

## Comment on hess-2021-528

Anonymous Referee #1

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Referee comment on "Attribution of climate change and human activities to streamflow variations with a posterior distribution of hydrological simulations" by Xiongpeng Tang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-528-RC1>, 2022

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### General comment:

Runoff change attribution is an interesting research topic. In this manuscript, the authors proposed a novel framework to quantitatively evaluate the contributions of climate change and human activities to runoff changes in the Lancang River Basin. It provides an optional method for attribution of runoff changes on watershed scale, which is valuable. Generally, the manuscript is well organized and presented interesting results, but the description of the innovation of the study should be enhanced.

### My specific comments:

# The authors did not present the advantages of the proposed method clearly. Please clarify what's the innovation of this study.

# Line 171. I suggest the authors clarify the reasons for selecting the dataset in the study (GMSWU). Is it because of the higher accuracy of the data set, difficult to obtain other field data or some other reasons?

# Line 181: It is not "avoid the common phenomenon of 'equifinality for different parameters' in hydrological simulation", in fact, the phenomenon of "equifinality for different parameters" in hydrological simulation is unavoidable. Suggest to revise it to "reduce the impact of "equifinality for different parameters" in hydrological simulation".

# Line 245, If multiple break points are detected for the annual runoff time series, how to select the break points and divide the whole period to natural period and impacted period? The authors should clarify this in the text.

# Line 290-303, The proposed method of quantifying the contributions of climate change and human activities to watershed runoff changes may not guarantee that the sum of the contributions equals to 100% (e.g., equations 6 and 7). This is to say, there is an intersection between climate change and human activities. It is recommended that the authors should give explanations about this issue in the discussion section.

# Line 475, Why the authors present the normalized runoff process of the Yunjinghong station? Please clarify the reasons.

# Section 4.4, In this section, the authors compared the results of the new quantitative framework proposed by the manuscript with two simpler methods. What's the advantage of the proposed method over the two methods? please clarify.

# Fig 15, How did you produce land use maps? Please clarify the satellite data that you used. The presented land use maps in 1980, 2000, 2010 and 2015 look like similar, no obvious land use changes can be identified. Figure 15 shows 6 types of land use while table 9 shows 7 types. They should be consistent.

Technical corrections:

# In addition, the format of the listed references is not uniform. For example, some references have DOI information, but some do not (Lines 831, 846, 915, etc).

# If some nouns have been abbreviated in the manuscript, please use the abbreviation after the first occurrence and keep consistent through out the whole text. For example, in line 13, please replace "contribution rate" with "CR". The same problem exists in other noun expressions in the manuscript. Please review the full text in detail and make consistent revisions (Line 16: human activities, Line 19: Lancang River Basin, etc.).

# Table 5, The titles of the hydrometeorological elements in the table should be consistent. At the moment, some of them are full names, and some of them are abbreviations.