Review of 'Topographical changes caused by moderate and small floods in gravelly ephemeral river – 2D morphodynamic simulation approach'

Earth Surface Dynamics – Lotsari et al., 2017

Overview

This paper uses a 2D morphodynamic model to assess the impact of small and moderate floods on the evolution of ephemeral rivers. This is an interesting topic which will be of use to the wider community however in its present form I do not think it is suitable for publication. The authors spend over half of the paper describing the model set up and calibration and do not really address the original question. Given a lot of the model inputs were from a previously published paper a lot of the rather dense description could be cut from the paper to allow more time for a detailed analysis of the impacts of flood characteristics. There is also little time devoted to discussing the applicability of this model to scenarios other than the very detailed description in the paper for which there is good input boundary data. Detailed comments and queries are below which the authors needs to address if this paper is to be published.

Page 2 Line 4 – I would query the word greatest and authors should consider an alternative

Page 2 – Line 19-21 – three papers might be worth reviewing – although not on the context of ephemeral rivers they give useful context

Viparelli et al (2011) 'A model to predict the evolution of a gravel bed river under an imposed cyclic hydrograph and its application to the Trinity River' WRR

An et al (2017) 'Gravel-bed river evolution in earthquake-prone regions subject to cycled hydrographs and repeated sediment pulses' ESPL

An et al (2017) 'Effect of grain sorting on gravel bed river evolution subject to cycle d hydrographs: Bed load sheets and breakdown of the hydrograph boundary layer' JGR ES

Page 2 Line 30 – when you say between and after flood topographies do you mean pre and post flood topographies?

Page 3 Line 12 – use alternative phrasing for high/ large floods

Page 3 Line 12/13 – the sentence beginning in addition does not make grammatical sense

Page 3 Line 25/ 26 – consider 'The river has a braided pattern associated with a high sediment supply' instead of current wording

Page 4 Line 15 – how far away was the gauging station from the study site?

Page 4 Line 15 – you say the discharges at the field site were estimated to be higher but how much? How did you estimate this?

Page 6 Lines 9-15 - you have assumed that the discharge between the gauging station and the reach is increasing but that the hydrograph shape remains the same but how is this so? This has important implications for the validity of the calibration of your model. Much more detail is needed to justify this assumption

Page 6 Lines 17-22 – you have assumed that bed level has not changed when you have calibrated discharge to water levels – how valid is this assumption?

Figure 3- it is unclear how this relates – more detailed description needed

Page 8 Lines 15 – 21 better justification is needed of cell sizes – e.eg what do you mean 'did not make more difference to the results'?

Page 8 Line 25 – MSL or MLS?

Page 9 – if the water level did not reach the high bank elevations why add that 2009 DEM results to the model – what does it add?

Page 9 Line 16 -17 – what do you mean ' the capabilities of the model to result correct channel bed elevations'? This sentence needs restructuring.

Page 9 lines 16- 20 – the meaning of this section of text is unclear

Page 9 Line 30 – is this the difference between the armour and sub surface layer? What was the difference in the D84?

Page 13 – what do you mean 'best and most interesting results'? This surely needs justification? What do you deem best or most interesting?

Page 13 Lines 2-3 define better performance?

Figures 4-6 – it would have been useful to show the 'analysed area in context with the broader area studied

Page 19 line 4 – ok so how many model runs are now relevant?

Page 19 Line 19 – should be satisfactory

Page 19 Lines 6 – 19 – would these plots have been better as hysteresis type plots so plotting Q against volumetric changes in bedload? You have not discussed hysteresis at all? The same comments apply for section 4.2.2

Figure 7 – you need axis labels, especially for the Y axis- what is it showing?

Page 22 – what do you mean reliable? How useful is it for predicting other events/ scenarios?

Page 23 Lines 1-4 – you definitely need to discuss the applicability of this model to other events a and need to discuss the limitations of this approach!!!

Page 23 Line 10 – did you really know the hydrograph shape?

Page 25 Lines 17-18 – have you considered how the role of the changing surface structure could be incorporated into the model as this has been shown to have significant impacts in transport rates?