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Hydrology and Earth System Sciences
Discussions

Interactive comment on "A comparison of the modern Lie scaling method to classical scaling techniques" *by* J. Polsinelli and M. L. Kavvas

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The comments made by Dr. Haltas were found to be helpful for clarifying the language of the paper, providing relevant references to facilitate understanding of the vital issues, and correcting inconsistencies / mistakes in the original article. Specifically:

Inclusion of the original work by Buckingham on the well known Buckingham Pi theorem is useful for providing readers with complete knowledge of the theorem and it's background and for giving the author due credit.

The article "Scale invariance and self-similarity in kinematic wave overland flow in space and time" is a relevant example of an application to the Lie group method to an important problem in hydrology and would be a good addition to this articles ref-

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erences. Similarly, the paper "Scaling and scale invariance of conservation laws in Reynolds transport theorem framework" is a fine example of Lie scaling.

Several comments suggested changes in the language of the paper to clarify the meaning and correct inconsistencies or mistakes (comments 3, 5, 6, 7, 8, 9). After reviewing these suggestions, I agree with Dr. Haltas' suggestions.

I agree that the statement in comment 10 "Preserving both kinematic and dynamic non dimensional groups was a choice that has substantially affected this analysis" should be clarified and explained.

I agree with comment 11 that a consistent form of the transformation should be used throughout the paper.

Comment 12 suggests that the statement "Also, the scaling of the 3-D system is similar to the scaling of the Dupuit approximation" should either be detailed and justified or removed. I am in favor of removing this comment since it is a simple exercise for the interested reader and adds very little to the analysis of this paper.

I agree with the last comment that in the literature and in practice the Froude and Reynolds numbers should be used as a parameter rather than the ratio of the numbers in the prototype and model.

I would like to thank Dr. Haltas for his consideration and insightful comments in reviewing this paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 10197, 2015.