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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Global warming causes sinkhole collapse – Case study in Florida, USA" *by* Yan Meng and Long Jia

Anonymous Referee #1

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While I found the topic of this manuscript interesting, there are some major problems with the research and the authors' conclusions which I have detailed below. There are two main issues: first, the authors do not seem to be aware of research conducted on this same problem in this same region of Florida. Second, I feel that the conclusions the authors reach are not supported by the actual reality of what is occurring in the study area. Consequently, I recommend rejecting this manuscript.

1. The very first thing I suggest is that the authors read this article as it pertains to their topic: Thornbush MJ (2017) Part 2: Spatial-Temporal Occurrences of Sinkholes as a Complex Geohazard in Florida, USA. J Geol Geophys 6:286. doi: 10.4172/2381-8719.1000286 There is also the book by Robert Brinkmann entitled Florida Sinkholes: Science and Policy.

2. Results are as good as the data. Do we know how well the data represents the actual occurrence of sinkholes? Many may occur in rural areas that may not require an insurance claim.

3. Page 3, Line 8: "sinkhole collapses recorded in Florida have three distinct peaks (Fig. 2)...". I only see two distinct peaks. Is there some statistical methods that the authors could use to justify these peaks as distinctive?

4. Page 3-4, last paragraph starting on page 3 needs references.

5. The section on sinkholes in Florida in the materials and methods really belongs in the introduction.

6. The authors do not have a results or discussion section, they include these in the materials and methods section.

7. The authors need to include a description of the drought index.

8. Figure 3 is difficult to interpret. Additionally, the authors classify P2 and P6 as dry periods yet they fall within the wet designation of the drought index.

9. The authors do not clearly state what the lags are between the droughts and the sinkhole collapse occurrences. From Figure 3 it appears that there are up to four years of lag between the drought and the sinkhole collapse. From my experience, sinkholes occur at the same period as droughts and which can drive the lowering of the water table which provides buoyant support to the "void roofs". For example, a cold snap in 2000s in central Florida required significant water withdrawals from the aquifer to prevent the freezing of crops. These withdrawals lower the water table leading to the formation of over 100 sinkholes forming in a matter of weeks, not four years.

10. The authors need to quantify/demonstrate changes in the water table which directly impacts the formation of sinkholes.

11. Figure 4 needs to be improved. The x and y axis need to be clearly labelled.

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