Reply to Editor's Comment

Thank you for your corrections to the previous version of the manuscript. I spent quite some time going over your manuscript again and found that while your revision is an improvement, several issues still need to be clarified:

Reply: Thanks for your diligent review of our manuscript. We have made revisions to both the main manuscript and the supplementary material based on your feedback. We now proceed to respond to these comments point-by-point.

L/G: median L /median G or median L/G? There is a difference. In McGuire 2005 they use median L/median G. You say in Table S3 that you use median (L/G) – why? Explain what this means for your results. Especially as you are now using a different measure than previous studies.

Reply: Thank you for bringing up this issue. We have included additional sentences to emphasize the distinction between the approaches in L/G and our rationale [L89-92]:

> "Please be aware that we defined the median of l_{fp}/g_{fp} (L/G) in our study, differing from McGuire et al.'s (2005) previous study, which directly used the median l_{fp} divided by the median g_{fp}. In the hydrological context, l_{fp}/g_{fp} represents the residence time of each flow path and the median of l_{fp}/g_{fp} characterizes the flow paths within a catchment, while the median of l_{fp}/g_{fp} reflects catchment-wide residence time."

Also – you should state in the methods that you are using median values. Throughout the text it is not clear when you are talking about L or G or H if you are referring to the median or not. This needs to be clarified.

Reply: In order to distinguish whether the description refers to individual values or medians of flow path characteristics, we have employed two distinct labels. We have made revisions to certain sentences in [L84-89]:

> "Specifically, flow path length (l_{fp}) is the route length from a cell to channel cell, flow path height (h_{fp}) is the elevation difference between the specific cell to channel cell, and flow path gradient (g_{fp}) is calculated as flow path height divided by flow path length. Each cell possesses its own value of l_{fp}, h_{fp}, g_{fp}, and l_{fp}/g_{fp}. Since the velocity of gravity-driven flow is typically proportional to the gradient ($v = l_{fp}/T \sim h_{fp}/l_{fp}$), this implies that the time (T) is proportional to l_{fp}/g_{fp}: $T \sim l_{fp}^2/h_{fp} = l_{fp}/g_{fp}$. Consequently, l_{fp}/g_{fp} could serve as a potential proxy for residence time. Within a catchment, the medians of the l_{fp}, h_{fp}, and g_{fp} distributions (L, H, and G) served as representative flow path characteristics."

Why is L/G a good proxy for residence time? If you base this on Darcy's law it would be good to explain this better than the currently slightly confusing sentence: "Note that G can also be regarded as a surrogate of flow velocity (most equations used for estimating flow velocity needs gradient to represent the conversion from potential to kinetic energy). Therefore, the composite ratio, L/G [m], can be a proxy for residence time (McGuire et al., 2005; Tetzlaff et al., 2009) and as a means to comprehend the interplay between landscape features and climate impacts on residence time (Seybold et al., 2017)." Instead I would suggest something similar to this (if this is indeed what you mean): As the velocity of gravity-driven flow is usually proportional to the gradient: v = L/T ~ H/L this results in time T being proportional to L/G: T~L^2/H=L/G. Therefore, L/G could be a potential proxy for residence time. In terms of a catchment this relates to the ratio of the medians of L and G.

Reply: We appreciated the editor provide the thoughtful explanation of L/G as the proxy of residence time. We rephrased the sentences in [L86-88]:

> "Since the velocity of gravity-driven flow is typically proportional to the gradient ($v = l_{fp}/T \sim h_{fp}/l_{fp}$), this implies that the time (T) is proportional to l_{fp}/g_{fp}: $T \sim l_{fp}^2/h_{fp} = l_{fp}/g_{fp}$. Consequently, l_{fp}/g_{fp} could serve as a potential proxy for residence time."

What do you mean by composite ratio? What is the difference between composite ratio and ratio? Why is a simple ratio not enough? This needs to be explained.

Reply: Upon careful consideration, we have opted to directly remove the term "composite" in [L90], [L289] and [L302].

