



Supplement of

Beyond Runoff Coefficient: Revealing Global Patterns of Process Connectivity in Runoff Generation through Intensity Integration

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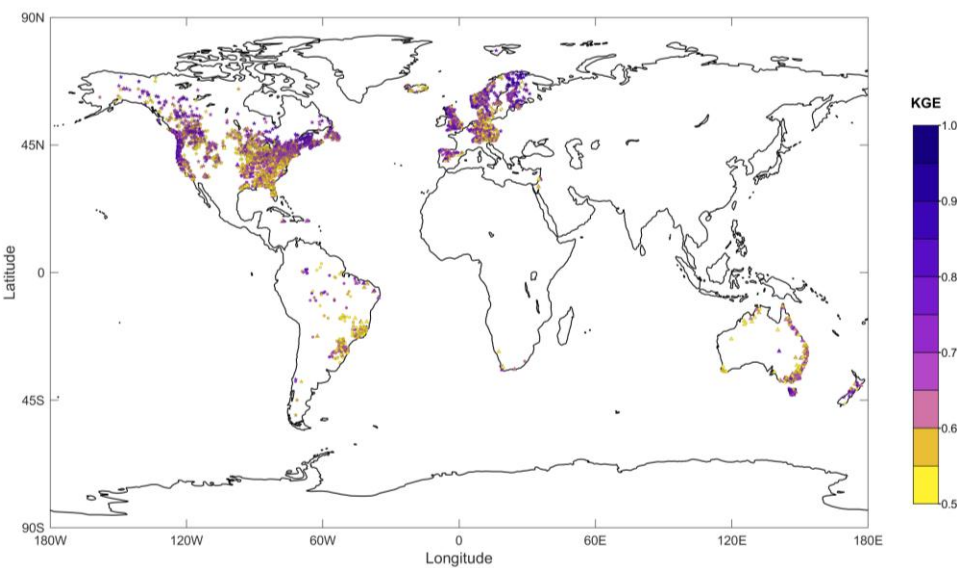


Figure S1. The spatial distribution of KGE values during the validation period for 6603 selected catchments.

