

Interactive comment on “Drought during early European exploration and colonization of North America, 1500–1610CE: A comparison of evidence from the archives of societies and the archives of nature” by Sam White

Anonymous Referee #1

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Referee comments on: Drought during early European exploration and colonization of North America, 1500-1610CE: A comparison of evidence from the archives of societies and the archives of nature

This paper takes an interesting and somewhat new and refreshing approach to historical weather/climate studies by comparing so called ‘archives of society’ (written historical documentary accounts) with those of ‘nature’ (here mostly tree rings). A great idea I think. The study takes a risk by attempting to establish climatic conditions based on documentary evidence, during what would have been the very beginnings of colo-

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nial conquest into North America (16th C). This at a time when documentary evidence would have been limited for any given place over any given time (certainly when one compares with the data density for a similar period in a European context).

Overall, the paper is stylistically and typologically excellently written and well organized. The abstract suitably covers what it should and is an accurate representation of the paper. I like the introduction (probably the best part of the paper for me) – it is well structured and introduces the topic in a succinct, clear and critical manner. Many of the challenges are highlighted in the introductory sections of the paper. However, I think some critical challenges are not adequately addressed, and so I will elaborate on some major challenges/concerns that I feel need to be addressed to make this work publishable.

Major concerns: 1. The paper does not define ‘droughts’ in the North American context. . . .and doing so for such a vast region is challenging as ‘experiencing dry conditions’ in specific areas may not necessarily imply drought, especially if it is during a naturally dry season, or in a dry region. Defining drought is also relative to the individuals’ past experience of climate (depending where they came from) – so someone who is accustomed to semi-arid conditions is less likely to identify ‘drought’ conditions as opposed to someone who is accustomed to a climate of all year plentiful rain. Such context must be taken into account in all instances, which I do not see much of in the case study examples presented in this paper. Then of course there are the different types of drought such as hydrological, climatological, agricultural etc and these differ too, yet the paper is unable to differentiate between these. 2. My second major concern is that in the examples presented there is very limited ‘societal/historical written evidence’ presented to support drought conditions. In most cases there are only one or two lines of evidence and this is surely insufficient, especially given the nature of some of this evidence. 3. This brings me to the third major concern regarding types of evidence used. Famines are of course not necessarily an indication of drought. As the author correctly implies, some of these famines may be due to severe cold, snow, storms,

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social disruptions etc. But they may also be due to poor farming practices, poor decisions made with regards planting time or most suitable crops, as also pests that might destroy crops. Praying for rain may also not necessarily imply a drought. Prayer might be asked for if the rains may be delayed, or there may be a mid- summer dry spell etc. . .but if one were to look at the season as a whole it may not have been a drought season. Poor harvests and crop failures may also not imply drought, for some of the same reasons already mentioned above. 4. A tough one here, but classifying a season or a year as a drought season or drought year would surely require one to have some sort of bench-mark to compare against (i.e. with other years). An important question for the author to clarify in this regard is whether, based on the documentary evidence, one is able to say whether a season or year is far enough below the 'normal' to define it as a 'drought'. Or, does this paper simply take dry conditions (irrespective of whether it is below normal, normal, or above normal in rainfall/moisture) which affect society, as meaning it is a 'drought'. Better clarity on all this is required. 5. Are there not a wider variety of evidence types that might be discussed in each case study? For instance, reports of grass being dry or sparse, fires, rivers dried up or far below the normal level, death of natural vegetation due directly to drought etc? It would be preferable if a wider variety of evidence types could be used (also in the table). 6. A further major worry is that some of the case study examples presented have nothing to do with drought or provide no evidence of drought. Yet this paper is specifically dealing with drought. In my view those case studies should not be included. There is considerable mention about severe storms, snow and cold and impacts these have had, but again this is not to do with drought and so only confuses matters further. I strongly suggest that the focus should be much more strongly set on droughts and considerably more evidence presented for such cases. I would have liked to see the inclusion of more quotations that convincingly point to drought conditions. 7. There is no evidence presented for droughts in Canada, yet it features in the table. I suggest that Canada is NOT included in this paper, simply because there is no evidence of Canadian droughts presented in this paper.

I will now work my way through the paper with further general comments and issues to address.

P1, line 29: has the word 'the' too many times. Suggest rather write as: 'This article presents evidence concerning the occurrence and human impacts of. ...'

P3, line 39: should not say 'in Table 1 below'...as there is no table 'below' on that page. ...just end it as 'in Table 1.' Same thing on P4 ...end sentence as '...discussion sections.'

Section 3.2.2 Soto Expedition On p5, lines 21/22 you say that the 'only evidence of drought' is based on the fact that people were asked to 'pray for rain to avert a drought and crop failure'. Surely this implies that there was not necessarily a drought yet?....as, by implication, the drought could still be averted. In such a case, maybe the season was drier than normal, hence the request for prayer. ...but what if the rains came shortly thereafter? So this single line of evidence is not sufficient or convincing for drought conditions. There would need to be other lines of evidence to support this apparent drought.

Section 3.2.3 Coronado Expedition This example presents nothing on droughts at all. In fact, it speaks to above normal winter precipitation. I suggest that this section be cut out.

Section 3.2.4 Luna Expedition Again no droughts here. Famine is reported but seems to be associated with a hurricane in Florida. I suggest this section be cut out.

Section 3.2.5 French and Spanish Florida Colonies Harvest failures are mentioned here but it is not convincingly demonstrated that these are due (only) to drought. Might there have been pests, or poor farming decisions, that contributed to this? Needs further support and some good quotations would help too.

Section 3.2.6 Ajacan Again, there is no convincing evidence from the 'archives of society' that there was drought. Mention is made about 'six years of sterility and

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death'. . .but the text continues to say that the death of plants and crops was due to 'intense cold and snow'. So there is again no strong evidence that drought was the major factor here – it seems more to do with cold and snow. Unless there is stronger supporting evidence for drought, then this section should also be cut out.

Section 3.2.9 Onate expedition Please add some quotations to support the occurrence of drought and elaborate with further examples.

Section 3.2.10 Jamestown Much is also mentioned here about snow and winter cold – not sure of its relevance? We are informed that crops failed repeatedly. . .but why? Needs a more thorough demonstration as to all factors causing this. . .or to more convincingly show that it was only due to drought. Maybe poor farming decisions, techniques etc as well? The fact that salt water intruded the James River also does not say much. Was this a normal or abnormal annual (or seasonal) occurrence? Was this due to the river being abnormally low in flow? The context here is missing, or at best vague.

Finally, I am not convinced with the discussion and conclusion which informs us that the archives of society are a good source to classify drought conditions given their general agreement with natural archives. This is simply because the evidence for such droughts is too sparse and lacking in absolute measure. Many of these European Colonial expeditions were on the move and would also not have been able to establish the context of conditions to the longer term 'norm'. The discussion also mentions that the paper addresses the impacts of drought on society, but there is very little in this paper that details precisely this. I suggest a section be written on the impacts of droughts on society during this time period. Overall, a much more convincing case needs to be presented to make this paper work and achieve its aim.

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