

## ***Interactive comment on “Rogation ceremonies: key to understand past drought variability in northeastern Spain since 1650” by Ernesto Tejedor et al.***

### **Anonymous Referee #2**

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This study is very interesting and provides new and valuable data to the scientific knowledge on droughts in the northeast of Spain in the last centuries. The main contribution to the historical climatology of this region lies in the fact that the study assembles an important set of series of rogation ceremonies, including two new unpublished series (Barbastro and Huesca). The study has potential to be published in *Climate of the Past*, however, in my opinion there are aspects of methodology and discussion that must be improved and completed in order to raise the overall quality of the article and achieve the quality standards of the journal.

Main remarks: 1. An important recommendation is about the presentation of the

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method and its limitations. Data of rogation ceremonies were converted into a “Drought Index” (DI) which was developed and applied in previous publications, as referred by the authors. However, the DI description is not totally correct when the authors simply say that “rogation data was transformed into quantitative monthly series” since the DI is, in fact, defined by an ordinal scale of intensity of droughts. Therefore, the study is based in a semi quantitative approach (DI series), which must be clearly stated in the methodology, as also the inherent limitations for the significance of the DI series should be more detailed and emphasized (in section 2, “Methods”). 2. Another important weakness of the study is the total absence of information on the historical archives visited and basic description of sources gathered within the data collection. In text, I have found only a reference to the “Actas Capitulares” of the cathedrals. That’s all? the single information provided on these important issues are the location and periods of the series (table I) which in my opinion is poor and quite insufficient to the readers and interested researchers. I suggest changing and complete this table or, preferably, add a new table with the recommended contents or even include a dedicated appendix. 3. In the methodology description the authors did not mention the completeness of the rogation records of the 13 collected series or even if there some possible gaps our periods with doubtful information from 1650 to 1899. Is it possible to estimate (approximately) the degree of temporal continuity of each series of rogation records? All uncertainties related with the study must be clearly stated. If the 13 series are complete permitting a suitable chronological analysis, please emphasize this fact, otherwise the readers may not be aware on the reliability of the data. 4. In the “Discussion” section some comments are missing about the apparent lack of coherence of cluster “Mountain” among the three defined drought patterns regions. As the authors pointed out, the correlations of DI within this group were weak or without statistical significance, but this evidence should be interpreted. What facts could explain this incoherency (or at least contribute to understand it). In my opinion these comments are relevant to support the consistency of the regional classification of drought series. 5. In the “Results” section is included a detection of the extreme drought years in the northeast of Spain

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(3.3). Some aspects shown in figure 5 appear somewhat surprising, particularly when we compare the DI level occurred in quite closer cities in certain extreme drought years (see the example of Lleida and Cervera in 1775 and 1798) and some (apparently) contradictory results emerge. Since droughts are regional climatological events, not “local” phenomena, how can be explained such apparent spatial inconsistency? Some comments or plausible arguments should be added in Discussion section to avoid possible questions or doubts that, reasonably, may arise to the readers.

Minor comments: Line 129: “regional droughts” instead of regional drought”; Line 134: Consider replace “geological formations” by “geological units” or geological regions”; Table 1: add variables units (are totally absent); Cities names are not uniformized in the text, figures and tables (e.g. Lleida and Lerida, etc.)

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