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Predictability of the low pressure systems leading concurrent events in the Iberian Peninsula.

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Filomena was an extratropical cyclone in early January 2021 that was most notable for bringing unusually heavy snowfall to parts of Spain, with Madrid recording its heaviest snowfall in over a century, and with Portugal being hit less severely. Filomena caused severe winds, heavy rainfall and snowfall in different parts of the country but also occurring at the same time. The atmospheric pattern during the event of Filomena was a rare one characterized by a low intrinsic predictability. Despite the number of studies focusing on the detection and characterization of extreme events in Western Europe, our knowledge regarding the predictability of such occurrences remains limited. By studying the intrinsic predictability of an extreme event, we can know the capacity we have to anticipate it, thus being able to take action for the minimization of its impacts by using early warning systems.

In this work, we show first an overview of the intense low pressure systems (including Filomena) that have recently struck specific cities/regions of the Iberian Peninsula with concurrent events. We assess their predictability and, finally, we perform an attribution study of these events to climate change.