



## MOonthly TEMperature DATabase of Spain 1951-2010: MOTEDAS (3) Maximum and minimum monthly temperatures reconstruction series in mainland Spain

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**Main Question:** It is very common that climate series, continuous in time and spatially close, do not overlap. How can we produce a long climate series when the original data do not overlap, or the overlapping period is too short, and avoid to create an artificial inhomogeneity?. To solve this problems in this second poster devoted to MOTEDAS dataset, we present the procedure applied to reconstruction series of Maximum and Minimum monthly Temperature (Tmax and Tmin). The reconstruction is applied after quality control explained in MOTEDAS Poster 1 and results of spatial correlation presented in MOTEDAS Poster 2. This reconstruction is based on the best available reference series given that no generalized metadata exist. The approach is as follows:

1. From original free of suspicious and homogenized series (end product of MOTEDAS Poster 1), we calculated a Reference series (R1) from station overlapped at least 7 years, highly correlated (mean monthly  $r > 0.6$ , monthly positive values only, and  $< 200$  km apart (main conclusion from MOTEDAS Poster 2). The neighbors stations are introduced in the Reference series after standardized the mean and deviation during the common period with the Candidate serie. The algorithm applied is  $1/\text{distance}^2$ . Software applied was Proclim (Stepanek 2008).
2. Temporally the original data series (Candidate series, C) are reconstructed with the previous Reference (R1), to obtain overlapping period between close stations not overlapped in the original series.
3. Then, in the pseudo reconstructed series from the previous paragraph 2 (C+R1) a new Reference (R2) following the previous conditions from paragraph is calculated.
4. Finally, the series of original data (C) are reconstructed using the reference series obtained with overlapped procedure (R2 from paragraph 3). An special attention is given in the R2 about the origin of reconstructed data by distances.
5. The reconstruction is applied to all original series, but for final climate analyses we select series combining different criteria accordingly percentage of original data and origin of reconstructed data during 1951-2010.

The final dataset of MOTEDAS (1951-2010) included 1358 monthly complete series, free of anomalous and homogeneous for monthly Tmax and Tmin. The 53% of final data are original ones; data reconstructed with values from  $< 10$  km resulted in 36%, and only 11% od reconstructed series used data from  $> 11$  km and  $< 25$  km.

These series were converted in a high resolution grid of  $25 \text{ km}^2$  by mean of local interpolation (Brunetti et al., 2006). In poster MOTEDAS 4 we present the initial results on trend analyses.

### References.

Brunetti M, Maugeri M, Monti F, Nanni T. 2006. Temperature and precipitation variability in Italy in the last two centuries from homogenised instrumental time series. *International Journal of Climatology* 26: 345–381.

Stepánek P.. 2008. ProClimDB – Software for Processing Climatological Datasets. CHMI, Regional office. Brno.