You are citing that Harman et al. 2009 found that heterogeneity between hillslopes increased with catchment area. However, they compare a single hillslope to a catchment of 10 ha and a catchment with a catchment area of 41 ha, so a maximum scale of not even 0.5 km². In your study, catchment areas only begin at 77 km². Does this relationship still hold at this very different spatial scale? This should be discussed.

Reply: We have added one sentence in [L266-270]:

> "The weak correlation between recession nonlinearity and those variables might be explained by: First is the scale effect. Some of our catchments are much larger than 500 km^2, which far exceeds the extent of rainstorms (usually less than 200 km^2). In these large catchments, the limited extent of rainstorms would not bring about a comprehensive recession response in the outflow hydrograph (Huang et al., 2012). Second, the drainage area cannot reflect the unknown number of aquifers (Ajami et al., 2011), making it unclear whether a positive relationship exists between nonlinearity and drainage area in our study."

Table 3 in the supplement – here the language can be simplified/clarified and there are also still some expressions that should be corrected:

- Definition of DD: fast not faster
- Water body coverage
- Forest coverage
- Agricultural land coverage

Reply: Thanks for the correction. We have enhanced the language in Table S3.

Please also see my comments to the supplementary material and within the pdf of your response.

Reply: Thank you for your thorough review of the supplementary material. Your advice has greatly improved the supplement, and we have incorporated the revisions accordingly.

I am glad to see the major improvements in this manuscript over the course of the review and am hoping that we can resolve these issues with a last round of minor revisions. Given that there are still some issues with the language I have been in touch with the English copy-editing department of Copernicus and they will assist you with final improvements on this front. Unfortunately, even your revised abstract still needs work, as the sentences have the tendency to be convoluted and confusing. Looking forward to bringing this review process to a close and moving your manuscript forward towards publication!

Reply: We again revised the abstract [L10-22]:

> "Streamflow recession, shaped by hydrological processes, runoff dynamics, and catchment storage, is heavily influenced by landscape structure and rainstorm. However, our understanding of how recession relates to landscape structure and rainstorm remains inconsistent, with limited research examining their combined impact. This study examines ~~the interplay between landscape structures and rainstorm characteristics~~ in shaping recession responses, ~~upon~~ 291 sets of recession parameters obtained through the decorrelation process. The data originates from 19 subtropical mountainous rivers ~~that display~~ a wide spectrum of rainfall amounts. Key findings indicate that the recession coefficient (*a*) increases while the exponent (*b*) decreases with the *L/G* ratio (the median of ratios between flow-path length and gradient), suggesting that longer and gentler hillslopes facilitate flow accumulation and aquifer connectivity, ultimately reducing nonlinearity. Additionally, in large catchments, the exponent (*b*) rises with increasing rainfall due to greater landscape heterogeneity, whereas in small catchments, it declines with rainfall, likely indicating catchment is prone to saturated and thus reduced runoff heterogeneity. Our ~~discovery~~ underscores the necessity for further validation across diverse regions ~~regarding how *L/G* and drainage area regulate recession responses to varying rainfall levels, given the pivotal role of assessing recession responses in understanding regional recession patterns within ungauged catchments, particularly within the context of climate change."~~

SPECIFIC COMMENTS

(in Response)

"defined as." [L85]

Delete.

Reply: Revised as the suggestion.

"Our variable H" [L279]

Our variable H likely suggests... not clear. Do you mean: The fact that H is negatively correlated with the recession coefficient suggests that...? Also why the stress on it being your variable?

Reply: We rephrased this sentence based on the editor's comment [L283-285]: "The fact that *H* is negatively correlated with the recession coefficient suggests that our groundwater flow paths possess greater depth and length, consequently leading to slower drainage rates."

"it does not necessarily correspond to hydraulic gradient due to the geologic and soil settings varying across regions" [L282]

I don't understand this. H/L is gradient, not H alone. Are you talking about the hydraulic gradients of GW level to stream? That can of course be different to the surface gradient to stream and depends on geology etc. Please clarify here what you mean.

Reply: We rephrased this sentence in [L285-288]: "While *H* is commonly believed to be positively correlated with the velocity of gravity-driven flow at a small spatial scale, the high heterogeneity in ~~subsurface~~ geology or soil properties at a larger spatial scale (Karlsen et al., 2019) implies that a large *H* does not necessarily lead to a large recession coefficient."

