



Identification of anomalous motion of thunderstorms using daily rainfall fields

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Adverse weather phenomena in Catalonia (NE of the Iberian Peninsula) is commonly associated to heavy rains, large hail, strong winds, and/or tornados, all of them caused by thunderstorms. In most of the cases with adverse weather, thunderstorms vary sharply their trajectories in a concrete moment, changing completely the motion directions that have previously followed. Furthermore, it is possible that a breaking into several cells may be produced, or, in the opposite, it can be observed a joining of different thunderstorms into a bigger system. In order to identify the main features of the developing process of thunderstorms and the anomalous motions that these may follow in some cases, this contribution presents a classification of the events using daily rainfall fields, with the purpose of distinguishing quickly anomalous motion of thunderstorms. The methodology implemented allows classifying the daily rainfall fields in three categories by applying some thresholds related with the daily precipitation accumulated values and their extension: days with “no rain”, days with “potentially convective” rain and days with “non-potentially convective” rain. Finally, for those “potentially convective” daily rainfall charts, it also allows a geometrical identification and classification of all the convective structures into “ellipse” and “non-ellipse”, obtaining then the structures with “normal” or “anomalous” motion pattern, respectively. The work is focused on the period 2008-2015, and presents some characteristics of the rainfall behaviour in terms of the seasonal distribution of convective rainfall or the geographic variability. It shows that convective structures are mainly found during late spring and summer, even though they can be recorded in any time of the year. Consequently, the maximum number of convective structures with anomalous motion is recorded between July and November. Furthermore, the contribution shows the role of the orography of Catalonia in the development of convective structures. This work has been developed in the framework of the Spanish project HOPE.