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Interactive comment on "Opportunities from low-resolution modelling of river morphology in remote parts of the world" *by* M. Nones et al.

M. Nones et al.

michael.nones@unibo.it

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Dear Referee,

Thank you for your helpful comments on the manuscript. We appreciate your feedback and have accounted for your suggested corrections into the text.

The intent of our paper was to describe two applications of the 1-D LUFM model. For this reason we propose only a minimal description of the mathematical background. As reported in our comment of November, 12, we will try to expand the description of the model reported in Section 3.

The calibration of the model's parameter (namely, alfa and m, and the relative parameters n, p, q) was reported in Di Silvio, 2004 and in two Ph.D. Theses. In detail, the

calibration of the Zambezi's parameters is reported in the work made by Ronco, 2008 (http://paduaresearch.cab.unipd.it/625/), while the calibration for the Parana was reported in the thesis made by Nones, 2012 (http://paduaresearch.cab.unipd.it/4468/). These two works explain the calibration and validation method, and also the sensitivity of the model to the parameters.

The computation of the model scales (i.e., the duration of the evolution windows and the size of the morphological boxes) depend on the velocity of the current and the geometry of the channel (expressed by the Froude number) and on the duration of a typical flood event. The mathematical background of this aspect and a sensitivity analysis was reported in Fasolato et al., 2011.

With regards to the Zambezi River, this manuscript reports only a qualitative analysis, because of the principal aim of the paper was to highlight the capability of the LUFM model to represent the morphological evolution of river due to anthropogenic and natural constraints. A thorough description of the Zambezi's evolution during the 20th century, also with a lot of graphical representation of the modeled processes, was reported in Nones et al., 2013.

In Figure 4a we have reported a comparison between the computed sediment transport along the Zambezi River and the measured delta area, taken form seven satellite images. It is possible to observe a huge decrease of the transport along the river after the construction of the Cahora Bassa Dam. The reduction of the sediment feed to the delta causes a delayed reduction in its extension. Even if it is unquestionable that these variations do not depend only by the sediment yield pattern of the Zambezi, it could be interesting and useful to compare the delta area evolution to the total sediment supply computed by the LUFM model. The computed reduction of the transport was due to the effect of the Cahora Bassa Dam on the transport (the impoundment entraps around the 50% of the sediments) and also to the total annual runoff, which decreases of around 60% (Nones et al., 2013). The time-scale used in our analysis may be not representative of the local evolution of the delta area, because of we want to represent a long-term evolution of the river using averaged input data.

Reference

Di Silvio G.: Review of state-of-the-art research on erosion and sediment dynamics from catchment to coast (a Northern perspective. Meeting of the Task Force Group of ISI (International Sediment Initiative) of UNESCO-IHP (technical report), Paris, France, 2004

Nones M., Ronco P., Di Silvio G.: Modelling the impact of large impoundments on the Lower Zambezi River. Int. Journal of River Basin Management 11(2), 221-236, 2013.

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