HESSD

Interactive
comment

Interactive comment on "An Analysis of Conflict and Cooperation Dynamics over Water Events in the Lancang-Mekong River Basin" *by* Jing Wei et al.

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Reviewer #1: This paper presents an analysis of conflict and cooperation sentiments in the Lancang- Mekong river basin countries, for which news media articles were analyzed. The general idea and outcomes are relevant and timely. It is also hopeful that once more it is demonstrated that water more often results in cooperation than in "water wars". How- ever, I think that the paper should be improved substantially before it can be considered for publication in HESS. First, it is not clear what the goal of the paper is. I would strongly encourage to make it very clear in the abstract and introduction what the authors aim to achieve with the paper. As a reader, it makes it sometimes

difficult to follow. Second, the general structure may be improved. Since the goal is not directly clear, it is also not logical to first present the case study in detail. I would suggest to make sure it is clear what research question is being answered, followed by a discussion of the chosen/developed method. Overall, I also think the methods are not presented well. Especially since the chosen methods are perhaps not trivial for the HESS readership, this should be clearly explained earlier in the manuscript. Third, in the introduction a case is made for using socio-hydrology for understanding transboundary river challenges. In the rest of the paper, to link is made to socio-hydrology. I would encourage to make this link in the discussion section. Finally, the manuscript would benefit from a thorough and critical discussion of the methods and results. It is not clear at all what assumptions are made and what uncertainties are introduced in the analysis. In conclusion, the paper has potential, but needs some additional work. Please find below some general comments on all sections, and several specific comments.

-Author response: We would like to thank reviewer #1 for the constructive suggestions and comments, which we believe will help to improve the manuscript substantially. We agree to re-work on the main issues pointed out by the reviewer to progress the manuscript further. Our explanations and responses to all the reviewer's comments and questions are listed below.

General comments Introduction The introduction provides a good context for this paper. I do think that the step from water related conflicts and transboundary river basin management to socio- hydrology (SH) is a bit sudden. I suggest to dedicate a short section on introducing SH in this context, and better argue for why SH is a suitable approach. Second, it is not clear to me what the goal of the paper is. Are you presenting a new method? Are you testing a hypothesis? Are you presenting a new perspective? Please make it very clear in the introduction what you aim to achieve with the paper.

-Author response: We appreciate this suggestion from the reviewer that the link from transboundary river basin management to socio-hydrology should be strengthened and

justified, in the new version, we will elaborate on the socio-hydrological approach, and how this research contribute to more rigorously model social element at transboundary level in socio-hydrological models. The goal of this paper is to provide a new perspective to understand the conflict and cooperation dynamics by highlighting each riparian country's conflictive or cooperative attitude towards their shared water. The justification behind this is riparian countries have their respective values and priorities for water management, their perspective of shared water often has possible impacts for propensity to involve in cooperative management and adhere to treaties/agreements. An in-depth analysis that looks into each riparian country's conflictive or cooperative perspectives is key to understand their cooperative or non-cooperative behavior. We thank the reviewer for raising this concern of confusion, and will rewrite the aim to make it much clearer in the revised manuscript.

Case study Nice introduction to the basin. I would suggest to rearrange the sections a bit. Perhaps first discuss the history of events (line 145-163), before discussing the stakes and interests of the individual countries (lines 129-144).

-Author response: Thank you for this comment. The reason we put the stakes and interests of each riparian country first is to emphasize that it is because of the competing desires for the use of the shared water that have resulted in the following historical conflict and cooperation events. As reviewer remarks below, we will re-arrange the case study and method section.

Methods The methods should be explained more clearly. The first section of the methods is an overall introduction to "news media" and for the approach the reader is referred to Figure 2 (line 183). Almost eight pages in, it still not clear to me what this paper is about or what method has been developed/used to answer what questions. I suggest to rearrange sections 2 and 3, and start with a very clear description of the goal of the paper and an overall introduction to the methods. After detailing the components of the method, a description of the case study can be given.

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Discussion paper

-Author response: Thank you for this comment. We will re-arrange the structure of this section to have a clear statement of the goal followed by the method and data collection.

Please provide additional details on how the news article search was conducted. What timeframe was used? What languages of news were considered? What were the generated "results"? Individual newspaper articles or also other media?

