

## ***Interactive comment on “Endogenous change: on cooperation and water in ancient history” by S. Pande and M. Ertsen***

### **Anonymous Referee #4**

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I am weighing in as a historian by training (albeit a non-specialist for Hohokam and Harappan sites).

In agreement with the previous reviewers, I find it exciting to have a quantitative model for the paleoclimatic and hydrological supply models for these significant ancient human settlements.

It would be crucial to hear from some practicing archaeologists (see the journal *World Archaeology*, for example) for this comparison between ancient sites. The Indus site is particularly well-known for its textual record that has not yet been deciphered by linguists. Indeed, this remains an exciting challenge. The Hohokam site creates other challenges of textual and social evidence. Practicing archaeologists will have plenty

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to say about the gaps and challenges of an absent textual record, and the level of certainty we might hope to interpret and understand any usable data about remaining sites.

However, and this is a crucial problem with the paper's contribution, in my opinion – I have strong reservations about the quantification of social structures based on the authors' assumptions about Hohokam and Harappan cultures borrowed from secondary literature.

Further, there is a frequency of causal, environmentally deterministic language that makes a historian of the human record more than a little uneasy. (Example: "Whatever the direct cause, it is clear that for the Pueblo Grande area the environment offered less possibilities in terms of plant and animal availability, and as a result human health deteriorated.")

To be absolutely clear, as a historian of the human record it seems counter-productive to offer causal explanations about human institutions without access to original analysis of the material and/or textual evidence that is the professional work of archaeologists and historical linguists.

The contribution of this paper would be much stronger, and indeed be much more exciting as a starting point for a variety of relevant disciplines, through making its strength in Engineering more accessible and written in very much clearer English (please!) : There is some potential for this paper to clearly and accessibly explain the modeling and certainty of dynamic hydroclimatic conditions for these two ancient settlements, while also clearly explaining that dynamic variables include human-induced (anthropogenic) withdrawals of water.

This paper could offer more to the reading audience if it worked closely with an English-language editor to remove the technical jargon borrowed from Engineering, Economics, Game Theory, and other neologisms that frankly read like nonsense to English-speaking audiences (An example that doesn't make enough sense in English

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is Heading 3.3. "Spatial distribution of scarcity conditions matters")

Similarly, I agree with the plea of previous reviewers to change the title (including the word "endogenous" is not helpful, and only adds to the heap of jargon).

As a final note, I would like to offer a historian's opinion that the human past is indeed worth studying for its own sake for many historians and archaeologists – it does not have necessarily need to occupy the role of "analogy" or "mature civilization" as a beacon or warning to contemporary social life, as if we are a popular song that will repeat itself. A recent, and very influential critique of this habit to seek analogy from past environments is argued by Davis in *Resurrecting the Granary of Rome: Environmental History and French Colonial Expansion in North Africa*. (Ohio University Press, 2007.)

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 4829, 2013.

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