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Earth Surface Dynamics Discussions

Interactive comment on "Perspective – synthetic DEMs: a vital underpinning for the quantitative future of landform analysis?" *by* J. K. Hillier et al.

Anonymous Referee #3

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This paper provides an interesting perspective on the use of synthetic DEMs; it introduces the concept of using synthetic DEMs for geomorphology, provides a range of examples from different areas of geomorphology and highlights the role of synthetic DEMs in improving process understanding. I really enjoyed the paper and think that it raised some interesting points and feel that this would make a valuable contribution to ESurf, however some further expansion on some of the points that were introduced in the paper is required.

1. Can you quantify the error difference between observational measurements and synthetic hybrid DEM generation? Each of these have inherent errors within the measurement/computations that are the result of the method used rather than the noise and it would be useful to highlight this in the article.

2. What about the importance of initial and boundary conditions? These will influence the generation of the DEM whether it is synthetic or based on observational data, and for process understanding it is important to state the influence that these will potentially have.

3. The comparison between the synthetic DEMs and LEMs was touched upon but this could be expanded further with further elucidation of the methods that were used to compare accuracy. Also, although the representation of LEMs is improving, I still do not feel that you can fully test the replicability of synthetic DEMs without drawing on observational measurements from nature; again this was mentioned but more discussion could be centred around this and what impact the simplifications made in LEMs and to some extent synthetic DEMs will affect the resultant DEM and its 'representativeness'.

4. "Hybrid DEMs" – a figure would be useful showing the DEMs produced and comparison of these with those in nature, so that the reader can visually compare and evaluate the difference between the DEMs produced from real/simple/LEM/hybrid simulations.

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