

## ***Interactive comment on “A climate-flood link for the lower Mekong River” by J. M. Delgado et al.***

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We thank the anonymous referee 2 for her/his valuable comments and suggestions.

### **Reply to major comments:**

*1. The connection is made between the two monsoon (West Pacific and Indian) and the flood in the Mekong river. It is stated that the northern region of the Mekong basin is more affected by the Indian monsoon and the southern region more by the West Pacific monsoon. (line 15-19 page 10127). This is however not shown in the paper. A regression of the two monsoon indexes (WNPM and IM) on the rainfall in the Mekong Basin should reveal this.*

The anonymous referee 2 suggests regressing the monsoon indexes on the rainfall

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over the basin. One of the reasons for not using rainfall in this study, is the lack of quality in this kind of data. The rainfall data has many gaps, and there is a lack in the spatial coverage of the most important regions.

We nonetheless made an attempt to regress rainfall, based on a GPCC product. This will be shown and discussed in the revised manuscript. A regression model can be created on the interannual scale, but its skill is greater for periods of enhanced variability of the monsoon indexes. We will show and discuss this in the revised manuscript.

*2. Although it is stated that the Indian Monsoon affects the northern part of the Mekong basin no effect of the Indian monsoon on the flood discharge is detected in the paper: Correlations below 0.1 (line 25 page 10136), no relation with decadal variance (Fig. 4). So if from the analysis of the rainfall data the impact of the Indian monsoon is small (see comment 1) than the whole discussion about the Indian monsoon can be deleted. Otherwise it is interesting that it not affects the lower Mekong basin an can be kept.*

By following your suggestion of plotting the correlation between rainfall over the basin and both monsoon indexes, we confirmed our hypothesis of a greater correlation of the ISMI in the upper Mekong basin. We will present this figure and discuss it in the revised manuscript.

*3. The discussion about the impact of the PDO is incomprehensible. In the text it is stated “The influence of the PDO on the flood discharge of the Mekong can be seen in the agreement between shift in variance of discharge time series in the downstream part of the basin and the PDO shift of 1976 (Fig. 3)”. The figure caption of Fig. 3 is unclear. The figure is also not discussed. What is the conclusion concerning the different time scales? Is 1976 crucial? Can’t you find other years with similar changes? Figure 6 is not discussed at all in the article. In this figure also the decadal variance of the discharge in Kratie should be included.*

The discussion in the manuscript was reformulated and it now extensively discusses the results presented in Fig. 3. The last sentence of the caption was also reformulated.

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The method used identified the year 1976 as a step change in variance. This happens to coincide with a major regime shift in the Pacific SSTs. A more extensive discussion was added to this part of the manuscript.

The conclusion concerning different scales is the prevalence of changes in short scales of 2 to 4 years. A change in greater scales like 8 or 16 years could mean that a local trend was taking place. The change in variance exclusively on short scales guarantees that the step change is due to variance and not to a local trend of oscillation. This discussion was added to the manuscript.

The detected change in 1976 was the only for the evaluated period 1948-2001. A longer time series would be necessary to identify other step changes. They were however not available for all the monitoring stations. We think it is important to keep the analysis consistent in terms of length of the time series.

Figure 6 was changed and now includes the decadal variance of Kratie. In the revised manuscript, a discussion about the figure was added.

*4. The readability of the article is hampered by sometimes unnecessary information and repeating already given information. Some examples are given below:*

*- The discussion about longer time scales (The paragraph starting at line 26 page 10128) including the Milankovich time scales is not relevant in the context of this article and can be deleted.*

The paragraph was deleted in the revised manuscript.

*- The same applies for most of the discussion in the paragraph starting on line 26 page 10134.*

This paragraph was moved and integrated in the Introduction.

*- The discussion of Fig. 1 (line 10-11 page 10128) should be included in the lines of 16 and following on page 10127*

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This sentence was moved to the paragraph where the Mekong basin is described, as you suggest.

*- Fig. 2 is discussed two times: page 10131 and page 10132.*

In the new structure of the manuscript, as suggested by anonymous referee 1, Fig. 2 will be discussed only once.

*Other comments: - Figure 3 is only discussed at the end of the article is therefore wrongly located.*

A new structure was defined for the manuscript. The discussion of the results presented in Figure 3 is now presented in an earlier phase of the paper and more integrated in the general discussion of the flood regime of the Mekong.

*- Description of the axes and the lines in Fig. 4 is too small. It was for me hard to read them.*

Description of the axes was changed in the revised manuscript.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 10125, 2011.

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