Seasonal vs. annual use of the analysis of rogation ceremonies: a human influenced proxy of climate change (southern Spanish Meseta).

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Rogation ceremonies are a useful tool for pre-instrumental climate reconstruction due to their homogeneity, length of their data series, and the number of places where this information can be found (Martín-Vide and Barriendos 1995). Most of the research on these data is focused on the annual scale reconstruction of rainfall series.

Our research has focused on the seasonal analysis of the rogation ceremonies to determine if these data represent the annual average conditions, a "regular" seasonal pattern (e.g. spring rainfall) or a "chaotic" seasonal pattern (seasonal conditions non coincidental from year to year). To achieve this goal, we have compared the rogation data from the Toledo Cathedral (1506-1850 AD) with the overlapping instrumental meteorological series resulting from comparison of the Madrid and Toledo stations (1800-actual).

This comparison reveals that: 1) Years with pro-serenitate rogations (invoking the cessation of rain) show greater meteorological differences with a "normal" (without rogations) year than years with pro-pluvia rogations (claiming for rain). 2) Spring is the season with more rogations but it is also the season with less difference in comparison to a "normal" year (especially for pro-pluvia rogations). 3) Winter is the season with bigger meteorological differences, for pro-serenitate and/or pro-pluvia rogations years, with a "normal" year.

These results reveal the strong influence of human dependence on water on their distribution. The ceremonies are only conducted when there is a weather/climatic extreme event (droughts affecting agriculture, continuous rain damaging crops, cold weather, thunderstorms, gales, etc.) and consequently, each event represents a combination of human (kind of activity, density of population, technology available, etc.) and climate factors (annual temperature and rainfall distribution). Therefore, rogation data represent an "irregular" seasonal pattern and must be compared with instrumental data and placed in the proper socio-economical setting, for the studied period, in order to extract the more reliable climatic information.

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