

CLIMATE OF MADRID CITY

Location ([Observatorio Meteorológico Madrid-Retiro](#)): 40.411° N, 3.678° W, 667 m above sea level. According to Köppen classification, Madrid has a *Csa* type of climate: *C* meaning temperate, *s* meaning dry summer, and *a* meaning hot summer. The 30-year averaged conditions (1961-1990) at Madrid-Retiro are presented in the following graphs.

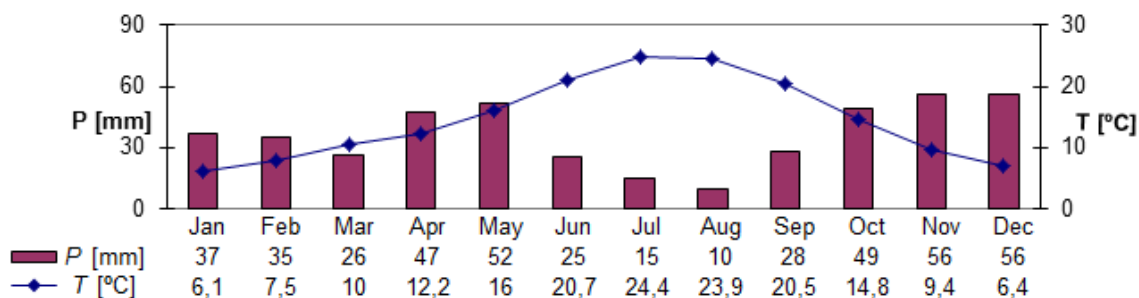


Fig. 1. Climogramme (climograph) of Madrid.

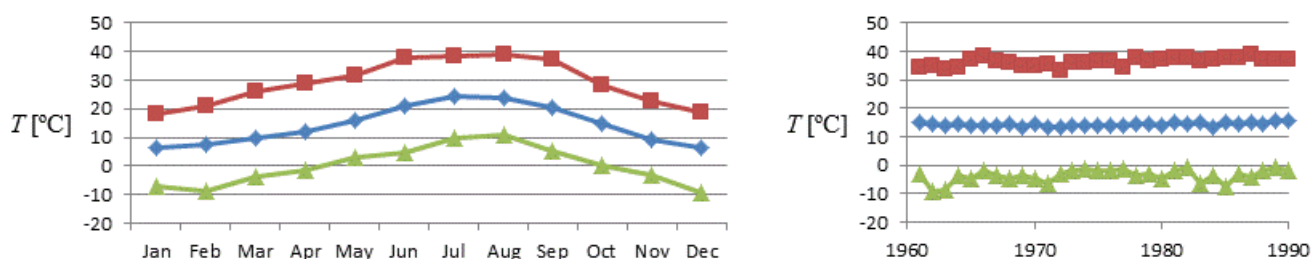


Fig. 2. Temperature: maximum, mean, and minimum (pluriannual mean is 14.3 °C).

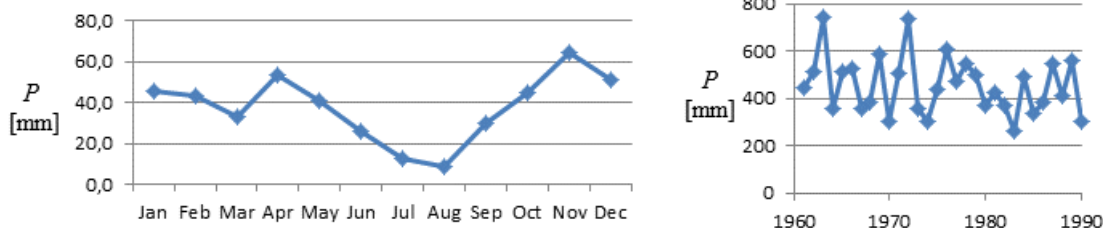


Fig. 3. Precipitation: monthly (see climogramme), and yearly (pluriannual mean is 455 mm).

