



The new MOPREDAS database and the monthly precipitation trends in Spain (December 1945- November 2005)

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Precipitation is one of the most important climate elements directly affecting human society, economic activities and natural systems; at the same time it is the most variable climate element, and its changes can be detected only if a spatially dense network of observations is used. Due to this, the last AR4 report renewed interest in the study of precipitation, and suggests focusing on detailed sub-regional studies, with a preference for those areas where water is a scarce resource with heavy demands placed on it.

We have developed the new MOPREDAS database (MOonthly PREcipitation DAtabase of Spain) by exploiting the total amount of data available at Spanish Meteorological Agency (AEMET, formerly INM). These provide a total of 2670 complete and homogeneous series for the period 1946-2005 after exhaustive quality control and reconstruction processes, and at present is the most complete and extensive monthly precipitation dataset uptodated in Spain, including dense information up to 1500 m o.l.s.. MOPREDAS has been created with the aim of analyzing the behaviour of precipitation in the conterminous provinces of Spain, and to validate the downscaling of climate models on a detailed spatial level. To this end, the station data were also interpolated on a regular grid, at 1/10 of degree of resolution, over the whole Spain.

Trend analysis (Mann-Kendall test, $p < 0.10$) confirms great spatial and temporal variability in the behaviour of precipitation across Spain between 1946-2005. Except March, June and October, no generalized significant pattern have been found, but subregional areas with homogeneous trend were detected. MOPREDAS shows a global decrease of precipitation in March that affects 68.9% of Spain and 31.8% in June, while in October the area affected by positive trends is 33.7% of land ($p < 0.10$). We detected numerous sub-regional coherent patterns well delineated by topographic factors, and passing unnoticed until now due to inadequate data density. These results suggest that both global and local factors affect the spatial distribution of trends in the Iberian Peninsula, being mountain chains the most significant geographical factor in determining the spatial distribution of monthly trends on a detailed, sub-regional spatial scale.