

Interactive comment on “A virtual water network of the Roman world” by B. J. Dermody et al.

Anonymous Referee #1

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I am pleased to comment favorably on this really interesting discussion paper, which I enjoyed reading. It is indeed an enlightening paper that is focused on “historical socio-hydrology” and should be published eventually. However, I have the following detailed comments:

1) I enjoyed reading the paper so much just on the basis of the information presented – then only in the end realized that while the authors presented details of the various components of the model, they did not clearly present how these components came together. In other words, the paper may benefit from a basic, but holistic description of the model, supported by a schematic. It should be of sufficient detail that someone who wants to repeat the work here or elsewhere can easily follow.

2) Other details I would have liked to are the distribution of water resource or water availability and the distribution of people (or water demand). After all, in this time

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period these are the two major factors that drove the virtual water trade. I am sure the authors have these details, but it will be good to include such patterns so the reader gets the sense of drivers of virtual water trade.

3) The paper must have been put together quickly, because despite (or because of) the large number of co-authors, there remained a really large number of typos of a grammatical or presentation type still left in the paper. The authors should go through the paper with a “fine toothcomb” to try and eliminate these typos.

4) Now I come to my final comment. I make this comment to traditional, place based hydrology papers. I always ask what has been learned that is general and transferable places. Here is a paper on the socio-hydrology of a region in the ancient world. There is a lot of virtual water trade work that is presented that is descriptive, but from a broad socio-hydrology perspective, we need these works to graduate to more explanatory type of papers that reveal fundamental concepts or principles or laws.

My question then is, what has been learned from here that is fundamental or general and therefore transferable to another region, 2000 years since, for example China in the present century. I know there is a lot of detail that went into the model, there is a lot of site specific complexity and heterogeneity. In terms of its resilience for a long time and then its eventual collapse, is it possible for the authors to distill the entire thing into a simple, abstract conceptual model that one can mimic in terms of a few coupled differential equations? I am not claiming that this will be easy to do, and I will not object if the authors decide not to do it, but in the final analysis this is the essence of “historical socio-hydrology”, learning the lessons from the past. This is already an excellent paper, and it is only this kind of extension that will make it a truly great paper that will stand the test of time. I hope the authors can rise up to this challenge.

The authors may want to look at three papers recently published in HESS and HESSD where such kinds of conceptual models have been attempted for contemporary situations in Australia and China. In particular, please refer to Figure 1 in Elshafei et al.

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(2014), Figure 3 in Liu et al. (2014) and Figure 12 in van Emmerik et al. (2013). Again, I do not claim for sure there is an analogy here, but the authors may want to consider it.

Essentially I am very supportive of eventual publication of this paper in HESS after moderate or major revisions (whatever the authors feel compelled or challenged to do).

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