-Author response: We agree with the specific suggestions and comments. The step-by-step data collection was illustrated in figure 2 as well as in description of line 185-210. We used the keyword search term (table 1) to retrieve articles from the Lexis database, without limiting the timeframe. The language of newspaper was limited to English only. Results generated are individual newspaper articles. In the revised manuscript, we will clarify in more specific details.

As sentiment and topic analysis is not commonly used among the HESS readership, I suggest to maybe illustrate the methods with some examples and even a diagram. This can be in the supplementary materials. For example, show how words and lines are analyzed and what words influence the AFINN score.

-Author response: Yes, we realize that we need to explain the method in more details in this manuscript so that readers who are not familiar with the method can grasp the general idea. As suggested by reviewer, we will put it in supplementary materials with more specific information and illustration.

Results The results are interesting, but read somewhat bulky. Is it possible to present the results in a more concise way? E.g. focus on the main points.

-Author response: We appreciate this suggestion from the reviewer and will incorporate the suggestion and adjust the results section in more concise way.

Discussion and Conclusion: I suggest to use some subheadings, especially since you describe "key points". Would be great to have those points clearly visible as subhead-

ings. Can you elaborate on why dam infrastructure and development is associated with negative sentiment? Can you elaborate on how this cooperation and collaboration has been achieved?

-Author response: We agree with the reviewer and will be more concise in key points. Some sections of the results and discussion will be re- arranged and re-written with the help of this input. As in line 379-381, the general concerns associated with infrastructure development along a river including limited sediment flow, lower water quality, the effect on fish species and the livelihoods of people who rely on the river, were not overly present without the threat of infrastructure. Yes, we can elaborate more on this along with a parallel description of how cooperation can be achieved in revised manuscript.

I'm missing a critical evaluation of the chosen method. Are there any sources of uncertainty? Are there any assumptions made about the news media used (e.g. "free journalism" vs "state-run"). What can be improved about the method? Can it be directly applied to other river basins?

-Author response: The limitation of this study is that only English newspapers were retrieved and included for analysis, which we might miss a variety of local languages newspaper sources that representing the local voices and perspectives. For future research, this could be improved by covering local languages through multiple newspaper databases. To avoid possible media-biases, we did not specify the types of news media to be included (e.g. "free journalism" vs "state-run"). With the keyword search terms, this method can be directly applied to other river basins.

Specific comments Line 22: Can you elaborate a bit on the method/analysis that was used for this paper?

-Author response: Yes, we would add more method/analysis description in the revised manuscript.

Line 26: Include the six states.

-Author response: We will incorporate the suggestion and add the names of six states.

Line 27: What do you mean with "international countries"?

-Author response: This study differentiates between the riparian countries and international countries to reflect the differences of how the water issues are perceived within the basin countries and outside the basin. "International countries" generally referred to all countries outside Mekong River Basin, we will clarify this in the revised manuscript.

Line 43: "world's freshwater" –> incorrect, this should be global river flow.

-Author response: Correction will be made accordingly.

Line 53: Given the somewhat outdated references, do you agree that the idea of "water wars" is also outdated?

-Author response: Given the existing and our research findings, "Water wars" could be an overstatement for majority of the international river basins, and for Mekong as well.

Line 67-72: Can you elaborate on why a socio-hydrological approach may be a suitable approach?

-Author response: Yes, we will incorporate this suggestion in the revised manuscript.

Line 76: Does the TFDD include water incidents after 1999? If so, to what date? Can you explain what this -7 to +7 scale is based on and what it means?

-Author response: The TFDD include water incidents from 1948-1999, then expanded to 2008. We will clarify this in the revised manuscript. The -7 to +7 scales are the intensity of conflict or cooperation events. Negative means conflict, positive score means cooperation.

Line 86: Omit "often".

-Author response: Corrections will be made accordingly.

Line 88: Can you specify what is defined as "war", "conflict" and "cooperation" in this

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Discussion paper

context?

-Author response: "war" referred to formal declaration of war, whilst "conflict" means varieties of negatively perceived events ranging from mild verbal expression to diplomatic hostile actions or even small-scale military acts, similarly, "cooperation" means range of positive events ranging from minor official exchanges to major strategic alliance.

Line 121-124: Please rephrase, this is a very long sentence.

-Author response: Corrections will be made accordingly.

Line 167: Specify "news media".

-Author response: "news media" in the context of our research referred to traditional newspaper media, other than "social media", clarification will be made in the revised manuscript.

Line 185: Provide reference to the Lexis-Nexis database.

-Author response: Yes, we will incorporate this suggestion in the revised manuscript.

