

Interactive comment on “The era of Infiltration” by Keith Beven

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Thanks for the comments Fred and I am happy that you found it to be an interesting read!! Like Roger you point out the continuing requirement for methods for engineering applications, and that is actually why I do not agree that the era of infiltration is over. There are far too many models that are based on the idea that fast runoff production is produced by an infiltration excess mechanism (e.g all over a HRU in SWAT - perhaps the most widely used model in hydrology - based either on the CN or Green-Amp options with homogeneous parameters). I do think that this is worth pointing out as delusional - even if functionally such models can be calibrated to give "good fits" to hydrographs. But machine learning can do that too (indeed often somewhat better than hydrological models) so perhaps we should be moving more towards engineering methods that are more realistic in their process understanding. This was an opportunity to say so, given the often obvious misapplication of some infiltration based models.

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Your final comment on the lack of a general hydrologic theory is clearly related to this. Given the detailed complexity of hydrological systems, and our lack of observational capability in the subsurface, this is clearly a challenging problem and one that I have struggled with throughout my career (including, as you know, all the work on the limitations of Darcy-Richards and trying to represent preferential flows). I suspect that this might also be solved by machine learning (see my recent commentary on Deep Learning in Hydrological Processes at <https://onlinelibrary.wiley.com/doi/10.1002/hyp.13805>). In the meantime, however, we should at least try and avoid applying misconceptions - even for engineering applications!

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