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The impact of Climate Change on the Iberian Low-Level Wind Jet: EURO-CORDEX regional climate simulation

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A sharp temperature contrast, observed mostly in summer, between high temperatures over land and lower temperatures over the ocean and the typical summer synoptic scale configuration (high pressure system over the ocean and thermal low inland) are responsible for the development of a coastal low-level jet (CLLJ). The low level horizontal pressure gradient induces, through geostrophic adjustment, a strong alongshore flow, which is also influenced by local orography and the high pressure subsidence over the maritime boundary layer. In this study, the EURO-CORDEX hindcast forced by ERA-Interim (1989-2009), the historic reference (1960-2006) and the future (2006-2100; RCP8.5) simulations, forced by EC-Earth global model, are used to determine the climate change signal on the CLLJ off the Iberian Peninsula's western coast. Although the boundary conditions of the hindcast and historic reference simulations have different resolutions, both have similar distributions and features of CLLJ. In the summer, a clear rise in the occurrence of CLLJ is expected throughout the 21st century, with the highest increase off the northwest coast of Iberia ($\sim$14%). The CLLJ prevailing height is confined between 300 and 400m and the most frequent maximum wind speed is 15ms-1 both in present and future climate, nevertheless a shift to higher values is expected. The predominant wind direction at jet height is north-northeast in all simulations. The temporal evolution of CLLJ occurrence during the 21st century shows that there is no significant trend in spring and autumn, although some decadal variability is observed.