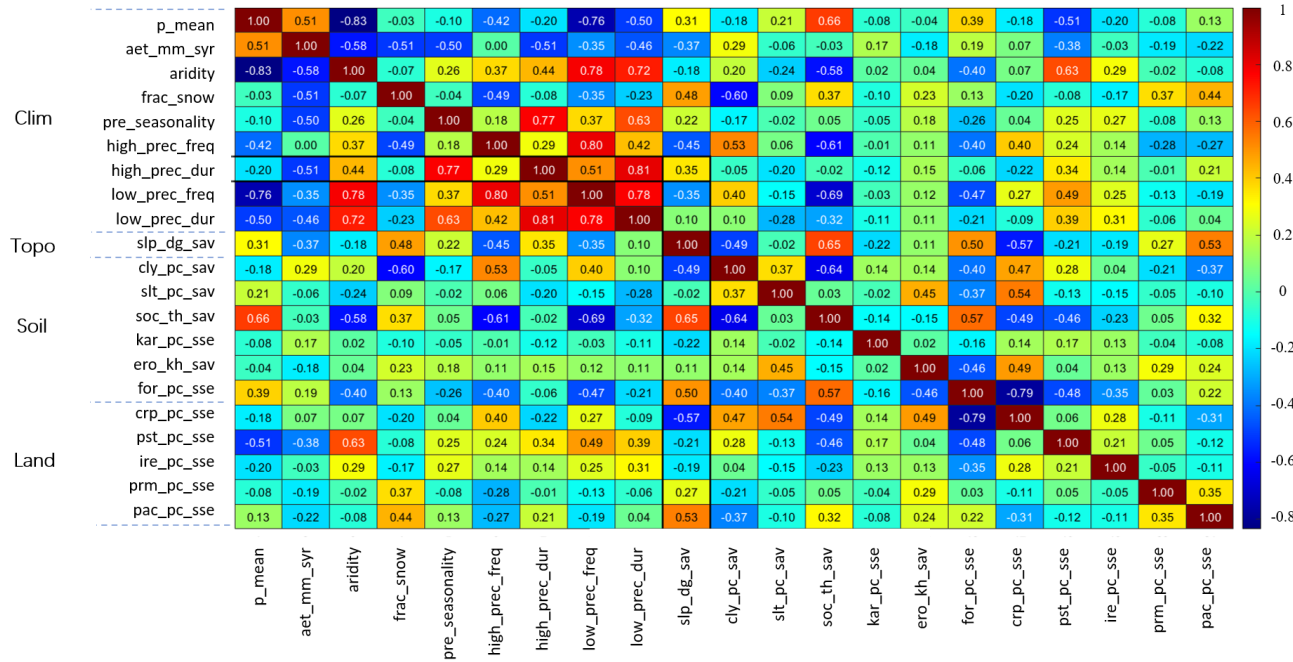


Figure S2. Pearson correlation coefficients for 21 selected catchment attributes.

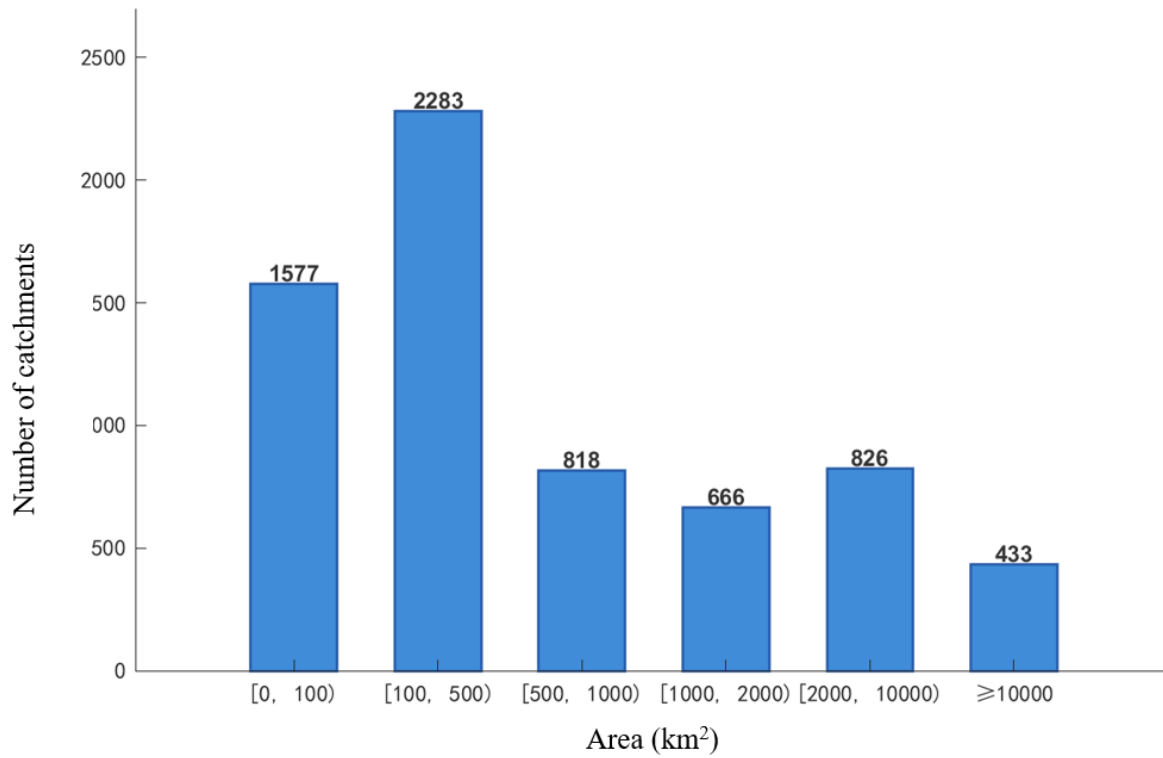


Figure S3. Distribution of the area of 6603 catchments for analysis.

