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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Frequency and magnitude variability of Yalu River flooding: Numerical analyses for the last 1000 years" *by* Hui Sheng et al.

Anonymous Referee #2

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The manuscript offers a very interesting and comprehensive study of changes in flood magnitude and frequency over the last 1000 years in Yalu River, China. The manuscript is overall well written but could be shortened by removing some redundancies. Some of the methodologies and results are unclear and must be better explained (see below). I found it quite challenging to assess the robustness of the analysis given the limitations in the model and input data. The use of monthly precipitation with daily simulations based on probability distribution for flood analysis is problematic, and, to a lesser extent, the reliance on peak annual discharge results. The model simplistic anthropogenic representation is also a confining factor. The authors are clearly aware of these limitations and effectively mitigated these limitations by framing the bulk of the

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analysis on differences between long time-periods. The authors need to more clearly and explicitly discuss these limitations early in the manuscript.

Specific Comments:

Line 74 - 'become' can be removed

The sentence starting in line 258 - Appendix A2 does not seem to show that.

Section 3.4 - additional information will be helpful - how was it calculated? what values were used (Qpeak)?

Section 4.1.1. - qualitative results are very limited which always raises suspicion unless clearly justified.

Figures 3 and 4 - consider changing the x axis title from 'item' to 'ranked yearly peak flow'. It may be worthwhile trying to explain or at least speculate about years in which the simulated and observed Qpeak strongly diverge.

Line 351 and later - 'frequencies of immense floods of 22.0%...' it is not clear to me what 22% means in this context! It is crucial that the authors clarify this as it is one of the main quantitative metrics used in the manuscript.

Line 407 - 'observed' - I think 'estimated' is more appropriate.

Lines 421-422 - this seems to be a bit too specific an explanation given the model's limited anthropogenic representation. Figure 8 and associated text - the figure needs to be better explained. It is not at all clear what it is showing.

Figure 9 and associated text - the figure is not immediately clear and could benefit from an explanation on how to interpret it. The results drawn from it are not at all apparent e.g. line 473, 479 & 487.

Line 500 - 'flood magnitudes' - Figure 10 title is % frequency of floods - is it magnitude or frequency?

Lines 538-542- is this based on the results or general assertion?

Line 544 and elsewhere - 'coupled' may be misleading in this context because it implies that the two models are dynamically coupled where, to my understanding, the output of ECHO-G is used as input dataset to HYDROTREND (just like any other input dataset).

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