"While the equivalent composite ratio can result from either L or G," [L288]

This sentence is not clear. equivalent to what? not sure what results from either L or G is supposed to mean, either.

Reply: We rephrased this sentence in [L291-293]: "Potentially, the relationship between recession parameters and *L/G* has the chance to establish a further linkage between recession parameters and water residence time.".

"Explain why this can serve as a proxy for residence time and what you mean by composite ratio."

see comment in separate document

Reply: Replied in the general comment, seeing revised [L84-92].

"recession event flow" [L330]

event recession flows (at least for me it seems like event recession makes more sense than recession event - here it is not clear how exactly a recession event is defined.)

Reply: Revised as the suggestion [L334].

"responses to" [L10]

relationships with

Reply: Revised as the suggestion.

"rainstorm~~s~~" [L10]

characteristics

Reply: Revised as the suggestion.

(in the Supplementary Material)

Table S1: "un-decorrelated"

is this really a word? What about using "original values" or "values before decorrelation"?

Reply: We have replaced "un-decorrelated" with "original values." [Table S1]

"CTS and VTS denote constant and various time interval of sampling (Q, dQ/dt) pair, respectively."

this does not make sense. Do you mean variable?

Reply: We rephrased this sentence: "CTS and VTS represent constant and variable time intervals for sampling (Q, dQ/dt) pairs, respectively." [Table S1]

Table S2: footnote.

state if these are medians or means or what sort of summary statistics you are using here.

Reply: We rephrased this footnote: "Here, *H* is the median of flow-path heights, *L* is the median of flow-path lengths, *G* is the median of flow-path gradients, L/G is the median of ratios between flow-path length and gradient. *A* is the drainage area, *DD* is the drainage density, S_m is the gradient of main stem, *HI* is the hypsometric integral, ELO is the basin elongation, C_W, C_F, C_A is the coverage of water body, forest, and agricultural land, respectively." [Table S2]

Table S3:

this table still needs work language-wise.

Reply: We have enhanced the language in this table [Table S3].

Table S4:

remove the large space between the median and the max/min.

State in caption that max and min are given in brackets or provide separate headers for median, max and min

Reply: We removed the large space and also separated the headers of median, min, and max. [Table S4]

Reference

References

Reply: Revised as the suggestion.

Supplementary Material

Table S1. Summary of empirical power-law recession studies. The number of references corresponds to Table 1 in the main text. The parameter a and â represent decorrelated and original values, respectively. T_0 represents recession timescale at the median flow. CTS and VTS represent constant and variable time intervals for sampling (Q, dQ/dt) pairs, respectively.