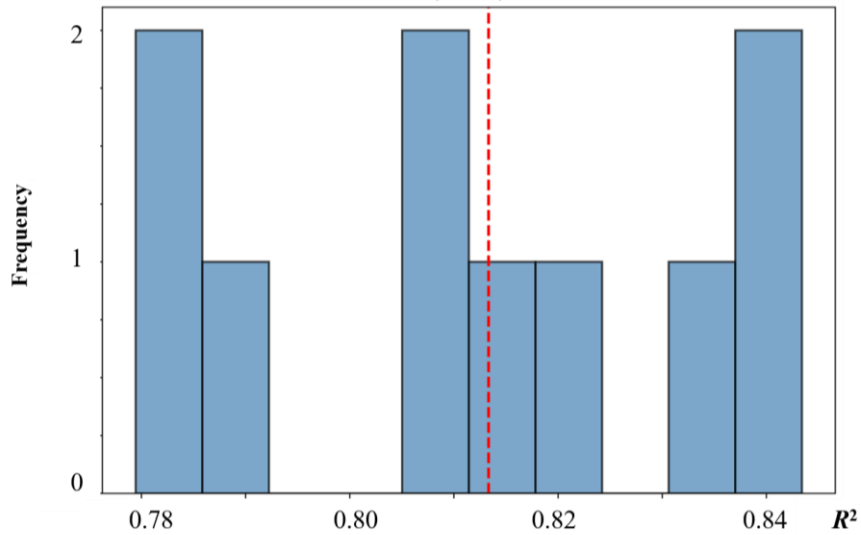
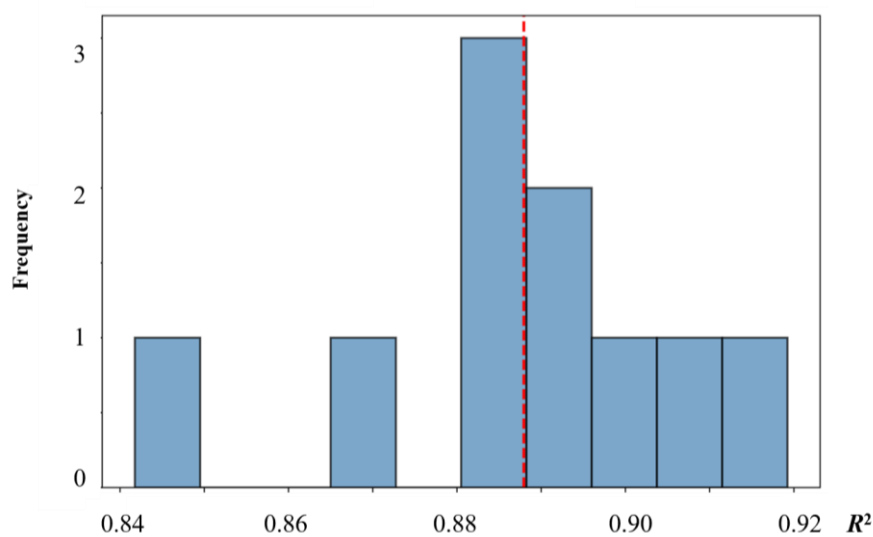


Figure S4. Distribution of R^2 of the random forest model in 10-fold cross-validation for RC. The red dashed line represents the mean value.

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50 **Figure S5.** Distribution of R^2 of the random forest model in 10-fold cross-validation for RI . The red dashed line represents the mean value.

