

## ***Interactive comment on* “Sediment budget analysis of the Guayas River using a process-based model” by P. D. Barrera Crespo et al.**

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Received and published: 16 November 2018

Dear Authors;

Last week I read with great interest your work on the sediment budget analysis of the Guaya River system. You applied a process-based model to derive a sediment budget in a data scarce environment. The modeling steps you take are somewhat crude. Still I like the approach since it make use of the capacity of process-based models to understand and describe system dynamics, even without much data.

Pls consider my minor comments in the attached document; My major concerns are

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summarized below:

1) Your methodology is as follows . 1-derive a 'realistic' bathymetry starting from a flat bed. 2- validate hydrodynamics-sediment dynamics and morphodynamics. 3- evaluate model results and scenarios. Update your methodology section so that it reads like this (especially wrt the morphodynamic validation) 2) At page 17 , line 7-8 you state that the resulting bed levels are validated against data. I think this is crucial and should be mentioned much earlier, eg in chapter 3. Also answer questions like; How realistic is the generated bed? Did you start from a flat bed ? How did you determine the initial bed level? What is the impact of a different initial bed level, eg on the water level bias? Was the generated bed in equilibrium? How long did that take? 3) You relate the outcome of the scenarios to tidal asymmetry, but why not show that in terms of ebb/flood duration or changing Stokes' return flow (eg see Van der Wegen et al 2008 and refs therein)? 4) As you admitted the EH transport is not really suitable for finer sediments. Even more, density driven (salt-fresh) flows may have considerable impact as well even on both fine and coarse sediments (see Effects of Density-Driven Flows on the Long-Term Morphodynamic Evolution of Funnel-Shaped Estuaries Maitane Olabarrieta W. Rockwell Geyer Giovanni Coco Carl T. Friedrichs Zhendong Cao doi:10.1029/2017JF004527). That make your conclusions vulnerable; pls discuss 4) Because of the many crude assumptions (still, necessarily taken), related to , waves, sediment size, tidal movement density flows etc. you should present the results more as indicative in the abstract and conclusions.

I hope you consider the above comments an encouragement to adjust the work. I am looking forward to an update

Mick van der Wegen

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-467/hess-2018-467-RC1-supplement.pdf>

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-467>, 2018.

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