No	Reference	Data pool	Temporal scale	Location	Number of basins	Number of events	Basin area (km^2)	Unit of flow	Initial time of recession segment (day after Q_p)	Sampling way (Q, dQ/dt)	*b*	Target parameters
1	Mathias et al. (2016)	Point-cloud	Long-term	UK	120	n.a.	1.1-1700	$L\ T^{-1}$	0	CTS	1.68-1.99	â, b
2	Patnaik et al. (2018)	Median	Long-term	Eastern USA	212	n.a.	n.a.	$L^3\ T^{-1}$	1	CTS	1-6	b
3	Tashie et al. (2019)	Median	Monthly	North Carolina	1	382	0.6	$L\ T^{-1}$	1	CTS	4-20	a, b
4	Bart and Hope (2014)	Events	Event	California	4	n.a.	119-632	$L\ T^{-1}$	7	CTS	1.8-2.1	â
5	Biswal and Nagesh Kumar (2014)	Events	Event	USA	67	n.a.	10-8858	$L^3\ T^{-1}$	0	CTS	1.47-4.57	â
6	Biswal and Marani (2014)	Events	Event	Eastern USA	4	n.a.	41-583	$L^3\ T^{-1}$	1	CTS	1.91-2.23	â
7	Clark et al. (2009)	Point-cloud	Long-term/eve nt	Georgia	3	n.a.	0.001-0.41	$L\ T^{-1}$	0	VTS	1-3	b
8	Ghosh et al. (2016)	Events	Event	Georgia	1	23	0.41	$L\ T^{-1}$	0.25	CTS	2.5-7.8	â, b
9	Patnaik et al. (2015)	Median/Events	Long-term/Ev ent	USA	358	n.a.	2-3247	$L^3\ T^{-1}$	7	CTS	n.a.	â
10	Millares et al. (2009)	Point-cloud	Long-term	Spain	3	n.a.	n.a.	$L^3\ T^{-1}$	0	CTS	1.15-1.30	â
11	Sayama et al. (2011)	Point-cloud	Long-term	California	17	n.a.	3-112	$L\ T^{-1}$	0	CTS	n.a.	b
12	Shaw and Riha (2012)	Events	Event	New York	7	80	100-6415	$L^3\ T^{-1}$	0	VTS	1.31-5.34	â
13	Shaw et al. (2013)	Events	Event	New York	9	72	287	$L^3\ T^{-1}$	0	VTS	0.98-2.42	â
14	Tague et al. (2004)	Point-cloud	Long-term	Oregon	22	n.a.	7.3-1337	$L^3\ T^{-1}$	0	CTS	1.38-3.16	â, b
15	Tashie et al. (2020)	Events	Event	USA	1027	155309	n.a.	$L^3\ T^{-1}$	0	CTS	1.1-7.3	b
16	Yan et al. (2022)	Point-cloud	Long-term	Eastern China	382	n.a.	34-18211	$L^3\ T^{-1}$	2	CTS	0.57-3	â, b
17	Ye et al. (2014)	Point-cloud	Long-term	Eastern USA	50	n.a.	66-9062	$L\ T^{-1}$	3	CTS	0.99-1.91	â, b
18	McMillan et al. (2014)	Median/Point-c loud	Long-term/mo nthly/event	New Zealand	28	n.a.	n.a.	$L\ T^{-1}$	0.5	VTS	1.5-4.0	T_0, b
19	Biswal and Nagesh Kumar (2013)	Events	Event	USA	39	5486	9.6-5457	$L^3\ T^{-1}$	0	CTS	1.52-2.61	b
20	Chen and Krajewski (2015)	Events	Event	Iowa	25	n.a.	66-16854	$L\ T^{-1}$	12	CTS	0.75-1.6	â, b
21	Bogaart et al. (2016)	Point-cloud	Annual	Sweden	316	n.a.	3-33000	$L\ T^{-1}$	3	CTS	0.5-2.1	â, b

22	Dralle et al. (2017)	Events	Event	California/Oregon	16	n.a.	17-5457	$L^3 T^{-1}$	vary	CTS	0.1-3.7	a
23	Santos et al. (2019)	Events	Annual/Event	Switzerland	5	n.a.	50-352	$L T^{-1}$	vary	CTS	1.73-2.4	a, b
24	Karlsen et al. (2019)	Events	Seasonal/Event	Northern Sweden	14	163	12-6790	$L T^{-1}$	2	VTS	1-10	T_0, b

Table S2. Landscape and landcover variables of the selected catchments.

