

Interactive comment on “Water discharge and sediment flux changes in the Lower Mekong River” by X. X. Lu and R. Y. Siew

X. X. Lu and R. Y. Siew

Received and published: 21 January 2006

1. General comments This paper provides important information about a major river in SE Asia. Assessing the impacts of recent dam construction is also a good topic, both scientifically and practically. The quality of the data available is not so great, but the authors are not responsible for this. But the authors are responsible for making more persuasive discussion. So I recommend acceptance with moderate revision.

Authors' Response: Yes, we acknowledge poor quality of the data. This is particularly true for suspended sediment concentration (SSC). SSC measurements were very sporadic, ranging from 1-6 times only per month and were not conducted at several gauging stations between the mid-1970s and 1980s. Nevertheless, the dataset archived by MRC is still the best dataset available for the Lower Mekong River.

* Title Vague. Please write about dam construction as well as the period (years) of

[Full Screen / Esc](#)

[Print Version](#)

[Interactive Discussion](#)

[Discussion Paper](#)

discussion.

Authors' Response: The paper now has a new title: "Water discharge and sediment flux changes over the past decades in the Lower Mekong River: possible impacts of the Chinese dams" to reflect the reviewer's comment.

* Abstract - Sudden appearances of local names such as "Manwan reservoir" and "Chiang Sean" are unfriendly to readers.

Authors' Response: In order to avoid sudden appearance of local names such as "Manwan reservoir" and "Chiang Sean", we now use "the first Chinese dam among the 8 cascades (i.e. the Manwan Dam), and at the nearest gauging station below the Dam (i.e. the Chiang Saen)". In other words, the local names are put into brackets.

- The fourth sentence (The infilling of...) tells something like a result, although it is written before the sentence "Analyses of discharge and sediment flux...have indicated...".

Authors' Response: This sentence (i.e. The infilling of...) has been removed from Abstract.

* Key words "Downstream dam effects" sounds awkward to me.

Authors' Response: "Downstream" has been removed.

* 1. Introduction. - 1st sentence. "Asia and Southeast Asia" is strange, because the latter is included in the former.

Authors' Response: "Southeast Asia" has been dropped.

- The latter half of the 2nd sentence is about China, which is sandwiched between the remarks about western developed countries. Please move the Chinese part elsewhere.

Authors' Response: The Chinese part has been moved downward.

- 2nd paragraph. Please clearly state which month of 1992 the operation of the Manwan Dam started. This is crucial for the following discussion. For instance, you defined

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

“pre-dam period” as 1962-1992, but it is not clear whether the dam started its operation near the end of 1992.

Authors’ Response: The information about the Manwan Dam infilling is confusing, some said that the Dam started to store water in 1992 and operate in 1993, whereas others said that the Dam started to infill water in 1993. According to our careful examination of the daily water flow data (which are not presented in this paper), we assume that the Dam started to store water in the late 1992 till 1993 to complete the infilling processes. Therefore, in our paper we defined the year 1992 as infilling year, but 1962-1992 as pre-dam period. As for which month, it’s hard to figure out an exact month.

* 2. Study area - 1st sentence of 2nd paragraph. It is better to cite Fig. 2 instead of Fig. 1, because the latter does not show the local names written in the sentence.

Authors’ Response: Fig. 1 has been changed to Fig. 2.

* 3. Data and methods - There are two relatively long paragraphs before Subsection 3.1. It seems better to define Subsection 3.1 with the first two paragraphs, and increase the number of the current subsections by 0.1 (i.e., the current 3.1 will be 3.2).

Authors’ Response: Yes, a new section 3.1 Hydrological data has been added, and other sections have been re-numbered.

- Near the end of the 2nd paragraph. The phrase “Table 2 lists the stations meeting the above requirement” sounds repetitive. “Table 2 lists the selected stations” would be better.

Authors’ Response: Yes, this sentence has been rephrased as “Table 2 lists the selected stations”

- About Eq. (1). You wrote “Daily sediment concentration value was estimated using this relation”. How can you assume that the values of a and b in Eq. (1) did not change during the period you dealt with? The values may have changed with time, especially due to the dam construction. The possibility of such changes is even interesting here,

because this paper analyzes the hydrological effects of dam construction. Thus, more careful data analysis is needed.

Authors' Response: Yes, the values a and b vary from year to year. We did not assume that the values of the a and b in Eq. (1) remain same over the estimated years.

* 4. Results. - This section sometimes includes discussion/interpretations. In other words, separation between Sections 4 and 5 is unclear. It is better to make only plain descriptions of the results in Section 4.

Authors' Response: Yes, we also found that we mixed our results with part of discussion. We moved whatever sounds like discussion (e.g. the middle of 4.1 and the end of 4.2 in the first paragraph etc.) from the Results to the Discussion section.

- Middle of 4.1. Interpretations about the year 1992 require monthly-level information as I commented before (Also, this is an example of discussion within the current Section 4).

