalonia, throughout the 1950-2005 period. The catalogue is composed by 9 circulation patterns which show the great variety of atmospheric conditions and seasonal or monthly distribution. Equally, we computed the mean index value of the Western Mediterranean Oscillation index (WeMOi) for the synoptic patterns obtained by averaging all days grouped in each pattern. The results showed a clear association between the negative values of this teleconnection index and the torrential rainfall occurrence in Catalonia. Therefore, we attempt to put forward the WeMO as an essential tool for forecasting heavy rain in Catalonia.

**Key words:** Catalonia, Principal Component Analysis, synoptic pattern, torrential rainfall, WeMO.