Earth Surf. Dynam. Discuss., 3, C460–C462, 2015
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Earth Surface Dynamics Discussions
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Interactive comment on "Perspective – synthetic DEMs: a vital underpinning for the quantitative future of landform analysis?" *by* J. K. Hillier et al.

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Received and published: 23 November 2015

We thank Jon Pelletier, Ian Evans and an anonymous reviewer for their fair yet rigorous comments on our submitted manuscript; for ease we refer to them by number i.e., [R1], [R2], and [R3] respectively. We have addressed each of the reviewers' comments, as detailed in the attached pdf (includes manuscript with changes tracked) and summarized below.

Summary of reviewers' comments,

Overall, the reviewers' comments [R1-3] were positive, agreeing with us that synthetic DEMs (i.e., generated landscapes including idealized geometries or the consequences of analytical solutions to governing PDEs) should be encouraged as a tool to enhance

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the rigor of our analyses of landscapes. They also found our attempt to draw from experience in a wide range of fields useful [R1-3].

In addition, R1 felt that the main message could be clearer; i.e. synthetic DEMs have the potential to add rigor to key parts of the (in)validation of geomorphological theories by comparison to real landscapes. R2 suggested that the typology might be expanded or refined, and that the impression should not be given that tests with synthetics should not replace those against reality. This last point was also made by R3, who requested some additions.

Our response and related changes to the manuscript

We have connected this work to the wider literature on model validation, as suggested by R1, although given the vast size of this literature (as noted by R1) we are limited to touching upon the key points. Fig. 2 has been completely revised, consistent with the wishes of R2, and a paragraph has been added to the start of the introduction.

We have re-ordered the abstract, rephrasing where necessary to reflect this broader context and also to convey the key message of the paper more clearly along the lines suggested by R1. This is followed through into the text, for instance re-ordering the end of section 2.

We have also used the revision to Fig. 2 (now new Fig. 1) to clarify the message of the paper by placing different conceptions of what might be considered a synthetic DEM into context. Furthermore, whilst doing this, we realised that a DEM measured from laboratory experiment could also readily be considered a synthetic DEM; at least, the arguments we put forward needed virtually no modification to encompass this addition.

In making these corrections, and modifying Fig. 2, we hope that it is now clear that we are not advocating analyses with synthetic DEMs as an alternative to measurements of real landscapes; indeed we see synthetic test as a means to more robustly validate concepts through establishing if they reproduce real-world observations.

ESurfD

3, C460–C462, 2015

We have added a Fig. 7 in response to a request by R3.

We have also made changes to account for all the detailed points made by the reviewers.

Please also note the supplement to this comment:
http://www.earth-surf-dynam-discuss.net/3/C460/2015/esurfd-3-C460-2015-supplement.pdf

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Interactive comment on Earth Surf. Dynam. Discuss., 3, 601, 2015.