



Weather Types, temperature and relief relationship in the Iberian Peninsula: A regional adiabatic processes under directional weather types

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We have analyzed at monthly scale the spatial distribution of Pearson correlation between monthly mean of maximum (Tmax) and minimum (Tmin) temperatures with weather types (WTs) in the Iberian Peninsula (IP), represent them in a high spatial resolution grid (10km x 10km) from MOTEDAS dataset (Gonzalez-Hidalgo et al., 2015a). The WT classification was that developed by Jenkinson and Collison, adapted to the Iberian Peninsula by Trigo and DaCamara, using Sea Level Pressure data from NCAR/NCEP Reanalysis dataset (period 1951-2010). The spatial distribution of Pearson correlations shows a clear zonal gradient in Tmax under the zonal advection produced in westerly (W) and easterly (E) flows, with negative correlation in the coastland where the air mass come from but positive correlation to the inland areas. The same is true under North-West (NW), North-East (NE), South-West (SW) and South-East (SE) WTs. These spatial gradients are coherent with the spatial distribution of the main mountain chain and offer an example of regional adiabatic phenomena that affect the entire IP (Peña-Angulo et al., 2015b). These spatial gradients have not been observed in Tmin. We suggest that Tmin values are less sensitive to changes in Sea Level Pressure and more related to local factors. These directional WT present a monthly frequency over 10 days and could be a valuable tool for downscaling processes.

González-Hidalgo J.C., Peña-Angulo D., Brunetti M., Cortesi, C. (2015a): MOTEDAS: a new monthly temperature database for mainland Spain and the trend in temperature (1951-2010). *International Journal of Climatology* 31, 715–731. DOI: 10.1002/joc.4298

Peña-Angulo, D., Trigo, R., Cortesi, C., González-Hidalgo, J.C. (2015b): The influence of weather types on the monthly average maximum and minimum temperatures in the Iberian Peninsula. Submitted to *Hydrology and Earth System Sciences*.