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The influence of the Western Mediterranean Oscillation (WeMO) upon the spatio-temporal variability of precipitation over Catalonia (NE Iberia)

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Previous studies have demonstrated the existence of a statistically significant influence of the Western Mediterranean Oscillation index (WeMOi) on the rainfall totals of Catalonia (NE Spain). In the present study, I analyse the statistical relationship between the WeMOi/rainfall correlation coefficients and two pluviometric indices at seasonal and annual time scales. The rainfall database used in the analyses comprises 70 pluviometric series covering the 1950-2015 (66 years) study period, and they are spatially distributed throughout Catalonia. The two pluviometric indices considered are the coefficient of variation (CV) and the disparity consecutive index (S). The results of the spatial variability of rainfall showed the strongest influence of the WeMO over locations in which precipitation irregularity was highest (high CV and S values), and vice versa. The results of temporal rainfall variability showed that in the subperiods in which the correlation coefficients between the WeMOi and precipitation were weak, rainfall variability decreased (low CV and S values), and vice versa. The best results were found to occur in autumn and winter, and in annual rainfall. The main conclusion is that this Mediterranean teleconnection pattern strongly determines precipitation variability in its areas of influence.