

New early instrumental series since the beginning of the 19th century in eastern Iberia (Valencia, Spain)

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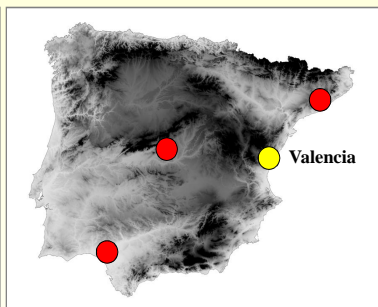
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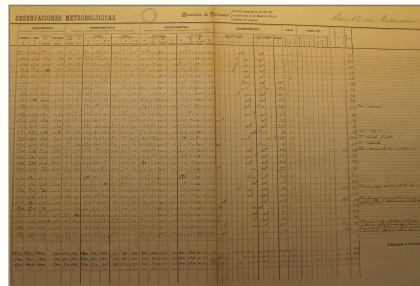
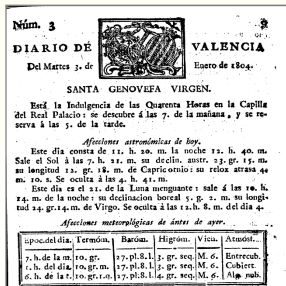


The Salvà-Sinobas project

- Early instrumental series are the main source for climate reconstructions in the late 18th and early 19th century.
- The first continuous series in Spain starts in 1780 in Barcelona by doctor Francesc Salvà. Only two other series have been recovered at the present: Madrid and Cádiz/San Fernando. Medical doctors, military institutions and university staff made the majority of the observations.
- Salvà-Sinobas project** (<http://salva-sinobas.uvigo.es/>), funded by the Spanish Ministry of Environment for the 2009-2011 period, aims at recovering and digitizing more climatic series in Spain. One new series with systematic observations was detected in the city of **Valencia**.



- Observations were daily published in the newspapers *Diario de Valencia* (1804-1834) and *Diario Mercantil de Valencia* (1837-1863). The records were initiated by a local **clockmaker** named Francisco Antonio Espinós. Official meteorological observations started in 1858 at the University of Valencia.

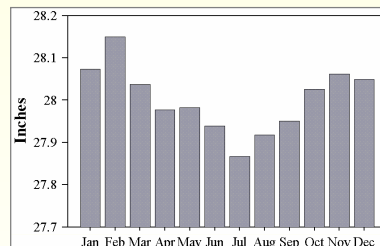


Climatic variables during the 1804-1864 period

- 3-daily observations (morning, midday, afternoon) were daily published with 5 climatic variables: temperature, air pressure, humidity, wind direction and sky state. Rainfall data is available only for the 1804-1808 period.
- Metadata about the instruments have been obtained from some observers comments published in the newspapers. During 1804-1834 observations were made from Espinós home in the ancient centre of Valencia (Santa Catalina square). No more metadata were obtained about the localization of the meteorological station.
- Temperature (in Reaumur scale) was recorded indoor and an unknown hygrometer was used until 1841.
- We started to digitize (12 years: 1804-1808, 1828-1834) air pressure records at midday, and sky state observation in order to improve atmospheric circulation reconstructions and study cloudiness variability since early 19th century. We also tried to assess the reliability of wind direction records (registered in 32 class intervals).

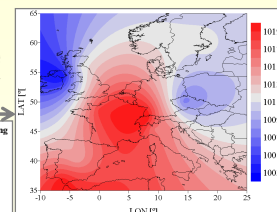
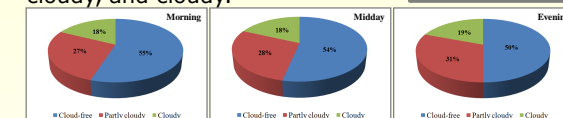
Air Pressure

- Pressure data were given in inches and lines. Possibly measured in French system units.
- Mean monthly course for the 12 years shows a coherent maximum (minimum) in winter (summer).



Sky state

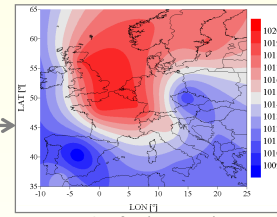
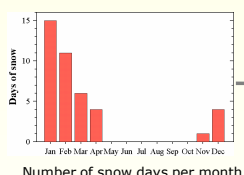
- To describe the state of the atmosphere there were 3 main categories: **cloud-free**, partly cloudy, and cloudy.



Mean SLP for the cloud-free days

- Other less frequent categories such:

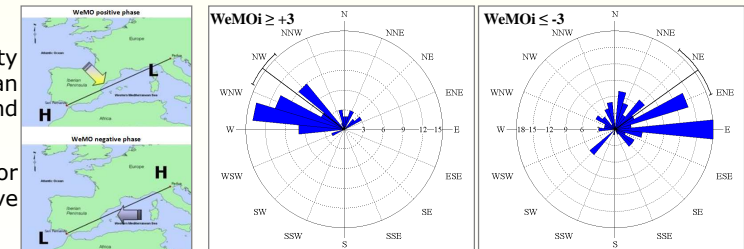
- Rain/rainy
- Snow/snowy
- Strong wind
- Sultry, etc.



Mean SLP for the snow days

Wind direction

- Preliminary assessment of their reliability using the daily Western Mediterranean Oscillation index (WeMOi) (Martin-Vide and Lopez Bustins et al., 2006).
- Wind direction classes intervals classified for WeMOi extreme positive ($\geq +3$) and negative (≤ -3) phases during the 1824-1834 period.



CONCLUSIONS

- An early instrumental series with systematic observations has been detected in Valencia. The records were published in local newspapers since 1804 by a clockmaker, which is a new profession interested in meteorological observations in Spain during this period. Further research is needed in order to find other meteorological observations by clockmakers in Spanish cities.
- Air pressure and sky state observations (wind direction) variables showed strong coherence in the preliminary digitized daily records.