

Interactive comment on “Minimum temperature and precipitation determine fish richness pattern in China’s nature reserves” by Wende Chen et al.

Anonymous Referee #1

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This is potentially an interesting and relevant paper. However, I have two major concerns:

First, it remains unclear if, and how, the authors accounted for sampling effort. Because the authors collated data on fish species richness from different studies, these data will likely differ considerably in sampling methods and sampling effort, and may be very difficult to compare with each other. For example, in some reserves electro-fishing was used, in others not. The authors mention they included “nature reserve area” in their analyses as a mean to account for sampling effort. However area of the nature reserve is a meaningless metric in this regards, and does not at all account for differences in sampling effort. How the studies used where standardized before the analyses needs to be better worked out and discussed before the manuscript can be published.

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Second, most of the lowland plots are in the south-east whereas the plots at high elevation are in the northern and western part of China. Because of this, the authors find longitudinal and latitudinal patterns. However, high elevation rivers/streams have relatively low species diversity everywhere in the world. I think this is a very well researched and established feature in limnology. The authors fully acknowledge the importance of elevation. However, I wonder what these results really show other than a difference between fish richness in mountains and lowlands. Furthermore, many, if not all, of the variables used to test the four hypotheses likely co-vary with elevation (e.g. temperature). It makes little sense to me to test these hypotheses when lumping all data together as is done now. In that case, the author inevitably find that the environmental variable that relate strongly with elevation explains most of the variance (and thus the hypothesis including this variable performs best). I strongly suggest to put more effort in separating an effect of (high)elevation before testing any other hypothesis on the driver of fish diversity patterns (if at all present when removing high elevation sampling points).

Some other comments: L77-78. suggest to better explain why this may be a problem. L84. I think 'obvious' is subjective. Suggest removing. L90. literatures should be should be literature L93-94. 'entirely for wetlands and lakes.' Not clear what is meant here; suggest rewriting. L103. Suggest explaining 'growing degree days'. And does this not also depend on the fish species?. L109-110. I think this is wrong and AREA does not correct for differences in sampling effort (see above). L142-143. Suggest adding more information on why these analyses were done for two different longitudinal bands. L133 and L153-154. It is unclear what this 'environmental model' represents and how it was developed. L149-153 The authors aim to test four hypotheses, but here only the result of three are given. L168. 'groundwater' must be a the wrong word here. L169-171. Add here that this study focused on North America. Now the geographical context is unclear. Section 4.2. I think this part of the discussion needs to be thoroughly strengthened. The arguments are very loosely connected, and the results of this study are poorly integrated (e.g. no references to figures, etc). Lines

201-215. Very difficult to understand what the point is that authors try to make and how such potential temperature effects relate to the biodiversity patterns observed. L199-200 suggests rewriting; especially the 'water availability is vital for fish' is like saying 'humans need air' in my opinion. I suggest including figure S1 and table S1 in the main text. This is a relatively short paper, and I think it is important that the underlying data (table S1) are clearly presented. Figure 1. the fish richness categories overlap (e.g. the numbers 12,23,43 and 61 appears to be in two categories). Table S1. Suggest adding more information. For example: date of sampling, length of sampling period, etc.

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