

CC1: ['Comment on egusphere-2025-4424'](https://doi.org/10.5194/egusphere-2025-4424), Keith Beven, 30 Sep 2025

Great stuff and an impressive program of experimental sites but your pictures suggest that the trenches are only on straight slope sections. Convergence and divergence of topography can be really important in how the subsurface responds (e.g. Beven, K.J. (1978), 'The hydrological response of headwater and sideslope areas'. *Hydrological Sciences Bulletin*, 23(4), 419-437 - now nearly 50 years old!!) and changing connectivities to the stream, which might also depend on (preferential) connectivities in the bedrock (e.g. Scaini, A., Hissler, C., Fenicia, F., Juilleret, J., Iffly, J.F., Pfister, L. and Beven, K., 2018. Hillslope response to sprinkling and natural rainfall using velocity and celerity estimates in a slate-bedrock catchment. *Journal of Hydrology*, 558, pp.366-379).

So it will be very interesting to see, given such complicating factors, whether you can indeed "move beyond the uniqueness of place" - actually even in your 4 study catchments. Indeed, I wonder if that should be the aim at all, rather than actually accepting uniqueness of place and finding ways of embracing it in both analyses and models.

But good luck to the whole team for the programme - I shall very much look forward to seeing the results.

Keith Beven

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Response: Thank you so much for your encouraging words! We really appreciate this.

We fully agree that topographic convergence and divergence play a key role in controlling subsurface stormflow dynamics. Therefore, prior to trench installation, we conducted a GIS-based topographic analysis to quantify and compare potential subsurface flow volumes across possible hillslopes within the four catchments. To allow for a better comparability of the trench sites our selection of slopes we indeed mainly aimed at straight or only slightly convergent slopes. Only at one site was the slope slightly divergent and here no subsurface stormflow was so far captured at the trench.

We also very much agree with you on the importance of the highly variable hillslope-stream connectivity which is indeed often dominated by preferential flow paths. We try to assess the impact of topographic convergence/divergence and bedrock connectivity through complementary measurements (e.g., geophysics – longitudinal and transverse transects, distributed groundwater monitoring, and irrigation experiments) and by replicating across three slopes in each of the four contrasting catchments. This design aims to capture variability in connectivity and assess its influence on SSF. The issue of preferential flow is also something we will now be focusing on more strongly.

With this experimental setup we aim for insights that can be transferred to other catchments but also – if as you say we must indeed embrace the uniqueness of place – we furthermore aim to identify proxy measurements of SSF that can provide information on the dynamics and whether or not this process is important also in locations where trenches are not available.

We will mention these points in the revised manuscript.