

Intense rain in the Ebro basin is becoming more and more uncommon

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The studies focus on intense rainfall and not torrential downpours, like those that have recently affected the River Ebro. Credit: sergis_blog

Researchers from CSIC's Aula Dei Experimental Station in Zaragoza, Spain have confirmed that the frequency of intense rainfall has been decreasing in the Ebro basin since 1955.

Despite what it may seem, intense rain is becoming rarer in the Ebro basin according to two studies carried out by Spanish researchers from the Department of Soil and Water of CSIC's Aula Dei Experimental Station in Zaragoza. Their results have been published in the *Journal of Hydrology* and the *Hydrology and Earth System Sciences* journal.

Santiago Beguería, one of the authors of both studies, explained to SINC that here we are not dealing with torrential rainfall like recent deluges that have caused great increases in the Ebro: "These are extraordinary events and their sporadic and elusive nature makes it difficult to make concrete conclusions. They are therefore harder to study."

In fact, according to a third study published in 2011 in the [International Journal of Climatology](#), in which Beguería also participated, "we cannot say in general terms that there is an annual trend in one sense or another for the maximum intensity of these extreme precipitations," outlines the author himself.

There is the hypothesis that more violent and frequent rains are caused due to [climate change](#), which are then followed by more intense droughts. Many studies state that this effect can already be seen in the weather of recent decades.

However, according to Beguería "this type of global affirmations has regional nuances."

More specifically, "different studies on the [Iberian Peninsula](#) show that the predicted increase of extreme rain is not actually occurring," ensures the expert.

Erosivity study

Beguería's studies focus on the northeast of Spain and the researchers

have reached the same conclusion after analysing rainfall erosivity (the capacity of a downpour to cause erosion) between 1955 and 2006.

For this purpose, use was made of an erosivity database developed from records belonging to the Spanish Meteorological Agency (AEMAT) and the Ebro Hydrographic Confederation and a generalised decrease in this parameter was observed both on an annual and season level.

This tendency can be explained by the decrease in the amount of [intense rain](#).

"This is a significant finding since it could be indicative of persistent long-term climate changes that have a regional effect," outlines Beguería.

The author clarifies that his work focuses on identifying these tendencies but states that it is difficult to "explain their causes given that climate is a chaotic system." Furthermore, he states that whereas for some phenomena, such as global warming, there is a high consensus regarding the causes, this is not the case for many other variables."

"As we do not know the causes, we are in no position to predict whether these tendencies will continue in the future. It is very difficult to link tendencies as we have seen with more general patterns, such as global warming. It may be possible that what we have found is a consequence of natural climate variability," explains the researcher.

"However, given the significant consequences of such a change on the frequency and magnitude of rainfall, our study proves the need to continue researching this phenomenon," concludes the expert.

More information: Angulo-Martinez, M., and Begueria, S. Do atmospheric teleconnection patterns influence rainfall erosivity? A

study of NAO, MO and WeMO in NE Spain, 1955-2006 *Journal of Hydrology* 450-451 (2012) 168-179. [doi: 10.1016/j.jhydrol.2012.04.063](https://doi.org/10.1016/j.jhydrol.2012.04.063).

Angula-Martinez, M and Begueria, S. Trends in rainfall erosivity in NE Spain at annual, seasonal and daily scales, 1955-2006, *Hydrol. Earth Syst. Sci.*, 16, 3551-3559, octubre 2012. [doi: 10.5194/hess-16-3551-2012](https://doi.org/10.5194/hess-16-3551-2012).

Begueria, S. et al. Assessing trends in extreme precipitation events intensity and magnitude using non-stationary peaks-over-threshold analysis: a case study in northeast Spain from 1930 to 2006, *Int. J. Climatol.* 31: 2102-2114 (2011), [doi: 10.1002/joc.2218](https://doi.org/10.1002/joc.2218).

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