

Interactive comment on “Evolutionary geomorphology: thresholds and nonlinearity in landform response to environmental change” by J. D. Phillips

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1. Does the paper address relevant scientific questions within the scope of HESS?

Yes. The issue of thresholds and nonlinearity of earth systems is an increasingly important topic of interest in the earth sciences in general and for geomorphology and hydrology, specifically.

2. Does the paper present novel concepts, ideas, tools, or data?

This paper presents succinct and compelling arguments for the practice of evolutionary geomorphology, recognizing that many pathways of landform and landscape evolution

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are possible and are contingent on history and geography. The paper also argues that the applications of nonlinear and complex systems analysis have evolved within the field of geomorphology itself in addition to elsewhere (i.e. not just borrowed from systems theory). In this sense, the paper provides an important synthesis of preceding work. The paper advocates a phenomenological approach into which local details are embedded. Certainly, this commentary contributes to ongoing discussions on how to conceptualize and model earth systems, be they geomorphological, hydrological or other. In many of the earth sciences, we continue to struggle with these ideas as we look for alternative model forms to incorporate nonlinear and threshold behavior. I think the author contributes a strong vision and proposed direction forward for the geomorphology and earth sciences community.

3. Are substantial conclusions reached?

See comment in 2.

4. Are the scientific methods and assumptions valid and clearly outlined?

Yes. Please see comments 2., 5. and 13.

5. Are the results sufficient to support the interpretations and conclusions?

Yes. The author presents a well supported argument with strong reference to the existing literature.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

Not applicable (see question 13. for additional comments).

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

The paper is very well referenced.

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Comment: page 376, line 27. “Chaos detection methods are discussed in a separate paper”. Would the author like to refer to a reference here? Otherwise, change this sentence to “Chaos detection methods are not discussed in this manuscript’.

8. Does the title clearly reflect the contents of the paper?

Yes.

9. Does the abstract provide a concise and complete summary?

Yes.

10. Is the overall presentation well structured and clear?

Yes.

11. Is the language fluent and precise?

Yes, the paper is very well and clearly written. I have provided a few comments on some grammatical/spelling changes below. Detailed comments: page 366, line 28. Change ‘with’ to ‘which’ Page 367, line 1: change ‘rather’ to ‘rather’ Page 368, line 20: change ‘protrayed’ to ‘portrayed’. Page 378, line 11: change ‘focussed’ to ‘focused’ Page 381, line 19: change ‘We make seek’ to ‘We may seek’ Page 382, line 22: Sentence that begins with “The dominant processes concept (DPC) is a recognition...”. This sentence is awkward and loses meaning after this first comma...”along with field observations that often only a few processes dominate hydrological response in any watershed...”. I suggest reworking this sentence.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

Yes.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

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I think the ideas presented in this paper would benefit greatly from more in depth discussion of the two examples provided in section 5.1. Currently, these two examples presented as illustration of the advocated approach are extremely brief. I think this is an important weakness of the paper. A strong connection between the ideas presented here and actual field experimentation would create a fantastic link between the more theoretical and field-based scientists. As an alternative to more in depth discussion of the examples, this paper could stand at the beginning of a special journal issue on thresholds and nonlinearity in the earth sciences or geomorphology, specifically followed by detailed studies that exemplify the authors approach. This might be most beneficial to readers, providing both an overview commentary and strong examples of how these ideas are currently being implemented when dealing with actual field experimentation. In Figure 2, the four different variables (width, depth, slope and roughness) are not clear in the current black and white version of the figure.

14. Are the number and quality of references appropriate?

Yes.

15. Is the amount and quality of supplementary material appropriate?

No supplemental information is provided or needed.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 365, 2006.

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