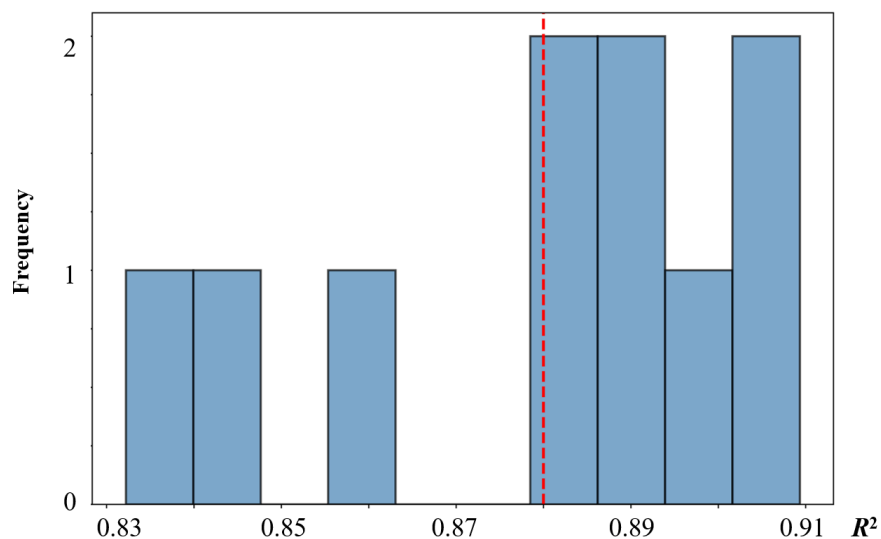
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57 **Figure S6.** Distribution of R^2 of the random forest model in 10-fold cross-validation for RE . The red dashed line represents the mean value.

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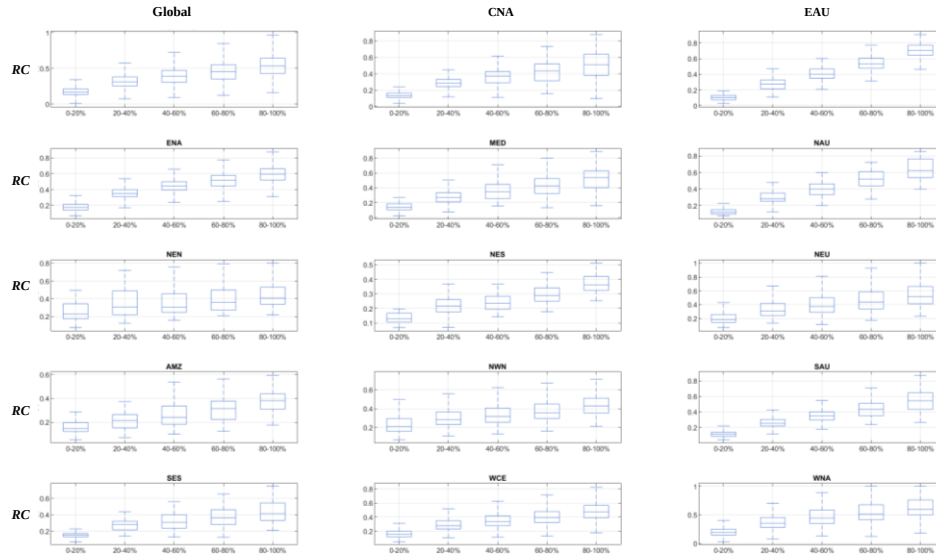


Figure S7. The changes of *RC* among events grouped by different peak discharge quantile ranges across the globe. The top and bottom of the box are the 25th and 75th percentiles, respectively. Whiskers represent the 1.5 interquartile range. The median is denoted by the horizontal line.

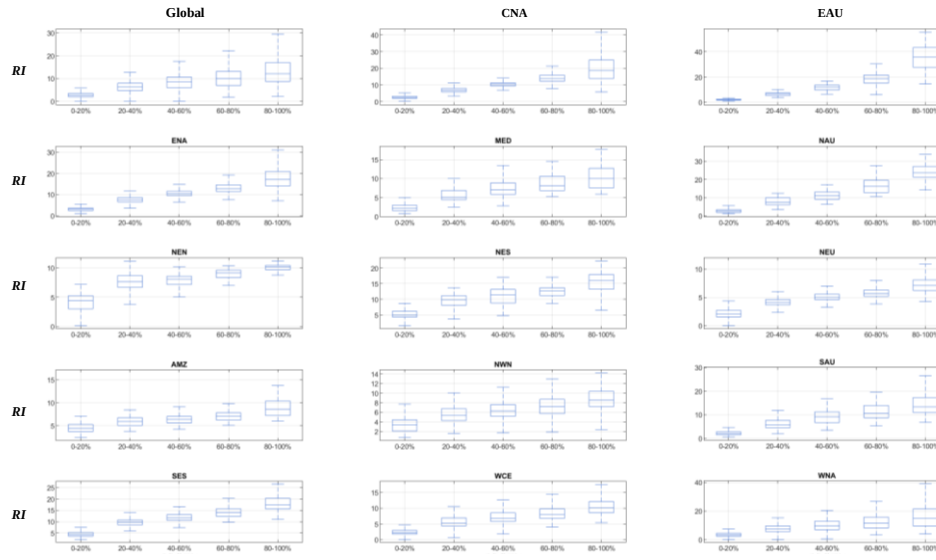


Figure S8. The changes of *RI* among events grouped by different peak discharge quantile ranges across the globe. The top and bottom of the box are the 25th and 75th percentiles, respectively. Whiskers represent the 1.5 interquartile range. The median is denoted by the horizontal line.

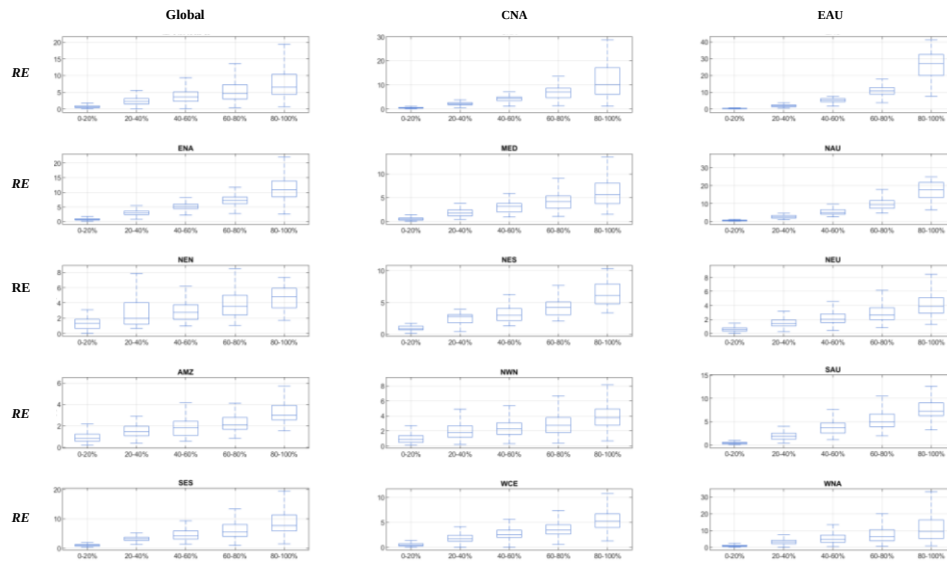


Figure S9. The changes of *RE* among events grouped by different peak discharge quantile ranges across the globe. The top and bottom of the box are the 25th and 75th percentiles, respectively. Whiskers represent the 1.5 interquartile range. The median is denoted by the horizontal line.

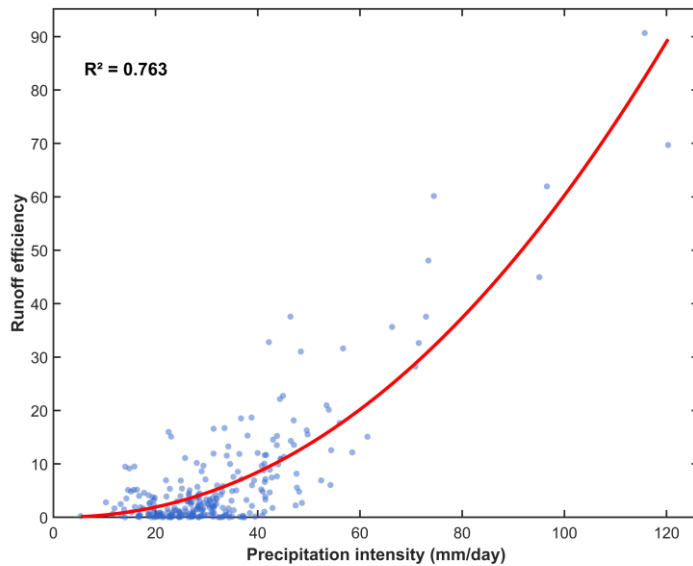
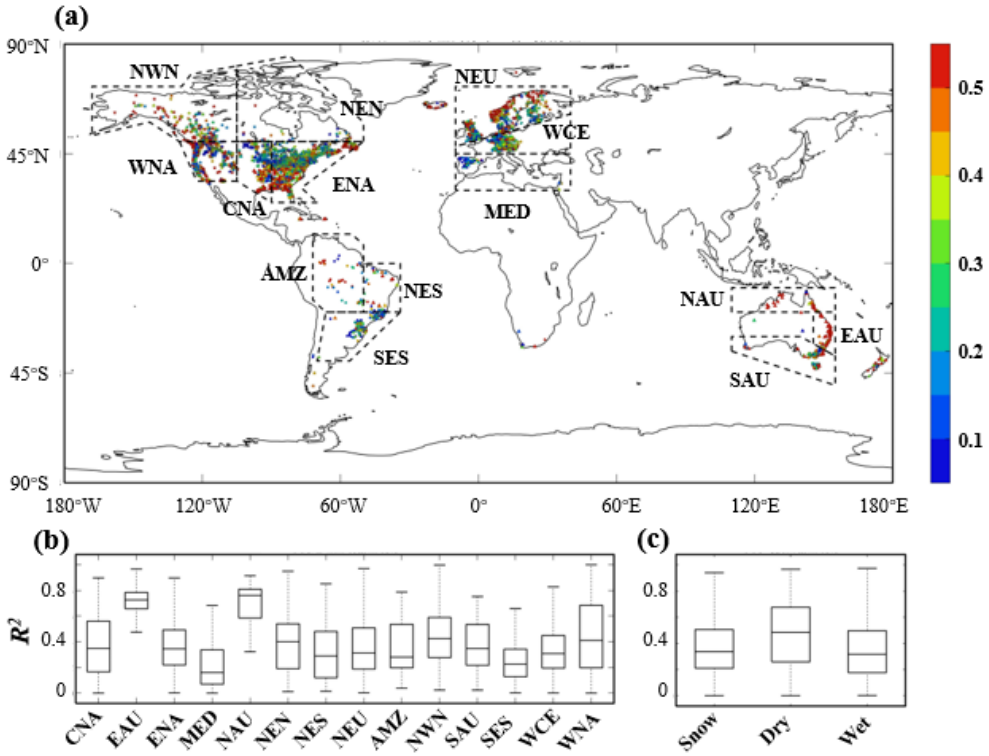


Figure S10. An example illustrating the power function fitting between precipitation intensity and runoff efficiency. The red curve represents the optimal fit.



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158 **Figure S11.** The fitting performance of the power-law relationships between precipitation intensity and runoff efficiency. The top and
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 160 the horizontal line.

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