Synoptic and local characteristics of severe wind episodes in the Basque Country.

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Episodes of very strong winds can occur in the Basque Country for different reasons. On the one hand, in the winter season (October-April) due to deep depressions that move from west to east within the intense zonal circulation, often passing through the British Isles. In the summer season (May-September) strong winds may be due to severe storms or "galernas" (coastal trapped disturbances). The most relevant and widespread damage occurs in the cold season, usually due to deep depressions or other configurations that generate a strong local pressure gradient. In fact, the most damaging situations affecting the Basque Country during the 21st century are related to deep low passages considered as explosive cyclogenesis events, the Klaus and Xynthia episodes.

This work analyses some of the most relevant wind events during the 21st century, in terms of synoptic configuration and local behaviour, using reanalysis data and observations from the Automatic Meteorological Stations (AWS) network of the Basque Country. The final objective is to identify and classify the common behaviour among high impact weather episodes, understanding the main synoptic features and drawing general conclusions on how synoptic features condition relevant aspects at lower scales, where complex orographic effects are relevant.

In the Basque Country area, most extreme episodes correspond to intense zonal circulations where deep depressions are generated, often explosive cyclogenesis. If we look at the surface configuration, the most frequent case is that of the British low, also secondary lows to the primary one, which is located around the British Isles. Wind events generated by depressions passing through the Bay of Biscay are also frequent. In general, these situations generate southerly wind events that can sometimes turn to the west. Other less frequent situations that can generate intense winds are Atlantic lows to the west of the Iberian Peninsula, which generate southerly winds, or situations of high pressure in the Atlantic with low pressure in Europe, sometimes in France, which generate intense winds from the north and northwest. Locally, due to the complex orography and the configuration of the valleys in the Basque Country, the wind is channelled in different ways, affecting different areas depending on the direction and strength of the wind.