Supporting Information for "Evidence of subsurface control on the coevolution of hillslope morphology and runoff generation"

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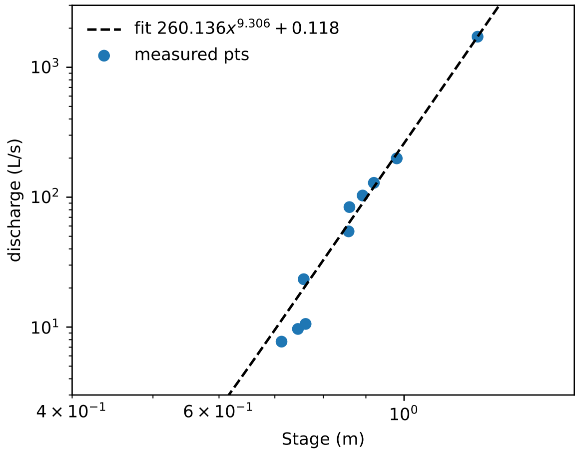

Figure S1. Rating curve for the Druids Run watershed, including measured discharge and the power law model.

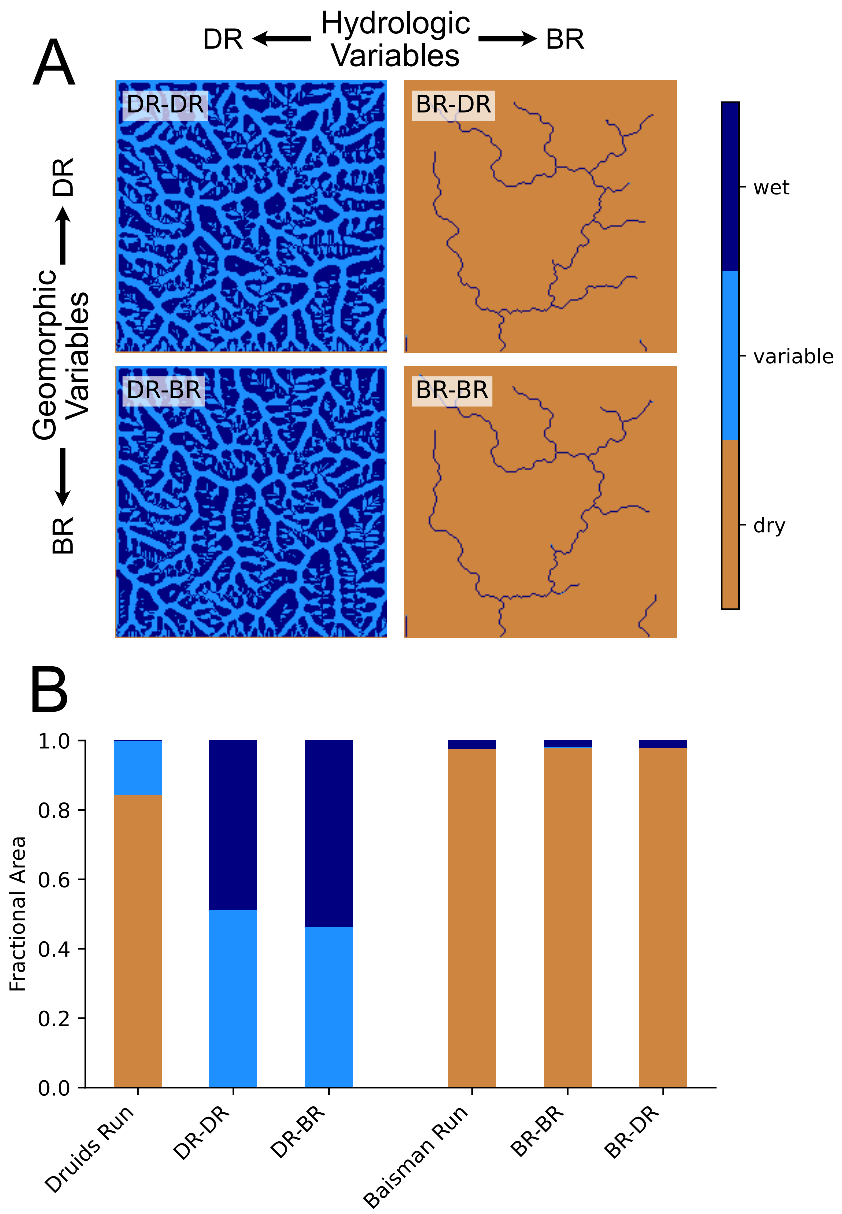

Figure S2. (A) Map view classified saturated areas for model results shown in Figure 14A, where $Q^*_{max} = 0.6$ was used to determine the erodibility for cases with Druids Run geomorphic variables. Saturated area behavior is not highly sensitive to swapped geomorphic variables, while it is sensitive to swapped hydrological variables. (B) Fractional area that is classified as wet, variable, and dry based on field data (labelled "Druids Run" and "Baisman Run") and the four modeled cases.

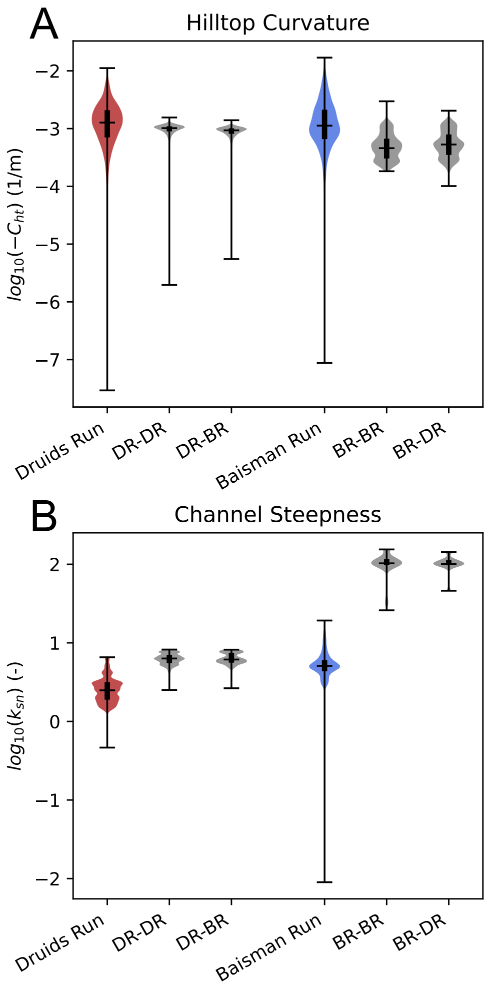

Figure S3. Violin plots showing distributions of hilltop curvature (A) and channel steepness (B). The results correspond to the updated runoff ratio cases, where DR-DR and BR-DR use Q^*_{max}=0.6 and BR-BR and DR-BR use Q^*_{max}=0.3. Modeled hilltop curvature shows good agreement with the sites, though it is slightly lower than true in BR-BR and BR-DR as the long hillslopes in these cases are still adjusting to baselevel. Channel steepness is substantially higher in modeled cases than true cases for the input value of K.