ID	HID	H (m)	L (m)	G (-)	L/G (m)	A (km^2)	DD (km/km^2)	S_m (%)	HI (-)	ELO (-)	C_W (%)	C_F (%)	C_A (%)
W1	1140H085	91	256.1	0.38	699.3	110	0.994	1.33	0.395	0.386	1.0	90.7	4.8
W2	1140H086	124	260.0	0.48	549.2	79	0.933	1.86	0.423	0.456	0.6	68.5	1.5
W3	1300H013	169	291.2	0.57	526.7	147	0.875	7.63	0.381	0.686	1.0	89.9	4.3
W4	1340H008	74	247.4	0.38	712.3	298	1.037	3.99	0.214	0.427	1.4	80.9	9.9
W5	1350H001	127	260.8	0.51	557.7	244	1.073	4.56	0.266	0.503	0.8	83.3	10.4
W6	1350H012	77	241.7	0.37	764.5	471	1.030	2.84	0.208	0.394	1.4	74.6	13.5
W7	1420H034	208	286.4	0.72	404.8	105	0.856	10.19	0.355	0.648	0.9	92.1	3.3
W8	1430H028	36	201.0	0.22	1109.3	265	1.191	1.18	0.203	0.545	2.4	41.1	29.4
W9	1430H030	131	269.1	0.55	561.0	1043	0.962	2.36	0.285	0.399	1.1	69.0	20.6
W10	1510H063	204	277.8	0.74	383.6	2089	0.924	2.22	0.432	0.421	0.5	84.8	4.3
W11	1540H014	7	200.0	0.05	3200.0	83	1.285	2.85	0.097	0.304	0.0	25.0	7.7
W12	1540H029	4	180.0	0.03	3600.0	220	1.539	1.14	0.103	0.424	3.0	18.8	53.2
W13	1580H001	148	282.8	0.52	545.3	81	1.157	6.66	0.391	0.541	1.9	11.8	70.9
W14	1660H010	23	208.8	0.12	1951.2	140	1.350	0.29	0.182	0.338	3.0	56.2	22.4
W15	1730H031	211	280.7	0.75	375.9	812	0.915	3.09	0.426	0.321	0.7	85.5	3.1
W16	2200H011	167	268.3	0.65	457.1	1573	0.919	2.36	0.383	0.433	2.6	59.2	19.4
W17	2370H017	157	260.8	0.65	475.8	1527	0.945	2.91	0.329	0.459	1.9	79.7	9.5
W18	2420H043	148	260.0	0.64	518.7	563	1.015	4.51	0.349	0.445	1.0	75.5	12.1
W19	2560H001	188	269.1	0.69	424.9	450	0.934	5.25	0.335	0.473	1.9	88.8	2.3

Here, H is the median of flow-path heights, L is the median of flow-path lengths, G is the median of flow-path gradients, L/G is the median of ratios between flow-path length and gradient. A is the drainage area, DD is the drainage density, S_m is the gradient of main stem, HI is the hypsometric integral, ELO is the basin elongation, C_W, C_F, C_A is the coverage of water body, forest, and agricultural land, respectively.

Table S3. Definition and calculation of hydrologic event and landscape variables.

Variable	Definition and meaning	Calculation method
Hydrologic event		
AP_{7day} [mm]	7-day antecedent precipitation ~~could be~~ used to ~~present~~ the saturation status of the watershed before the rainstorm.	Sum of rainfall amounts over the previous seven days leading up to the start of the rising limb.
P [mm]	Total precipitation ~~describes the magnitude of a rainstorm~~.	Sum of rainfall amounts throughout the defined rainfall period[a]
D [hr]	Duration of precipitation ~~indicates how long does the rainstorm last~~.	Length of time between the start and end of the defined rainfall period.
I_{avg} [mm hr^{-1}]	Averaged precipitation intensity ~~presents the magnitude of rainstorm intensity~~.	P/D
Q_{tot} [mm]	Total streamflow represents how much water is exported during a rainstorm	Sum of flow rates during the rainstorm.
Q_{ant} [mm]	Antecedent streamflow. Recorded flow rate before the start of the rising limb.	
Q_{p} [mm]	Peak flow. The highest recorded flow rate during a rainstorm.	
Q_{tot}/P [-]	Ratio of total streamflow to precipitation, also called runoff coefficient. It indicates the efficiency of the conversion from rainfall to runoff.	
Landscape		
H [m]	Median of flow path heights, which is related to the potential energy of water.	Compute the elevation differences between hillslope cells and stream cell along the flow path. Then, determine the median of these difference across the catchment.
L [m]	Median of flow path lengths, which is related to flow accumulation from hillslopes.	Compute the distances between hillslope cells and stream cell along the flow path. Then, determine the median of these distances across the catchment.
G [-]	Median of flow path gradients, which could be regarded as a surrogate of flow velocity.	Calculate the gradients between hillslope cells and the stream cell along the flow path. Then, ascertain the median of these gradients across the catchment.
L/G [m]	Median of ratios between flow-path length and gradient, which is related to the mean residence time.	Calculate the ratios of flow path length to gradient for each cell, and subsequently, determine the median of these ratios across the entire catchment.
A [km^2]	Drainage area, which could be linked to how much total water volume could be stored.	Total area of cells that can route to the outlet.
DD [km km^{-2}]	Drainage density. It is related to how fast the catchment can drain water via stream.	Ratio of total stream length to the drainage area
S_m [%]	Gradient of main stem, which is related to water velocity in main stem.	The changes in elevation along the main stem.
HI [-]	Hypsometric integral. It represents how much a catchment can contain water storage.	Calculate the area under the hypsometric curve, which relates elevation and cumulative area
ELO [-]	Basin elongation measures catchment shape and affects surface flow travel time.	Measure the ratio of the length of the longest axis of a catchment to the length of the perpendicular axis across it.
C_W [%]	Water body coverage, which is negatively related to the recession exponent.	Percentage of the area of water bodies divided by drainage area.
C_F [%]	Forest coverage, which is negatively related to the recession coefficient.	Percentage of the forest area divided by drainage area.
C_A [%]	Agricultural land coverage, which is related to the field capacity.	Percentage of the agricultural area divided by drainage area.

