

Interactive comment on “Sediment yield model implementation based on check dam infill stratigraphy in a semiarid Mediterranean catchment” by G. Bussi et al.

Anonymous Referee #2

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This paper presents an elegant modelling exercise made using a distributed hydrological and sediment transport model. The hydrological part of the model was calibrated in a nearly usual way, whereas the sediment part was calibrated using the volume of sediment trapped in a check dam with the help of a trapping efficiency model. The hydrological simulation was validated in a usual way, whereas the sediment simulation was to some extent validated using the comparison of the main simulated transport events with the main sediment deposition events identified in the sediment body.

General comments

The paper is in general well written, scientifically correct and follows the standards

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for its publication in a scientific journal. Nevertheless, there is no obvious advance in the knowledge after this exercise, as all the relevant information was obtained without the need of the model and there is no feedback for rejection or improvement of model structure or parameterisation. The manuscript just presents a successful deterministic modelling exercise, so it seems more a brochure than a paper for a scientific journal. The discussion, imbedded with the results, is focussed to diverse aspects of the data and model implementation, but there is no the real critical analysis of the modelling exercise.

One of the main conclusions of the paper is the low sediment yield rate obtained in the test basin, but this rate could be obtained, as stated by the authors, in a much easier way by a mass balance calculation with the help of a simple sediment trapping efficiency equation.

A similar objection can be made respect to the adequacy of the model to simulate the main deposition events in the dam, once calibrated with the total sediment volume. A much simpler (lumped) model might provide similar results without the need for such a complex distributed model which needs maps of model parameters that must be inferred from limited information.

For instance, a more interesting exercise would be a real predictive one: after the calibration of the hydrological part of the model, a ‘blind’ validation exercise might be performed for the sediment part, using sediment parameters obtained without calibration. Another possibility would be the comparison of the model results with those obtained with much simpler methods...

Anyway, the authors should be more critical with their exercise for the manuscript deserving publication in HESS. The value of the work does not depend on the success of the model implementation, as an unsuccessful implementation might be much more illustrative if the reasons for the failure were identified.

Detailed comments

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English style: There are a few scattered grammatical errors in the text. The past tense is not always used for verbs when the results are described. In some phrases there is no sufficient distinction between facts and assumptions.

Abstract: It is unclear that distributed models may facilitate the 'comprehension' of the soil loss and sediment transport phenomena. The ephemeral behaviour of the basin does not need any 'confirmation' by the modelling results.

Introduction: The review of the use of reservoir deposits for sediment yield studies is somewhat wordy, but the citations for the early works since the 1950s are lacking (the Brune and Brown equations provide a proof of these activities).

Hydrological calibration and validation: The text is confusing respect to the calibration, as it is stated first that this was made using a single event in October 2000 and then between October 200 and October 2003. This part should be improved and preferably moved to the methods section.

Sediment sub-model calibration and validation: Pag 3433, lin10: STEP is suspect not reproducing...

Sediment yield: the annual flow of 2.05 Mm³ seems to be actually 2.05 Hm³

Acknowledgements: The origin of the data, if it is not from the authors institutions, should be preferably stated.

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