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Use of an analogue method to downscale temperature and precipitation climate change projections over Spain

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A step by step downscaling method built up using synoptic analogue data to each problem day has been applied to regionalize climate change projections of temperature and precipitation over Peninsular Spain and Balearic Islands. The method makes use of daily 1000 and 500-hPa geopotential data from a selection of global climate models (CGCM2, ECHAM4-OPYC, HadAM3) under two emission scenarios. The evolution of temperature (Tmax and Tmin) and precipitation for the 21^{st} century is analyzed over a 50 km grid with respect to the reference period 1961-1990. Great emphasis has been placed on the estimation of uncertainties associated to the selection of the global model and emission scenario. Seasonal and geographical differences are thoroughly discussed.

While downscaling of temperature gives relatively good results using simpler and less costly statistical algorithms, the analogue methods have proven to be very accurate to downscale precipitation using synoptic scale pattern information.