Line 189: What do you define as riparian states? What is this claim based on?

-Author response: Riparian states referred to countries that the shared water flows through. Thank you for the comment, we will clarify this in more specific terms to avoid confusion.

Line 185-192: Not clear what languages you included in your analysis. Only English articles?

-Author response: Yes, the scope of analysis includes English articles only due to language constraints.

Line 204: Who read all 12,316 articles? The same person or a team?

-Author response: The first author and two co-authors manually read through all 12,316 articles. In the initial stages of reading, we randomly select 100 newspaper to read

it independently among three of us. The variability of interpretation of articles was discussed and common definitions were set to ensure consistency and reliability.

Line 206: When was an article considered not relevant?

-Author response: When considering the relevance of an article, an article that is classified as relevant need to discuss the conflictive or cooperative aspects of the events involving at least one of riparian countries. Other than the above criteria, articles that discuss other issues, i.e. tourism, history, were considered as irrelevant.

Line 225: Spell out AFINN.

-Author response: AFINN is the name of the sentiment lexicon consists of a list of English terms rated for valence developed by Finn Årup Nielsen. AFINN is the full name not abbreviation of the lexicon.

Line 239: What ten topics were selected?

-Author response: Structural Topic Modelling (STM) can identify topics automatically. The number of topics it can generate was decided through an analysis of the topics produced until clear, relevant topics emerged as a result. In our case, the number is ten after several round of trials. When we chose five topics, all topics were pertaining to similar topics, i.e. water, resources, and six riparian countries; however, at ten topics, there were more clear events emerging such as dam infrastructure, agriculture and fisheries.

Line 250: English language articles? What about the overall trend in news articles in the same period? E.g. what is the influence of just overall more news?

-Author response: Yes, scope of analysis is English language articles. The overall trend of conflictive and cooperative articles is increased over time, see Figure 3a. To minimize the influence of overall news articles in general in the same period, we looked at relative prominence of conflictive sentiments to cooperative sentiment over time as seen in Figure 3b. From this we will be able to see the ratio between cooperative events

and conflictive events, and the trend of change over time.

Line 354: Why is it important?

-Author response: In the context of transboundary rivers, riparian countries have their respective values and priorities for water management, and their values of shared water often has possible impacts for their propensity to involve in cooperative management and adhere to treaties/agreements. Understanding value is therefore vital for understanding their conflictive/cooperative behavior and developing effective management and policies toward cooperation.

Line 388-389: Unclear sentence ("riparian is over-critical"), please rephrase.

-Author response: Yes, we will revise it in the new version.

Fig. 1: I suggest to also use a background color for the basin in Cambodia and Vietnam. It now looks like the Lancang-Mekong basin stops at Kratie (Cambodia).

-Author response: We appreciate the suggestion and will change the background color for a better illustration.

Fig. 2: Barely referred to. Either discuss more explicitly or remove.

-Author response: Figure 2 is the diagram of how we conduct the method as reviewer pointed out in previous comments. As stated earlier, we will re-arrange the method section along with this Fig to produce a clear description of the method section.

Fig. 3: Difficult to distinguish the various countries. Try to make the figure clearer, e.g. put the countries on the right side of the figure.

-Author response: We appreciate the suggestion, we will adjust the legend and color of each country.

Fig. 4: Very messy figure. Be consistent with percentages (e.g. Fig. 4A has 0-1 scale, unlike Fig. 4B). Also I suggest to only use once decimal for the percentages in Fig. 4B.

-Author response: Thank you for this comment, we will change the percentage in Fig 4B as consistent with Figure 4A

Fig. 5: Is there a reason why the words/topics are not spelled out? It reads very messy. (e.g. "countri"). Also I suggest to make it more clear that the three subfigures are for three specific years. E.g. add it to the figures rather than only in the caption.

-Author response: The word cloud was produced automatically by the frequencies they appear in the articles, the words appeared in the cloud are directly from the original context. Yes, we will add the specific year to the figure itself to make it clearer.

Fig. 6: Please improve the quality. Specifically the scale of the bubbles in Fig. 6B is not very clear.

-Author response: We thank the reviewer for the suggestion, we will improve the layout and scale of the bubbles in revised manuscript.

Fig. 7: Can you please use the same scale on the y-axis? That would allow a better comparison. Also you can remove the legend in each sub-plot.

-Author response: We thank the reviewer for the suggestion, all figures will be updated and improved for a better presentation.

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