Authors' Response: Yes, the middle part of 4.1 has been moved to the Discussion. For the monthly-level information about the Dam infilling, as discussed earlier, it was not clear in which month the Dam started to infill water.

- 2nd sentence of 4.2. You wrote "all stations" but it does not apply to Nakhon Phanom.

Authors' Response: Yes, it does not apply to Nakhom Phanom, so we add "except for Nakhom Phanom".

- Latter part of 1st paragraph of 4.2. Why did you show a table only for mean (Table 4), not for maximum?

Authors' Response: The paper compares pre- and post-dam mean water discharge (Table 4) and sediment flux (Table 5). These are the most concerns of the paper. We left out the maximum and minimum water discharge of pre- and post-dam periods.

- Middle part of 2nd paragraph of 4.2. I looked at Fig. 4a, b, but it does not clearly show

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

what you wrote here. Can you show this in a more quantitative way?

Authors' Response: We agree with this comment—the synchronized patterns described here are not clear, and, therefore, we removed this paragraph completely.

- 1st sentence of 3rd paragraph of 4.2. This is a repetition of what was already mentioned.

Authors' Response: No, this is first time to discuss the minimum water discharge.

- Section 4.4. Overall, what is written here is not so convincing to me, partly because of the use of Eq. (1) without serious consideration.

Authors' Response: The reviewer concerned about the Eq. (1). He/she thought the values of the a and b were constant. As we explained already that the values of the a and b in fact varies from year to year.

- 1st sentence of 2nd paragraph of 4.4. This is similar to what you already mentioned.

Authors' Response: The sentence is a summary of the paragraph and is associated with Fig. 8. We do not think this is a repetition.

- 1st paragraph of 4.5. Your remark about Luang Prabang is not convincing because data are very sparse.

Authors' Response: We agree with the comment and the sentence on Luang Prabang is removed.

- 2nd paragraph of 4.5. Another example of discussion within Section 4.

Authors' Response: Yes, the comment is valid. In order to separate the Results and Discussion, we moved the paragraph after modification to the Discussion (the last paragraph in 5.2).

* 5. Discussion. - 5.1. Overall, discussion here is not so strong, because your findings tend to be the same as what has already been reported elsewhere, or something like

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

common knowledge.

Authors' Response: Well, we do green that some of our “findings tend to be the same as what has already been reported elsewhere”, like what we point out in the Introduction, the focus of the paper is systematic analysis of water discharge and estimation of sediment flux across the whole stretch of the Lower Mekong River. We found that the water fluctuations occurred more frequently in the dry season, rather than in the wet season, and monthly suspended sediment concentrations had been decreasing significantly in several stations even before the construction of the Chinese Manwan Dam and the Dam further enhanced the decline in the sediment concentration. We would think these are the new findings and have not been reported yet as far as we understand.

- 1st paragraph of 5.2. This sounds a sort of a matter of course.

Authors' Response: The paragraph of 5.2 is removed.

* 6. Conclusions. I am wondering how similar the paper by Kummu et al. (in press) is. The title suggests that the paper deals with something similar to this draft, and you wrote that your findings agree with theirs. I could not check the contents of the Kummu et al. paper because it is not yet available even on-line. But it will appear in a major international journal, so your originality needs to be ensured.

Authors' Response: As far as we know that the title of Kummu et al.'s paper has changed (see Reference list). While Kummu et al. (in press) mainly discuss the sediment-related impact as a result of the Chinese Dams, our paper investigates both water and sediment changes along the whole section of the Lower Mekong River.

* Table 1. - “Project” sounds a bit strange, because what is actually shown is the name of a dam.

Authors' Response: “Project” is changed to “dam”.

- “-“ is put in the column of Total Storage, but nothing is put in the lower part of the

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

column “Commissioning”. What is the difference between these two?

Authors’ Response: “-“ is added in the column “Commissioning”

* Table 2. - Please clearly define “No. of annual sediment records”. Does it mean the number of years when sediment records are available?

Authors’ Response: Yes, it is the number of years with available sediment records.

* Table 3. - Please show the number of samples used. Otherwise it is hard to evaluate the usefulness of R-squared.

Authors’ Response: The numbers of samples are added in Table 3.

* Fig. 1. The “inset” map seems to be the main point here, but it is smaller than the general map. The general map looks a scanned copy from a report, and it includes non-relevant information such as the locations of power plants far from the river. Please enlarge the “inset” map, and reduce and simplify the general map.

Authors’ Response: Fig. 1 will be redrawn in order to address the comment. In addition, Fig. 2 will also be redrawn to improve its quality.

* Fig. 10. Is this really necessary? The pictures seem to show only usual river banks.

Authors’ Response: The 2 pictures will be removed.

3. Technical corrections. - Final sentence of Section 1. Put “the” before Manwan Dam.

Authors’ Response: “the” is added before Manwan Dam.

- Final sentence of 1st paragraph of 4.4. Put “and” between Tan Chau and My Thuan.

Authors’ Response: “and” is needed here but separated by “,”.

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 2287, 2005.

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper