Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-181-RC1, 2020
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Hydrology and Earth System Sciences
Discussions

# *Interactive comment on* "Predicting probabilities of streamflow intermittency across a temperate mesoscale catchment" *by* Nils H. Kaplan et al.

**Anonymous Referee #1**

Received and published: 24 June 2020

General comments:

In "Predicting probabilities of streamflow intermittency across a temperate mesoscale catchment," Kaplan et al. explain the local and accumulated catchment controls on flow intermittence along the flow network of the Attert catchment in Luxembourg. Using logistic regression models for annual as well as wet and dry periods, the authors evaluate the variable importance of land cover, road density, soil, geology, and terrain metrics in controlling flow intermittence. The authors use a unique, empirical high spatial and temporal dataset (Kaplan et al., 2019) to develop these models. The authors presentation of model results and discussion of implications and uncertainties is fairly robust but with several opportunities for enhancement prior to publication. In addition, there are grammatical and tense errors and inconsistency throughout, so the



manuscript needs detailed proofreading prior to publication. This study is an important scientific contribution with high scientific and presentation quality.

Specific comments:

- Introduction does a good job of describing prior work and science gaps in the field of hydrology relevant to studying drivers of intermittent flow occurrence as well as spatially mapping it. Good review of logistic regression approach for mapping streamflow presence and absence. - Introduction would benefit by discussion of how streamflow intermittence varies by stream order in arid vs humid locations - Authors asssert that climate variables constant throughout catchment, so the authors can focus on geological and pedologial factors, but is this proven? pointed to another paper Pfister et al. (2017) for major assertion that climate does not significantly vary across the catchment, better to include figure in paper showing this. - Discussion could benefit from greater synthesis on process-based logic behind the significance of certain variables being included in wet vs dry vs annual models - I appreciate that streamflow intermittence is not easy to predict. Perhaps including gridded estimates of precipitation at observed timesteps would help improve performance. I expect that this data is available. Could use precipitation on day of flow observation as well as 1 day prior , or 7-day antecedent precipitation for example. The current models of landscape / soil / geology variables are justified, but including climate could potentially improve performance substantially.

Technical comments:

- Instead of "permanent" term, suggest "perennial" throughout. Also use this instead of "continuous" - Provide additional information on the range in climatic conditions when virtual sites were visited and how exact locations were chosen - relative intermittency of streamflow Ir is analogous to more commonly used "no flow fraction" - Clarification of local and catchment variables needed in abstract - Better clarification in abstract of which variables important in which models (annual, wet, dry) - Final sentence of abstract: could suggest that the first step was the extensive monitoring that was

completed using a variety of sensors - Combine first two sentences of introduction - Figure 5, color bar legend does not match figure caption - First sentence of conclusion, highlight the novelty of this approach as compared to previous logistic regression approaches mentioned in intro - Conclusion a bit redundant with discussion, suggest focusing on key takeaways

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