Spain climate: temperature raise on both Mediterranean and Atlantic climates

http://climatemodels.uchicago.edu/timeseries/#ZfJctBDCCLBCL

The Iberian Peninsula can be divided into two main regions taking into account many features —as are soil type, insolation, precipitation, temperature...— that are key to form different ecosystems: there is a Northwest area, wetter and lower in average temperatures (Atlantic climate) and a Southeast area mostly dry, with higher temperatures and more sunlight (Mediterranean climate) (Martín Cano & Gurrea, 1990).

I choose the stations according with this two different climates to study the amount of change due to climate change. For this I selected 5 stations within the Atlantic climate area and other 5 stations within the Mediterranean area (see Figure 1).

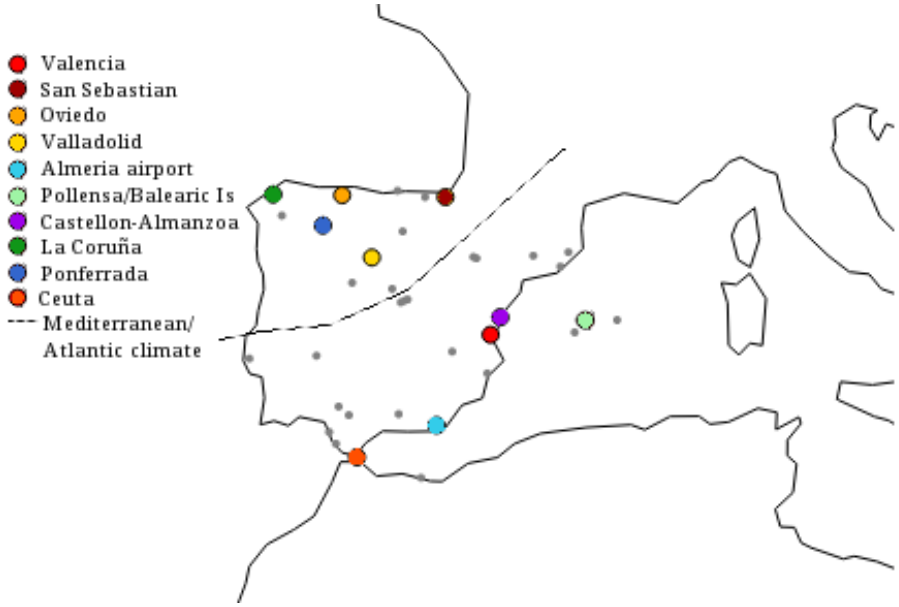

Figure 1: Map for the location of the selected stations in Spain. Dot line divides the two main climate regions, Mediterranean on the Southeat and Altantic on the Northwest.

If we look the data on this figure, (Figure 2a and 2b) we observe that the seasonal variation whiting a year is wider in the Mediterranean area (from on average of 9ºC on the coldest months to and average of 27ºC —is not uncommon to reach max of 35-40ºC on a summer day— on the hottest months) than in the Atlantic area (sea influence keeps this variation on 3ºC to 20ºC).

