

PARALLEL SESSION C: IMPACTS AND APPLICATIONS
C2: REGIONAL ATMOSPHERIC AND OCEAN CIRCULATION SYSTEMS

The Summer Iberian Coastal Low-Level Wind Jet in a Warming Climate

Pedro M.M SOARES

Instituto Dom Luiz - Portugal

Coastal Low-Level Jet (henceforth referred to as “coastal jet” or simply as CLLJ) is a low-tropospheric wind feature driven by the pressure gradient produced by a sharp contrast between high temperatures over land and lower temperatures over the sea. Although being a mesoscale feature, coastal low level jets (CLLJ) have a larger scale synoptic pattern forcing behind them: a high pressure system and a thermal low in land. For this reason CLLJ potential regions coincide with cold eastern boundary currents in the mid-latitudes. These regions are amongst the most productive ocean ecosystems, where the atmosphere-land-ocean feedbacks, which include marine boundary layer clouds, coastal jets, upwelling and inland soil temperature and moisture, play an important role in defining the regional climate along the sub-tropical mid-latitude western coastal areas.

During the summertime the Iberian Peninsula is under the effect of the Azores High and of a thermal low pressure system inland, giving rise to a seasonal northerly wind, and CLLJ. This study presents future projections of the Iberian Peninsula CLLJ based on a 2-member GCM EC-Earth simulations (the “ensemble”), on EURO-CORDEX WRF simulations and on a WRF high resolution (9km) regional climate simulation. The impact of a warmer climate on the Iberian coastal low-level wind jet in the twenty-first century is briefly analyzed, using the classification and filtering criteria of CLLJ detection proposed by Ranjha et al. (2013). A twentieth century period (1971-2000) from present climate is used as control run. The projections are analyzed for a time slice at the end of the 21st century (2071-2100) with the RCP8.5 greenhouse gas emissions scenario. The projections show that the Iberian Peninsula CLLJ wind speed maximum is higher in height and stronger in wind speed, and a significant increase of the frequency of occurrence of CLLJ. There is also a projected expansion of the offshore extension to the west.

Daniela C.A. Lima¹, Pedro M.M. Soares¹, Rita M. Cardoso¹ and Alvaro Semedo²

¹Instituto Dom Luiz, University of Lisbon, Lisbon, ²Escola Naval-CINAV, Almada, Portugal