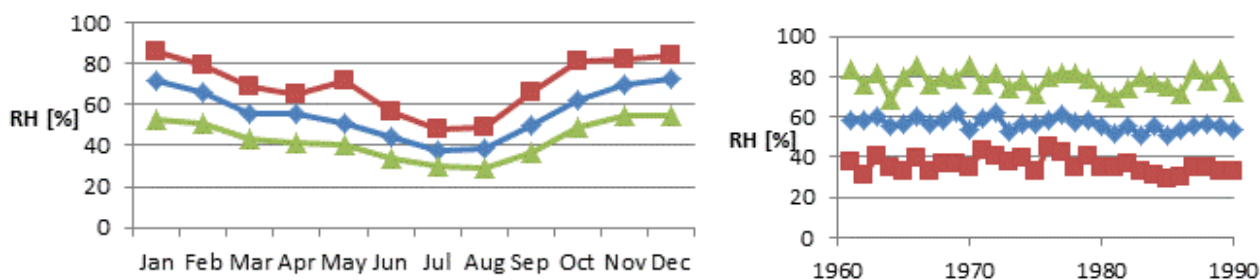


Fig. 4. Relative humidity: maximum, mean, and minimum (pluriannual mean is 55%).

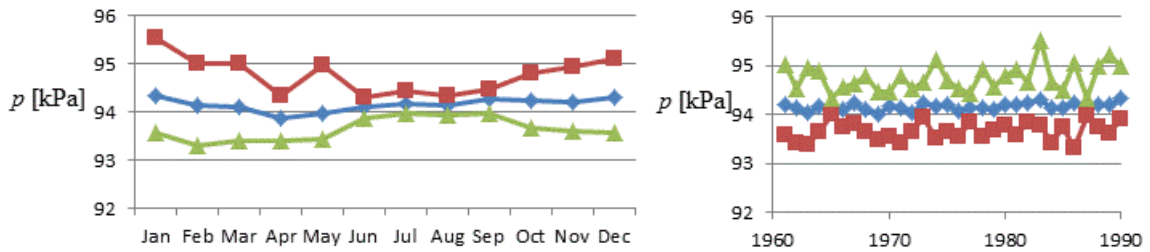


Fig. 5. Barometric pressure: maximum, mean, and minimum (pluriannual mean is 94.2 kPa).

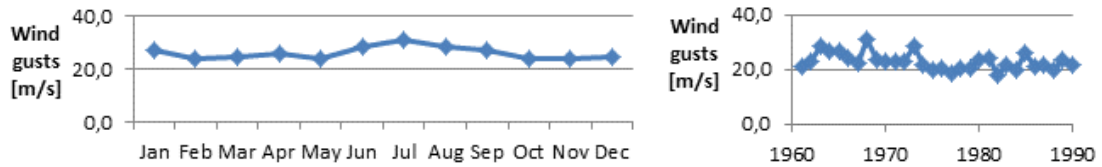


Fig. 6. Maximum wind gust speed [m/s]: monthly, and yearly. Mean wind speed is around 2 m/s, with average pluriannual maximum gusts of 23 m/s, and a 50 yr return maximum value of 30 m/s.

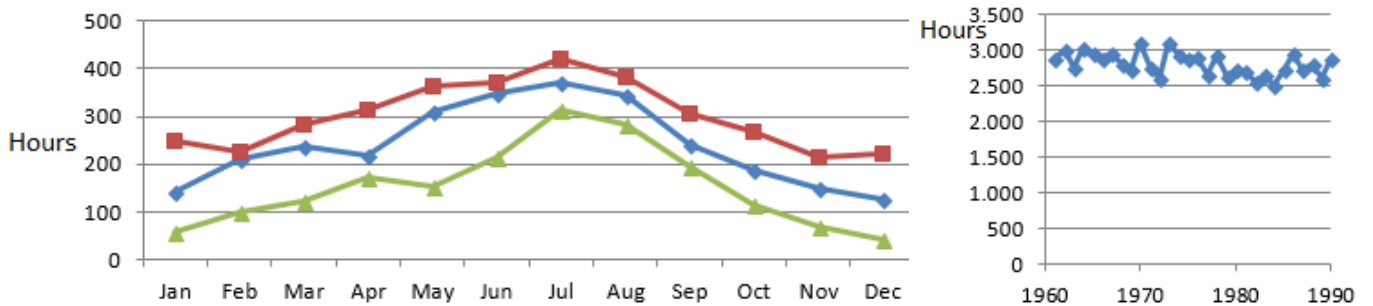


Fig. 7. Sunshine hours: monthly (maximum, mean, and minimum), and yearly.

