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Extreme torrential episodes in eastern Spain and its relationship with the Western Mediterranean Oscillation (1950-2016)

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The Western Mediterranean Oscillation index (WeMOi) has been widely used to characterize the intra-annual variability of precipitation in different regions of the Mediterranean and Iberia. Specifically, it exhibits a very good relationship with the occurrence of torrential rainfall episodes over eastern Spain. In the present study we selected extreme torrential rainfall episodes ($\geq$200 mm in 24 hours) registered in at least one gauge station in the hydrological basins of the Jucar and Segura (East and Southeast Spain) rivers from 1950 to 2016. 10-day WeMOi calendars were calculated according to the mean of 10 daily WeMOi values. The principal results show the occurrence of 239 episodes, mainly concentrated in autumn (145 events, over 60% of total episodes). This coincides with the lowest 10-day WeMOi values, specifically in the second decade of October, when a WeMOi value of -0.46 is computed and the number of events is maximum (27). Comparing two sub-periods (1950-1983 and 1984-2016), a decrease in WeMOi values is observed throughout the year, especially in November and December. In contrast, no increase in torrential events was detected when comparing both subperiods. Nevertheless, we identified changes in the episode seasoning; the occurrence of extreme torrential rainfall in the second period occurred more frequently in early September and mid-November, but from 1950 to 1983 they tend to be more frequently in October. These frequency changes in the seasonality of extreme torrential episodes may contribute to improving flood emergency planning in eastern Spain.