



Sea level extremes around the north-western Iberian Peninsula and their link to atmospheric forcings

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In the context of increasing flood risks through rising sea levels, the danger of flooding is primarily linked to regional extreme sea levels, thus single events superimposed on the mean sea level trend. The majority of extreme sea levels are caused by tropical or extra-tropical cyclonic activity. Here, we aim at a better understanding of the link between extreme sea levels at the western and northern Iberian Peninsula and the large-scale atmospheric circulation. For this we have analyzed sea level data from 8 tide gauge stations. The four longest stations, Santander, La Coruna, Vigo and Ceuta cover the 60-year period 1943-2005. Records of Bilbao, Gijon, Cascais and Lagos are maximum 15 years long. The extreme values from the quality-checked, hourly tidal residuals time series were derived by fitting a General Pareto Distribution (GPD) to the five largest values per year. The 10 largest events per year have been extracted for the detection of existing trends. Highest values of 230-260 cm are found at the northern coast of the Iberian Peninsula. For the western stations, extreme values are slightly lower (200-217 cm). For each extreme event the corresponding large-scale sea level pressure (SLP) fields are derived from the NCEP reanalysis. Composite analyses are presented. The results are well correlated with the positive NAO-signal. As expected, geographically close stations often show very similar SLP distributions for their local extremes. Extracted predominant pressure fields will be compared with SLP trends from regional climate models to gather information about the future evolution of potentially hazardous forcings at the north-western coasts of the Iberian Peninsula.