Geosci. Model Dev. Discuss., 7, C703–C704, 2014
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Interactive comment on "A cusp catastrophe model for alluvial channel regime and classification of channel patterns" *by* Y. Xiao et al.

Anonymous Referee #2

Received and published: 2 June 2014

The paper describes the use of catastrophe theory to discriminate between alluvial channel forms. Although I am eager to learn of new and unique approaches to fluvial geomorphology, the effort presented by the authors is too poorly written to allow an adequate assessment of its quality or novelty. Without an appropriate introduction into how cusp catastrophe theory can help inform understanding of river dynamics in ways that other methods or approaches can not, the average reader will struggle to appreciate what new can be learned from this. Further, the authors fail to convince the reader of their understanding of fluvial geomorphology. No synthesis of the science problem is offered, and the authors fail to provide any physical basis of statements and equations that seem integral to their work. For instance, the authors suggest that rivers with a sinuosity greater than 1.5 are braided, whereas rivers with a sinuosity less than this are meandering. This is profoundly incorrect. Further, Eqs. (3) and (4), which describe

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riverbed stability, form the framework of the analysis, but no explanations are provided of their form or derivation. Without a clear integration with existing river theory, I see no way for the current work to advance understanding or be of interest to the international river community. As a result, I recommend the work to be rejected for publication by Geoscientific Model Development, but encourage the authors to redevelop their efforts to both utilize and clearly advance river theory.

Interactive comment on Geosci. Model Dev. Discuss., 7, 1477, 2014.