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Comment on hess-2021-475

Anonymous Referee #1

Referee comment on "Decreased virtual water outflows from the Yellow River basin are increasingly critical to China" by Shuang Song et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-475-RC1, 2021

Based on the concept of "complexity" in complex economics, this manuscript points out that the virtual water flow for trade in the Yellow River basin is decreasing, but its irreplaceability is increasing. There are significant flaws in literature citation and method description, so it is hard for me to recommend the current version of the manuscript to be published in the *HESS*. Following are some comments:

1.The methodological part of the manuscript is not clear and accurate. In the process of model construction, there are obvious errors in all corner labels of the author, such as . According to Sciarra et al. (2020), the author wrongly defined the meanings of and in the calculation in this formula, especially when using the same qualification conditions as in Sciarra et al. (2020). The same error occurs in Equation 3. In addition, the content of Formula 5 and 6 is the same, and the author does not give an effective description of its essential difference. Therefore, I doubt the rationality of the calculation method in this manuscript, and the results revealed are debatable.

2.There is little information on how the VWF are simulated.

3.Information on data sources is lacking!

4.In general, the boundaries of river basins are not equivalent to the administrative boundaries. Since this paper focuses on the Yellow River basin, the quantification results at the provincial level cannot accurately reflect the situation of the basin itself. Or it should be clearly described that how the part of each province within the basin was identified.

5.L21-29: For descriptions of the current status of water resources in the Yellow River

basin, it is important to cite official statistics rather than secondary literature.

6.L33-34: As for the derivation of the concept of water footprint and virtual water, the literature cited here is not clear and unrepresentative.

7.L56-57: Reference citation format error.

8.In Figure 2 c, why choose to show 1979 instead of 1978?

9.L154: Spelling mistake: production.