[a]Rainfall period is defined as the elapsed time from 6 h before the rising flow to the peak flow.

[b]Flow path is defined as the trajectory taken by water from a hillslope grid point, as it follows the surface flow direction toward the channel.

Table S4. Descriptions of the selected catchments and events

ID	HID	N	AP_{7day} (mm)			P (mm)			I_{avg} (mm h^{-1})			Q_{ant} (mm h^{-1})			Q_{tot} (mm)			Q_p (mm h^{-1})			Q_{tot}/P (-)		
			median	min	max	median	min	max	median	min	max	median	min	max	median	min	max	median	min	max	median	min	max
W1	1140H085	15	70	3	282	246	131	904	7.3	3.7	11.7	0.32	0.02	2.35	205	100	697	8.7	4.9	27.2	0.76	0.49	1.05
W2	1140H086	18	60	1	294	272	98	854	7.1	3.1	17.5	0.24	0.02	1.91	190	99	650	8.8	4.6	27.1	0.80	0.52	1.04
W3	1300H013	16	56	3	248	239	25	1012	10.0	5.6	23.6	0.34	0.07	2.16	111	26	537	8.6	0.9	37.5	0.52	0.26	1.02
W4	1340H008	21	51	0	498	206	58	865	7.4	3.9	21.6	0.13	0.01	1.06	122	16	670	12.6	1.6	31.8	0.71	0.23	1.00
W5	1350H001	20	53	0	272	352	127	1247	5.4	1.3	13.4	0.19	0.05	0.89	191	51	749	10.5	2.4	52.2	0.61	0.20	0.94
W6	1350H012	18	45	9	489	336	155	596	5.9	3.5	11.3	0.14	0.01	0.86	221	55	424	8.0	2.1	32.9	0.54	0.24	1.06
W7	1420H034	11	38	4	186	558	189	651	10.3	5.4	12.1	0.34	0.08	1.03	302	104	691	11.9	4.9	22.8	0.63	0.32	1.08
W8	1430H028	26	81	4	355	343	89	934	6.5	3.6	13.8	0.23	0.12	0.46	138	38	458	13.6	4.0	65.4	0.41	0.21	0.70
W9	1430H030	13	84	3	923	415	87	674	4.7	1.9	8.7	0.40	0.11	0.76	150	43	446	3.6	1.5	14.0	0.34	0.23	1.03
W10	1510H063	15	31	8	102	471	105	1276	6.2	2.6	10.4	0.11	0.05	0.70	237	46	964	5.8	1.6	19.1	0.51	0.21	0.91
W11	1540H014	9	80	17	187	164	85	364	7.1	3.0	10.3	0.25	0.03	0.63	137	30	304	13.0	3.2	22.2	0.73	0.36	1.10
W12	1540H029	12	69	13	237	158	28	581	6.2	4.0	11.9	0.33	0.19	0.70	112	16	591	8.4	1.6	28.1	0.75	0.27	1.02
W13	1580H001	24	65	2	396	712	61	2558	9.7	4.2	20.3	0.44	0.04	1.27	368	37	1736	24.9	1.6	84.5	0.56	0.25	1.08
W14	1660H010	17	80	11	707	201	24	982	6.6	3.2	13.6	0.16	0.02	3.22	137	14	946	11.7	1.7	27.4	0.72	0.31	1.10
W15	1730H031	10	106	26	317	507	186	820	7.6	4.8	17.0	0.28	0.11	0.66	254	101	628	9.8	2.2	28.8	0.67	0.38	1.00
W16	2200H011	10	66	21	175	236	65	716	4.9	2.4	9.4	0.20	0.03	0.92	156	27	583	5.2	1.0	18.8	0.67	0.25	0.99
W17	2370H017	10	28	4	124	456	225	840	5.2	4.4	10.8	0.10	0.05	0.68	369	59	512	10.9	2.6	21.3	0.76	0.22	1.11
W18	2420H043	21	49	0	358	333	102	813	4.9	2.7	13.8	0.30	0.01	0.85	187	34	602	10.1	1.5	47.6	0.58	0.28	0.98
W19	2560H001	5	58	48	59	255	196	484	5.0	4.1	9.5	0.12	0.03	0.46	109	82	277	4.9	2.0	11.5	0.43	0.42	0.57
	Average		62			340			6.7			0.24			194			10.1			0.61		

