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Storminess at the Gulf of Biscay: classification and long term trends

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Widespread geomorphological evidences along the northern coast of the Iberian Peninsula, such as beach retreat or falling cliffs, show the remarkable activity of the Atlantic storm during the last decades. In the present communication we analyze some characteristics of those events and their temporal evolution over the area.
Oceanographic information (significant wave height, wave direction and period) was retrieved from observed (buoys network from Puertos del Estado –PdE-) and hindcast (KNMI/ERA 40) databases. To explore the atmospheric mechanisms responsible, we combined local reports from coastal observatories, a regional Eulerian approach (a synoptic typing) and a larger-scale Lagrangian method, based on the analysis of storm-tracks. Surface meteorological variables (sea level pressure and wind speed and direction) were extracted from ISWHO (Integrated Surface Hourly Observations) CD Rom collection. Sea level pressure, surface 10m U and V wind components gridded data were obtained from ECMWF ERA40 Reanalysis. Storm tracks and cyclone statistics were obtained from the CDC Map Room Climate Products Storm Track Data (http://www.cdc.noaa.gov/map/clim/st_data.html).
In other to accomplish the objectives of this contribution, first we validated the hindcast data with actual observations from buoys. Secondly, we identified the storm episodes, considering them as a period longer than 12 hours in which the wave height was higher than 6 m, and separated by at least 48.
Long winds fetch and locally strong westerly and northwesterly winds expose the northern coast of Iberia to episodes of intense storminess, mainly during the winter months. Extratropical disturbances tracking between the 50-60ºN parallel are the main driving force behind those episodes, many of them as a result of a cyclogenesis processes along the eastern coast of North America. In some cases, the deep cyclonic storms are product of a secondary cyclogenesis, crossing the area southward of the 50ºN parallel; significant wave heights can be as high as the northernmost cyclones, but the wave period is slightly lower. Only in the western sector (Galicia and Asturias) storms following a SW-NE path induced episodes of high waves.