This manuscript presents an innovative approach to the regionalization of the baseflow separation parameter *N* by bridging the gap between "black-box" machine learning and traditional physical hydrology. By utilizing Symbolic Regression (SR) across 855 catchments in the US, the authors successfully identified explicit and interpretable mathematical formulas that incorporate key catchment attributes such as drainage area, soil conductivity, and snow processes. The study is well-motivated, and the use of SEC for validation adds significant scientific rigor. While the work is technically sound and highly relevant to the community, there are several conceptual and methodological points that require clarification and revision before publication.

1. A major concern is the mathematical structure of F_2 and F_3, where catchment area (A) is directly added to saturated hydraulic conductivity (K_{sat}). Please clarify the physical or mathematical justification for adding variables with different dimensions and how this affects the transferability of the formulas across different unit systems
2. Why was a standard Genetic Programming-based SR approach chosen over more recent continuous search methods or grammar-based optimization, such as those discussed by Feigl et al. (2020)?
3. There is a mismatch in the units of K_{sat} between Table 1 (10^{-2} mm/h) and Figure 3 (cm/day). Please unify the units throughout the manuscript and figures for consistency.
4. Catchments with a KGE below 0.5 were excluded from the analysis. Please clarify if these excluded catchments belong to a specific hydrologic regime (e.g., arid or ephemeral streams), and discuss the potential limitations this imposes on the global applicability of your formulas.
5. You report an R^2 of 0.54 for SR versus 0.80 for RF. This is a substantial loss in predictive power. I request a more detailed discussion on whether the gain in interpretability justifies such a high "accuracy cost," particularly for practical water resource management applications.
6. In Section 5.2, the formulas indicate that N (flow event duration) increases with K_{sat}. Physically, higher soil conductivity often implies faster drainage. While you attribute this to a shift toward slower subsurface paths, please provide more quantitative evidence or literature support to explain why this "slowing" effect dominates over the expected increase in drainage efficiency.
7. Line 230, Performance is notably poor in HUC 12. Given that your input data includes reservoir storage, please clarify if the SMM method's fundamental assumption of "natural" baseflow is even applicable in these highly regulated and irrigated basins.

8. In Figure 3, the ten individual lines representing different cross-validation folds are extremely difficult to distinguish. Please improve the visualization to more clearly show the variance between folds.
9. The use of multiple hatching patterns and overlapping colors in Figure 7b results in a cluttered visual presentation that is difficult for the reader to interpret.