Review of Numerical modelling landscape and sediment flux response to precipitation rate change, by Armitage et al

This paper deals with the response of sedimentary systems to sudden increase or decrease in precipitation rate, in terms of timing and magnitude. Starting from the very basic equations of sediment transport, the authors derive two equations that are solve numerically. These equations represent two end-members of the expected dynamics of sedimentary systems. One considers that sediments are immediately evacuated once produced (this is the stream power equation) and the other one considers that there is always some sediments (this is the transport model). The authors explore the response of these two models in terms of sediment flux. They show some differences in terms of magnitude and timing and propose an interesting discussion with respect to natural examples (stratigraphic series associated with the PETM in Spain and in the US).

The authors have seriously taken into consideration the comments and suggestions of the first reviews and the manuscript has been greatly improved. The paper is better organized and discussions of the natural cases are much more robust. However, the manuscript could benefit from some clarifications that I propose below. In addition, typos and inconsistencies in names or convention are found throughout the manuscript. Considering that it should not be an issue to tackle these comments, I recommend accepted with minor revisions.

p 5 l 13-20 and p 17 l2 The definition of Qw is unclear, especially compared to the other equation given p 17. Why do you include a width coefficient ? Why do you use two different expressions and how are they related ?

p 6 l 26 consider adding a comment on the implications of this difference (in the context of this work or in general)

p 8 l 4 the reason for co-variation of the parameters is very clear, but a few words on the choice of the values would be welcome (here or later in the manuscript when you give the values)

p 9 l 5-7, table 1, p 17 l 19 and appendix: theta is named the slope area exponent (p9, Table 1) or the concavity (p17) or the gradient (p10 l 10) and it is given first in negative and then in positive value. For clarity, please use the same convention.

section 3.1 a few words about why the sediment flux responds in this manner (increase or decrease and then back to previous steady state value) would help readers that are not familiar with such models.

p 15 l 9-10 this sentence is a bit strange here because you have already mentioned differences between the two models.

p 17 l 1 is it possible that there is also a dependency with the uplift rate, which is not explored and therefore not seen in this work ?

p 20 l 9 «even accounting for drainage area» this is not clear

p 24 you use deposition as a proxy for erosion. This is a required approximation when working on the sedimentary archives as a proxy for relief evolution. However, deposition is not directly equivalent to sediment flux and there are some underlying hypothesis that should at least be mentioned, if possible discussed (ie, sediment partitioning along the sedimentary and its potential evolution with climatic perturbation).

p 25 l 12-13 I understand the point of this sentence is to highlight the very high sediment flux at the time of Claret deposition but Maastrichtian to end Palaeocene is ~20 Myrs. Your simulations show

that the sediment flux goes back to «normal» value in ~1 My. This sentence appears quite inappropriate and does not support your work.

Minor comments

Subfigure labels a and b are in or out of the figures. This could be harmonized.
For some figures, using the same vertical axis would help to ease the visualization of the difference between the two models

Figure 12 missing inbox caption in subfigure b (although we can assume it is equivalent to subfigure a)

p 3 l 10, p 7 l 9, p 7 l 22 this work explore only precipitations perturbations

Some typos throughout the manuscript, here are the ones I noticed. The authors should check the text very carefully before final submission:

Abstract (2) and (3) within any (1)
use Equation or equation
p 5 l1 k not defined
p 5 l15 h for the Hack exponent -> h is also the sediment thickness
p 6 l19 qw is already defined
p 8 l 1 lienar
p 9 l 8 extra ( )
p 10 l 7 withn
p 10 l 9 realtionship
p 12 caption precipaiton
p 12 l 10 resonable
p13 l 4 cathcment
p 13 l 10 decease
p 13 l18 : The
p 13 l 5 responce
p 17 extra ,
p 20 caption respectfully X2
p 21 l 8 extra a
p 26 l4 Figure 9 (not 10)
p 24 l 17 1 Myrs