

Interactive comment on “Large-scale quantification of suspended sediment transport and deposition in the Mekong Delta” by N. V. Manh et al.

Anonymous Referee #2

Received and published: 13 May 2014

General Comment

A fairly extensive modeling effort has been presented in this paper to develop a sediment budget (of a sort) for the MD. For the paper to become worthy of publication a significant amount restructuring and some additional explanation of cohesive sediment transport is required. The grammar is below par; please have an English speaker redo the language. I have suggested some corrections (and likely missed many) up to p. 4320 as a guide.

Restructuring

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1. The manuscript is a bit too long. The initial description of the hydraulic system is quite interesting but perhaps too detailed; the simple model is not quite capable of simulating the system to the extent described. Include description that is mainly relevant to the model.

2. The focus should be limited to sediment; the nutrient bit is best described elsewhere, since in any case it is not covered well. Please delete all references to nutrient transport.

3. In results and analysis, describe hydraulics first then describe sediment transport. To avoid confusion do not leap-frog as far as possible. Sediment transport

1. My main concern is that even though the paper is about sediment, it is not described adequately, and I believe there are major errors in the description as well.

2. Equation (2) is a bit confusing. If k is not independent of C , why is it defined as a seeming constant?

3. When flocs are free-settling it means that they do not experience hindrance, which occurs at high values of C .

4. Free-settling of flocs is not quite related to the settling of dispersed (i.e. deflocculated) particles. Dispersed clay particles do not settle well, or settle at all, and are usually (and appropriately) ignored in cohesive sediment transport modeling. I do not believe W_0 is the settling velocity of dispersed particles; it is the settling velocity of free-settling flocs described by Stokes law.

5. The sediment is described as clay or silt based (correctly) on the dispersed (deflocculated) size. However, flocs typically contain both clay and silt particles, and floc densities are considerably lower than material (mineral) densities. For inorganic materials “clay” indicates a particular type of crystalline mineral considered to be below 2 microns. Silt particles by themselves are not very cohesive. So please include a brief discussion of why you feel a single equation with a single set of coefficients is ade-

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quate to describe the settling of a heterogeneous particle population. Justify by using appropriate citations.

6. At one point erosion shear stress is mentioned. However, the erosion function is not defined.

7. If you keep the critical shear stress for erosion high, when the bed shear stress is above the critical deposition shear stress, you get neither erosion nor deposition. What in your view does this mean in the modeling and how realistic it is? Should we just take the word of the specific model manual and accept it? Did you consider the critical deposition shear stress as well to have a large value and permit deposition over the entire range of bed shear stresses?

8. You have given W_s and D values. What values of mineral density and floc density would you use to relate one to the other?

9. Only partial justification has been provided for parametric values listed in Table 1. In every case include a citation for the value, or mention model-based calibration, whichever it may be.

Minor comments

10. Use of SSC and C for the same quantity is confusing.

11. Total sediment load (e.g. Table 3) implies the sum of bed load and suspended load. I believe in your case it is really total suspended load only.

12. ρ is used both for water density and a correlation coefficient. Who is Spearman? The maps look smudged due to too many details. Try to cut down the number of drawings.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/11/C1374/2014/hessd-11-C1374-2014-supplement.pdf>

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