



Modeling precipitation zones in the Iberian Peninsula

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In this work we validate the monthly precipitation over the Iberian Peninsula from 1989-1999 simulated by the regional climate model REMO against the high spatial density dataset MOPREDAS that covers the Spanish territory. In our methodology, we regionalize Spain, dividing it into nine zones, each with a characteristic precipitation regime. This is done via a cluster analysis performed on the first eleven principal components of the precipitation anomalies. In order to investigate the influence of the domain size, grid resolution and the driving data in the quality of the simulation, we analyze here four numerical experiments performed with three different spatial resolutions: 0.44 degrees (R0440a and R0440b), 0.22 degrees (R0220), and 0.088 degrees (R0088). The R0088, R022, and R044a simulations have been driven by ERA Interim Reanalysis and have a relatively small domain centered in the Iberian Peninsula, while R044b has been driven by both the ERA Interim Reanalysis in a small domain centered in the Iberian Peninsula and by the ERA40 in a larger domain, covering all of Europe and the Mediterranean region.

We also study the Northern Hemisphere atmospheric (sea level pressure and wind anomalies) patterns associated with the precipitation variability in each of the nine clusters defined within the Spanish domain, by regressing those atmospheric fields onto the average precipitation anomalies in each of those regions. Likewise, we examine the relationship between the rainfall variability in each of the clusters and major climate signals, such as the North Atlantic Oscillation and the El Niño - Oscilación del Sur.