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Precipitation variability and extremes in ENSEMBLES RCM simulations over Portugal

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A new dataset of daily gridded observations of precipitation, computed from over 400 stations in Portugal, is used to assess the performance of 12 regional climate models at 25 km resolution, from the ENSEMBLES set, all forced by ERA-40 boundary conditions, for the 1961-2000 period. Standard point error statistics, calculated from grid point and basin aggregated data, and precipitation related climate indices are used to analyze the performance of the different models in representing the main spatial and temporal features of the regional climate, and its extreme events. As a whole, the ENSEMBLES models are found to achieve a good representation of those features, with good spatial correlations with observations. There is a small but relevant negative bias in precipitation, especially in the driest months, leading to systematic errors in some indices. The underprediction of precipitation occurs in most percentiles, although this deficiency is partially corrected at the basin level. Interestingly, some of the conclusions concerning the performance of the models are different of what has been found for the contiguous territory of Spain. Finally, models behave quite differently in the simulation of some important aspects of local climate, from the mean climatology to high precipitation regimes in localized mountain ranges and in the subsequent drier regions.