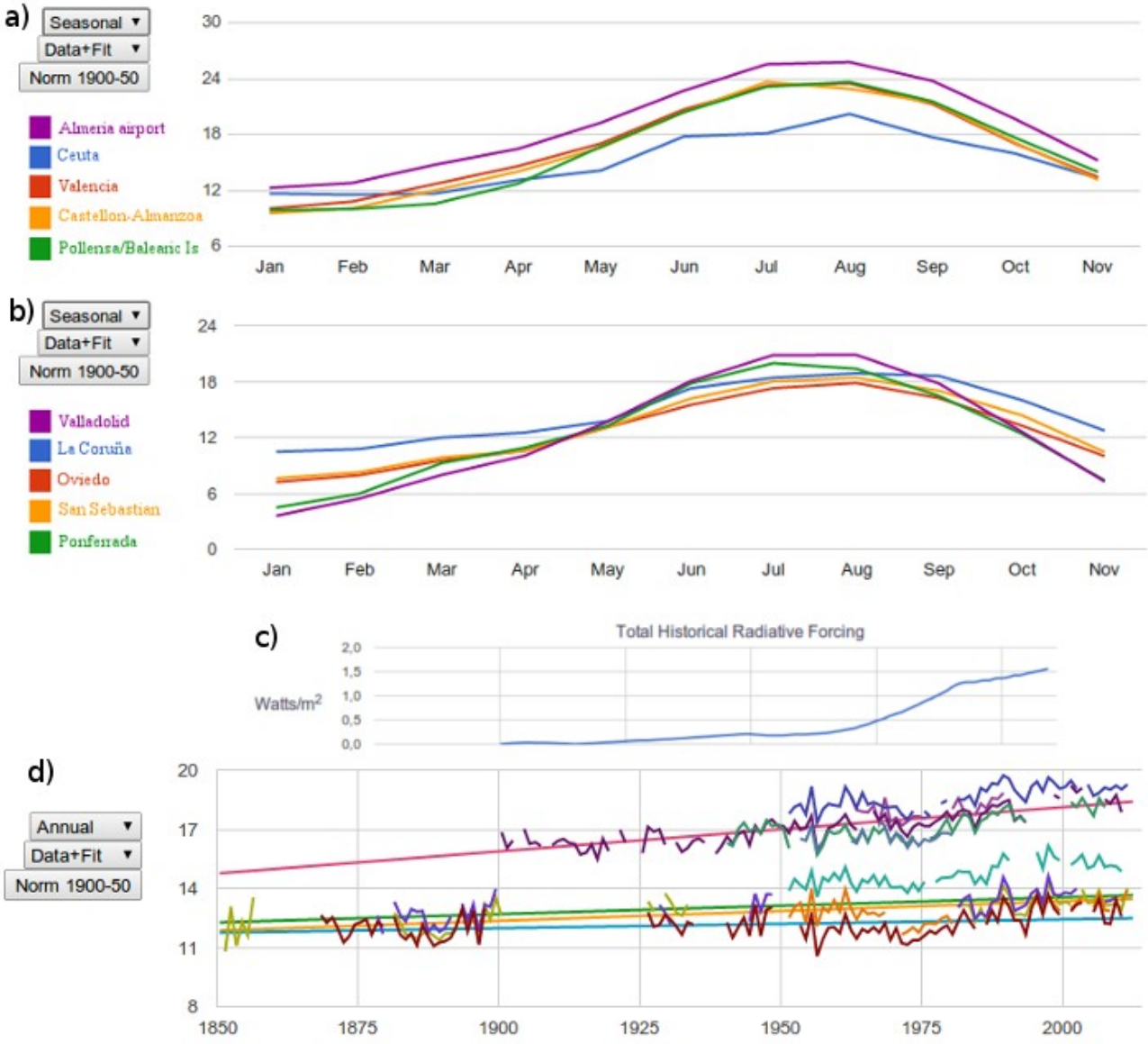

Figure 2: a) and b) shows the seasonal variation of temperature for the stations selected in the Southeast (a) and the Northwest (b). Letter c) represents the variation on Radiative Forcing over the time considered for the study. Letter d) shows annual variation on temperature for the stations selected for the study.

On Figure 2c and 2d we can see variation time, in this case, general increase on radiative forcing on Figure 2c and annual temperature averages for the selected stations on Figure 2d.

Looking the fit line we can distinguish between stations in the Atlantic area (lower temperatures) and Mediterranean area (higher temperatures). Temperature has increased since 1850, and this rise is consistent with increase on radiative forcing. The difference between this areas (or climates) it's the increase ratio in temperature. Although we have year variation —for example, 1956 was a cold year with temperatures of 10,56ºC in the colder station (Valladolid, red line on the figure) preceded by a hot year with an average temperature of 19,16ºC on the hottest station (Almeria, dark blue line on the figure)— the tendency of temperature is to increase with time, more in the Mediterranean group and less in the group influence by the

Atlantic.

It's important to take this difference of increase temperature ration into account as the Mediterranean biome (that I represented on the Iberian Peninsula, but is not only present in the Mediterranean basin) is a global hotspot for biodiversity (Médail & Quézel, 1999). As is said in Klausmeyer & Shaw, 2009, climate change will impact the extent and distribution of the Mediterranean climate, posing a threat to the survival of many species, so conservation and preservation should be taken to avoid this loss (Underwood, Viers, Klausmeyer, Cox, & Shaw, 2009).

Klausmeyer, K. R., & Shaw, M. R. (2009). Climate change, habitat loss, protected areas and the climate adaptation potential of species in mediterranean ecosystems worldwide. *PloS one*, *4*(7), e6392. doi:10.1371/journal.pone.0006392

Martín Cano, J., & Gurrea, P. (1990). The peninsular effect in Iberian butterflies (Lepidoptera: Papilionoidea and Hesperioidea. *Journal of Biogeography*, *17*, 85–96.

Médail, F., & Quézel, P. (1999). Biodiversity Hotspots in the Mediterranean Basin: Setting Global Conservation Priorities. *Conservation Biology*, *13*(6), 1510–1513.

Underwood, E. C., Viers, J. H., Klausmeyer, K. R., Cox, R. L., & Shaw, M. R. (2009). Threats and biodiversity in the mediterranean biome. *Diversity and Distributions*, *15*(2), 188–197. doi:10.1111/j.1472-4642.2008.00518.x