Assuming that heating is required if the monthly averaged temperature is below 15 °C, and that cooling is required if the monthly averaged temperature is above 20 °C, heating in Madrid is required for 7 months, and cooling for 4 months, in a year, and only one month in the year is there 'balanced weather': May, the month of Madrid feast San Isidro.

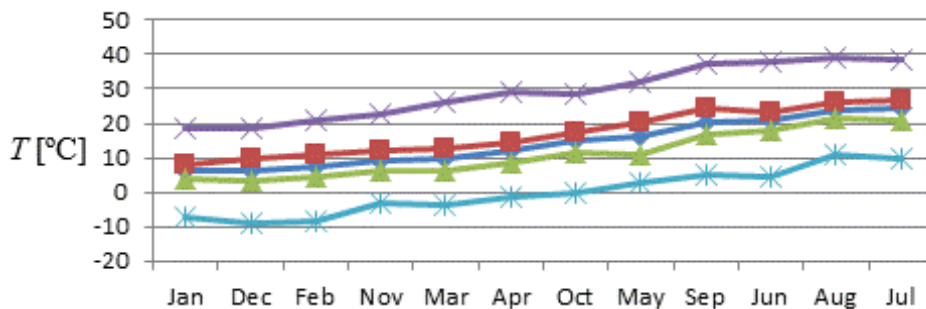


Fig. 8. Sorted, ascending order monthly temperatures: maximum of maxima, maximum of mean, mean, minimum of mean, and minimum of minima.

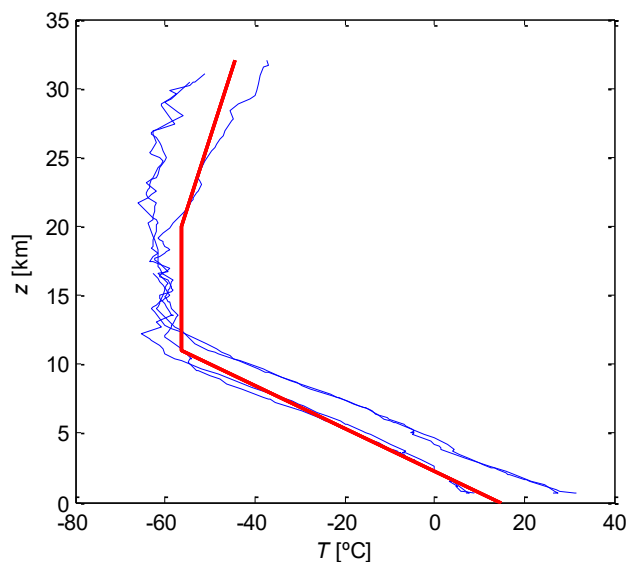


Fig. 9. Vertical temperature measurements (sounding balloon) at Madrid-Barajas airport, for 1-Jan-2009 and 1-Jul-2009, both at UTC 00Z and 12Z, and comparison with ISA model.

Average annual isolation is slightly under 200 W (17 MJ/day), with a monthly distribution spanning from 70 W in winter to 310 W in summer (see [monthly isolation](#)).

In summary, the 30-year averaged conditions at Madrid down-town, and the time-series standard deviations are:

- Temperature: 14.3 ± 20 °C.
- Precipitation (annual): 455 ± 200 mm.
- Pressure: 94.2 ± 1 kPa.
- Humidity: 55 ± 30 %.
- Average wind speed is 2 m/s, with gusts up to 20 m/s (record 30 m/s).

For many thermal project calculations, reference data in Madrid are taken to be:

- Winter: -3 °C and 70% RH.
- Summer: 34 °C and 40% RH.
- Temperature oscillation: daily 15 °C (sunrise to sunset), yearly 37 °C (average minimum in January to average maximum in July).

References

Climate of Madrid: [Agencia Estatal de Meteorología \(AEMET\)](#), Publicación K-69, 1995.

Actual weather in Madrid can be found at <http://www.aemet.es/>, <http://www.bbc.co.uk/weather/>, etc.

A general view on climate and weather can be found in '[Termodinámica de la atmósfera](#)'.

Older data can be found in <http://seguimeteo.forumcommunity.net/?t=32905876>.

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