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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 #1

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The authors combine two parameters from Ning Chien in Eqs 3-4. One essentially rewrites the inverse of the Shields parameter and the second describes the channel width. It is worth noting that the second parameter is not even dimensionally correct. There is actually no rationale to use a = b = 0.5 in Eqs. 5 and 6, except for reducing the variability in the data.

The main result of this article is a set of two-parameter combinations in Eqs 18-20. With the identity Q = BhV where B is the width, h is the depth and V = Q/Bh is the flow velocity, the combinations describe velocity as power functions of flow depth, slope, grain size and width/depth ratios. The authors thus found a long path to reinvent something we all knew and that the authors did not introduce upfront in their analysis: resistance to flow equations. As we all know, the width/depth ratio B/h does separate meandering

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channels from braided channels. So, we have gained the grand illusion of rediscovering something that has been hidden all along: resistance to flow.

The title is misleading and this article should not get published. The true cusp catastrophe is to let mathematicians work out fancy algorithms to explain physical problems they do not understand.

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