

Interactive comment on “A shift in the spatial pattern of Iberian droughts during the 17th century” by F. Domínguez-Castro et al.

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This paper uses rogation series from seven Iberian cities to infer the spatial extent of droughts across the peninsular between 1600 and 1750. By selecting periods where rogations are held in Toledo, and looking at the number of other cities where rogations are held in the same season, they identify multidecadal variations in the spatial distributions of such rogations, and infer that these indicate similar variations in the spatial extent of drought. The primary conclusion is that widespread Iberian droughts were much less common between 1600 and 1652 than between 1653 and 1749.

This is an interesting paper that provides valuable new information on multidecadal climate variability. It should be published, but I have listed below a few points I would like to see addressed in a revised version.

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Major points:

1) The paper relies on the assumption that there is a strong relationship between rogation and drought, and that this relationship is consistent in time at all of the sites studied. To be confident that the effects found are changes in drought it is necessary that all the rogation records are complete for the whole period (or at least homogeneous); and that there are no changes in ecclesiastical policy, agricultural techniques, local political or economic conditions, or other effects that might change the relationship. How confident can we be that the amount of drought required to trigger a rogation is the same in 1620 and 1720? In particular, how confident can we be that the observed multidecadal rogation variability is actually drought variability?

2) The methodology used only analyses seasons where there is a rogation in Toledo (84 of the 600 seasons in 1500-1750?). This is effectively discarding most of the data - why is this a good idea? It would be simple (for example) to make a version of fig.4 with all the years included (whether or not there was a rogation in Toledo), and each year coloured by the total count; and fig. 5 could be re-made similarly. It's possible that only using the Toledo times does not introduce a bias and is a more powerful analysis, but this needs to be explicitly justified.

3) The division of the series into two periods (1600-1652 and 1653-1749) is arbitrary and shows spurious precision. Looking at figure 4, I would agree that the second half of the seventeenth century showed notably more widespread spring droughts than either before or afterwards; and also that the number of widespread autumn droughts rose in the early eighteenth century. But I don't think the idea of two distinct periods is a defensible conclusion from the data.

Minor points:

1) Bilbao should be added to figure 4 (leaving out data that doesn't fit a pattern gives misleading results).

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2) Figure 5 panel 2 suggests that there were MORE widespread spring droughts in 1600-1652 than afterwards. This is because points where the frequency is zero have been omitted from the graph.

3) Page 1115 lines 11-25 - this paragraph needs rewriting. It leads to the conclusion 'the period 1600-1750 was the longest with homogeneous data for all the series', but the justification for this is inadequate: no references and vague explanations.

4) Page 1118 lines 4-12 - this paragraph is also vague and unconvincing (no references).

5) The extra documentary data in section 4 is interesting, but doesn't support the conclusions of the paper. It does demonstrate that on two occasions when the rogations indicate a widespread drought then a widespread drought did occur. But this isn't enough to support the conclusions - that would require separate documentary evidence either validating the relationship between rogations and droughts, or directly supporting the change in drought frequency.

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