



Characterisation of top ranking damaging windstorms over Iberia

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Extreme cyclones are often associated with intense winds and heavy precipitation leading to strong socio-economic impacts. Over southwestern Europe, such extreme cyclones occur less often. Still, several windstorms have recently caused high economic losses in Iberia (e.g. Klaus, Xynthia). This study analyses the typical atmospheric conditions and cyclone tracks' associated with the top-100 potential loss events over Iberia within the last 65 years based on reanalysis data. Our analysis revealed that in most cases cyclones were primarily responsible for the strong wind events over Iberia. Events were classified into four groups: (i) cyclone tracks crossing Iberia on the event day (Iberia), (ii) cyclones crossing further north, mostly southwest of the British Isles (North), (iii) tracks crossing southwest to northeast in the northwest of Iberia (West), and (iv) so called Hybrids, days with a high pressure gradient over Iberia due to the juxtaposition of a low and a high pressure centre. Generally, Iberia events are the most frequent, followed by North and Hybrid, while West type storms are rare. Cyclones associated with Hybrid events are typically weaker than for other cases, but the mean MSLP gradient over Iberia is comparable to the other types. Multi-decadal variability of events was identified for all intensities. The peak in recent years is quite prominent in terms of the number of top-20 events. Other periods with a large number of storms were the 1960s and 1980s. This study documents that windstorms affecting Iberia may have different characteristics, they are not rare events, and their frequency of occurrence undergoes strong multi-decadal variability.