*ID is the identifier of catchments in this study, HID is the identifier of catchments named by the Taiwan Water Resource Agency, N is the number of events. Values in each column present the median and range of the events in the corresponding catchments. Numbers in parentheses indicate the lower and upper limit among the events in the specific catchment.

Table S5. Median, minimum, and maximum values of the recession coefficient and exponent for each catchment.

ID	HID	*a* [hr^{-1}]			*b* [-]			1/*a* [h]		
		median	min	max	median	min	max	median	min	max
W1	1140H085	0.033	0.019	0.067	1.73	1.30	2.38	30.0	14.9	53.7
W2	1140H086	0.035	0.018	0.049	1.82	1.30	2.38	28.8	20.4	54.2
W3	1300H013	0.046	0.011	0.156	1.94	1.00	2.74	21.9	6.4	93.8
W4	1340H008	0.074	0.028	0.172	1.62	1.19	1.99	13.6	5.8	35.2
W5	1350H001	0.022	0.010	0.094	1.96	1.62	2.53	45.0	10.7	95.5
W6	1350H012	0.068	0.020	0.129	1.56	0.90	1.92	14.6	7.8	50.0
W7	1420H034	0.016	0.010	0.041	1.92	1.58	2.37	62.5	24.3	102.2
W8	1430H028	0.068	0.025	0.166	1.63	1.26	2.39	14.6	6.0	40.3
W9	1430H030	0.026	0.010	0.102	2.34	1.37	2.98	37.9	9.8	99.4
W10	1510H063	0.031	0.013	0.116	1.51	1.12	2.05	32.6	8.7	77.4
W11	1540H014	0.110	0.048	0.144	1.30	0.95	1.60	9.1	6.9	21.0
W12	1540H029	0.089	0.052	0.156	1.63	0.91	2.95	11.2	6.4	19.4
W13	1580H001	0.031	0.003	0.273	1.67	1.19	4.39	32.2	3.7	303.8
W14	1660H010	0.094	0.049	0.218	1.29	1.05	1.63	10.6	4.6	20.6
W15	1730H031	0.025	0.009	0.087	1.71	1.25	2.39	40.1	11.5	108.8
W16	2200H011	0.036	0.026	0.164	1.74	1.32	1.96	28.1	6.1	38.0
W17	2370H017	0.029	0.015	0.087	1.67	1.16	1.95	34.6	11.6	64.9
W18	2420H043	0.054	0.020	0.180	1.60	0.97	2.21	18.4	5.6	49.0
W19	2560H001	0.055	0.021	0.202	1.30	1.05	1.72	18.1	5.0	47.1

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