

Interactive comment on “Sedimentation monitoring including uncertainty analysis in complex floodplains: a case study in the Mekong Delta” by N. V. Manh et al.

Anonymous Referee #3

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General comments

This paper aims to estimate fine sediment deposition rates and their quality in the Mekong delta by: (1) quantifying the measurement uncertainties and (2) measuring the spatial variability of sediment deposition (quantity/quality) in order to identify the mains controlling factors.

The paper presents a significant field work with original measurements and analyses. But I do not recommend the publication of the paper in its present form. First, the structure of the paper is complex and not well-organized (eg. two results' sections, 7 sections). Secondly, many problems arise with the methodology and in particular the

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field measurements and the statistical analyses. I suggest that the paper should be resubmitted to the HESS journal after major revisions. This work should be valuable for the community: the estimation of sediment deposition rates in the VMD, their quality, the spatial variability.

To improve the paper (without many expensive new field works) I would suggest to remove the complex uncertainty analyses (or only provide rough estimation of uncertainties and the discussion) and to better describe the field methodology, your lab analyses and better discuss of the deposition rate/quality variability in the VMD in relation with infrastructures.

1. Does the paper address relevant scientific questions within the scope of HESS? Yes
2. Does the paper present novel concepts, ideas, tools, or data? Yes
3. Are substantial conclusions reached? No
4. Are the scientific methods and assumptions valid and clearly outlined? Yes
5. Are the results sufficient to support the interpretations and conclusions? No
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes
8. Does the title clearly reflect the contents of the paper? Yes
9. Does the abstract provide a concise and complete summary? No, the results are not really presented (%uncertainty, deposition rate. . .)
10. Is the overall presentation well-structured and clear? No: mainly the Monte Carlo methodology.
11. Is the language fluent and precise? Yes, except at several sections identified below

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12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Yes. The paper need to be structured with a single method section, result section and discussion.

14. Are the number and quality of references appropriate? Yes

15. Is the amount and quality of supplementary material appropriate? Yes

Major comments

P326, L15: 3 samples are not enough to lead an uncertainty analysis. At least 10 - 20 samples are required to estimate SD.

P328, L14: A description of the Mekong drainage basin and a description of the economical/social issues of suspended sediment sedimentation in the MD floodplains are missing in the paper.

P331, L24: What is the dimension of the trap when installed on the field? Always 30*30cm ?

P332, L6: 3 samples are not enough to lead a statistical analysis.

P332, L16: what is the dimension of the bowl-shape sampler when installed in the field (Fig 4)? It is important to estimate as it will govern your final estimation of sediment deposition rate. Furthermore, what are the variations of the bowl-shape sampler surface with the sediment quantity deposited in the sampler during a flood? It will be probably not the same with few grams of sediment and 2000 grams (range found at Fig 4).

Fig 3: Idem. The horizontal trapping surface may decrease with an increase of the sediment quantity and sediment density (size). Did you take this process into account in your final estimates and uncertainty analysis?

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P333, L15: More information is required about your lab. techniques and methodology (method, temp., duration. . .).

P334, L5-10: Do you think that a dry and compacted sediment sample with large aggregates that was pull out in water can be re-suspended as easily as “natural” suspended sediment deposited in rivers? What is the duration of the experiment?

Fig 6: The number of experimental plots is not enough. Sediment samples are not homogeneously distributed (dry sediment). You need the same number of replicates for each range of dry sediment mass. Furthermore, you can simplify this Fig; why using linear and exp. models. Please simplify this fig.

P335, L20: the continuity between your two equations is not verified. It is a mathematical problem.

P336, L4: What about the remobilisation of sediment during the flood event (i.e. influence of the local velocity)? You should discuss this point.

P336, L20: SD and mean estimated with 2 or 3 samples is not relevant at all (see previous discussion).

P337, L20 and Fig 7: the MC methodological framework is not clear for me. You need to simplify your analysis and explanations.

P337, L25: all this section is not easy to read and to understand.

P338, L17: I don't understand what you've done.

P339, L10: Idem, the methodology needs to be clarified.

P339, L20: What is your methodology for grain size measurements (laser?)? This measurement also introduces important bias (methodology for resampling? aggregated grain size?).

Fig 8: I'm not convinced by this relation. It looks highly variable. What is the p-value of

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the fit?

P338, L4: “MC sampling of single trap data taking the measured value as mean, based on the assumption that the measurement value is a good estimator of the (unknown) cluster mean. Single trap SD is derived from the SDs and the means of cluster traps by: “ This assumption is not correct when you lead a statistical analysis. You cannot use this relation to estimate CV for single sampling point and next introduce it in your MC analysis as it was a result from replicates. You should only use cluster traps (with more than 3) and simplify your analysis.

Minor comments

P326, L19: Please give your estimation of uncertainty and sedimentation rates (mean and variability) in the abstract.

P327, L5: Provide a reference

P327, L15: Explain why studying floodplain sedimentation (with references).

P327, L22: rather “systematic”

P328, L14: Provide references.

P329, L8: “during” rather than “around”

P329, L16: “based on”

P329, L23: A proposition: 1. Floodplain topography =>control the hydraulic patterns
2. Flood magnitude/duration 3. Suspended sediment concentration 4. Downstream water level height (tide?) 5. Dikes, hydraulic structures, irrigation channels 6. Human activities (fishing..)

P330, L8-15: move it in the method Section

P330, L26: Problem with this sentence

P333, L4-11: Result section

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P334, L28: “These findings imply . . .” I don’t understand why.

P335, L14: “an exponential behavior” you can provide details.

Fig 1: larger figure required or 2 fig.

Fig 2: idem

Fig 4, Fig 5: too small; do not use a line for the mean. There is not dependence between samples.

Fig 7: Work flow is not very clear.

Fig 9 and 10: give only one title to the fig.

Fig 11 and 12: not usefull

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