## SUPPLEMENTARY INFORMATION

Table S1. Q_2 equations for different groups of regions. Meigh (1995) did not include regions 13 or CAR, so the total number of sites in the three groups is 431.

| Group	Regions in group	Number of sites	Equation	R^2	se
Growth curve					
A	1,13,CAR	65	$Q_2 = 0.0675(A.RMED)^{0.765}$	0.74	0.287
B	2,3,4A,6,11,12	241	$Q_2 = 0.0218(A.RMED)^{0.836}$	0.68	0.387
C	4B,5,7,10	126	$Q_2 = 0.139(A.RMED)^{0.662}$	0.45	0.443
D	8,9	34	$Q_2 = 0.145(A.RMED)^{0.685}$	0.75	0.203
K-means clustering of regional regression equations					
E	1,6,7,8,11	142	$Q_2 = 0.0222(A.RMED)^{0.851}$	0.73	0.336
F	2,3,4A,CAR	167	$Q_2 = 0.0172(A.RMED)^{0.864}$	0.71	0.391
G	4B,9,10,12,13	103	$Q_2 = 0.148(A.RMED)^{0.659}$	0.59	0.376
H	5	54	$Q_2 = 0.693(A.RMED)^{0.500}$	0.30	0.457
Meigh (1995) contiguous regional groups					
I	1,2	86	$Q_2 = 0.0513(A.RMED)^{0.779}$	0.63	0.369
J	3,4A,4B,5,6,7,8	264	$Q_2 = 0.0583(A.RMED)^{0.759}$	0.61	0.408
K	9,10,11,12	817	$Q_2 = 0.0723(A.RMED)^{0.696}$	0.57	0.342

5   **Table S2.** Q_{100} equations for different groups of regions. Meigh (1995) did not include regions 13 or CAR, so the total number of sites in the three groups is 431.

Group	Regions in group	Number of sites	Equation	R^2	se
Growth curve					
A	1,13,CAR	65	$Q_{100} = 0.366(A.RMED)^{0.750}$	0.77	0.255
B	2,3,4A,6,11,12	241	$Q_{100} = 0.248(A.RMED)^{0.751}$	0.59	0.425
C	4B,5,7,10	126	$Q_{100} = 6.026(A.RMED)^{0.447}$	0.27	0.447
D	8,9	34	$Q_{100} = 2.023(A.RMED)^{0.537}$	0.60	0.228
K-means clustering of regional regression equations					
E	1,6,7,8,11	142	$Q_{100} = 0.244(A.RMED)^{0.772}$	0.72	0.312
F	2,3,4A,CAR	167	$Q_{100} = 0.184(A.RMED)^{0.787}$	0.63	0.421
G	4B,9,10,12,13	103	$Q_{100} = 4.198(A.RMED)^{0.477}$	0.41	0.393
H	5	54	$Q_{100} = 24.95(A.RMED)^{0.298}$	0.09	0.520
Meigh (1995) contiguous regional groups					
I	1,2	86	$Q_{100} = 0.317(A.RMED)^{0.756}$	0.58	0.399
J	3,4A,4B,5,6,7,8	264	$Q_{100} = 1.122(A.RMED)^{0.621}$	0.48	0.427
K	9,10,11,12	81	$Q_{100} = 4.111(A.RMED)^{0.446}$	0.33	0.359
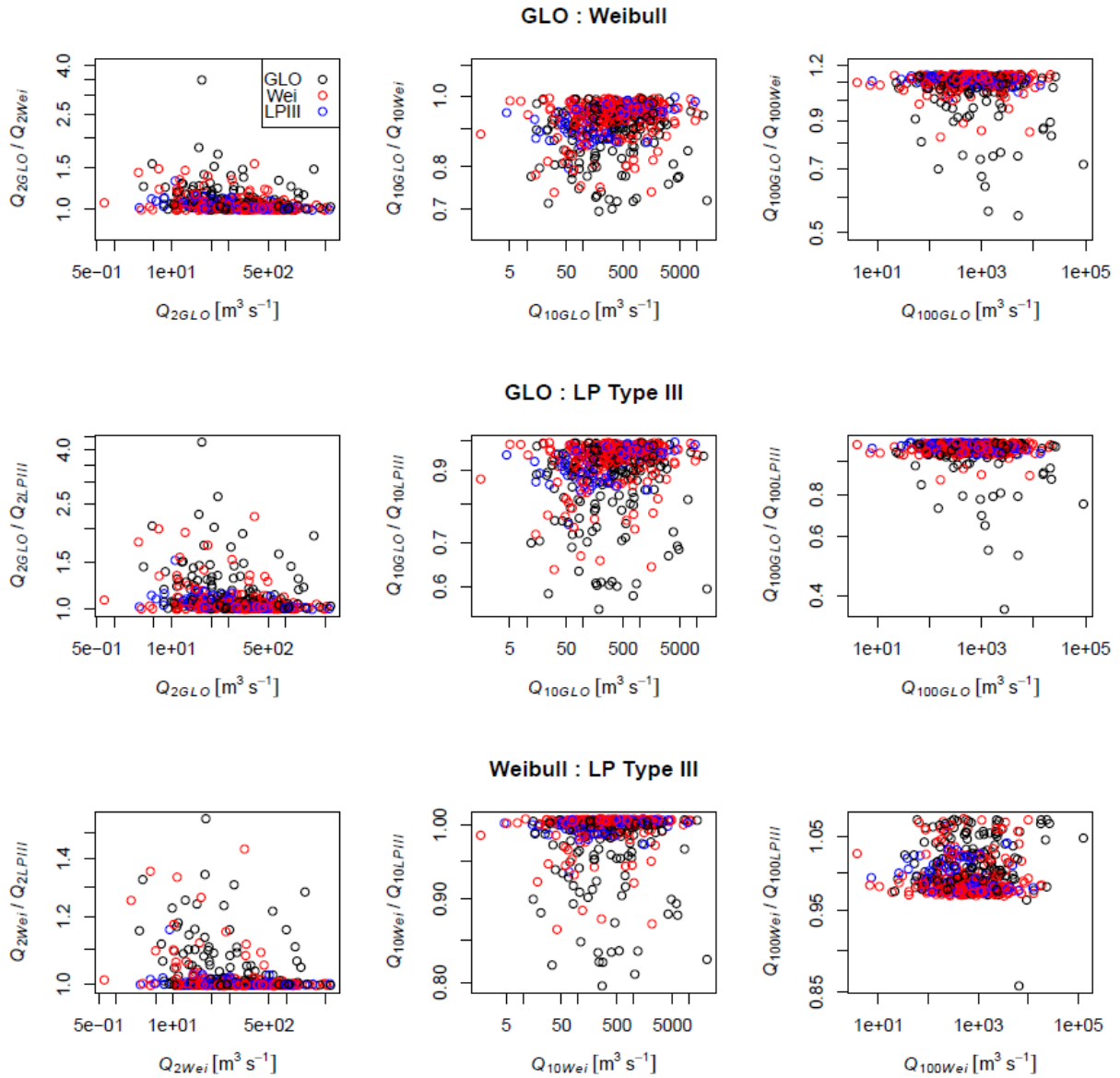
Figure S1. Comparison between flood estimates for 2, 10 and 100 year return periods determined from the three curve fitting methods. GLO = Generalised Logistic Distribution; Wei = Weibull distribution; LPIII = Log-Pearson Type III. x-axes are flood estimates from the GLO (upper two rows) and Weibull distributions, and y-axes are ratios between the estimates obtained from two of the methods, as indicated for each row. Data are colour-coded according to the best-fit curve for each site.
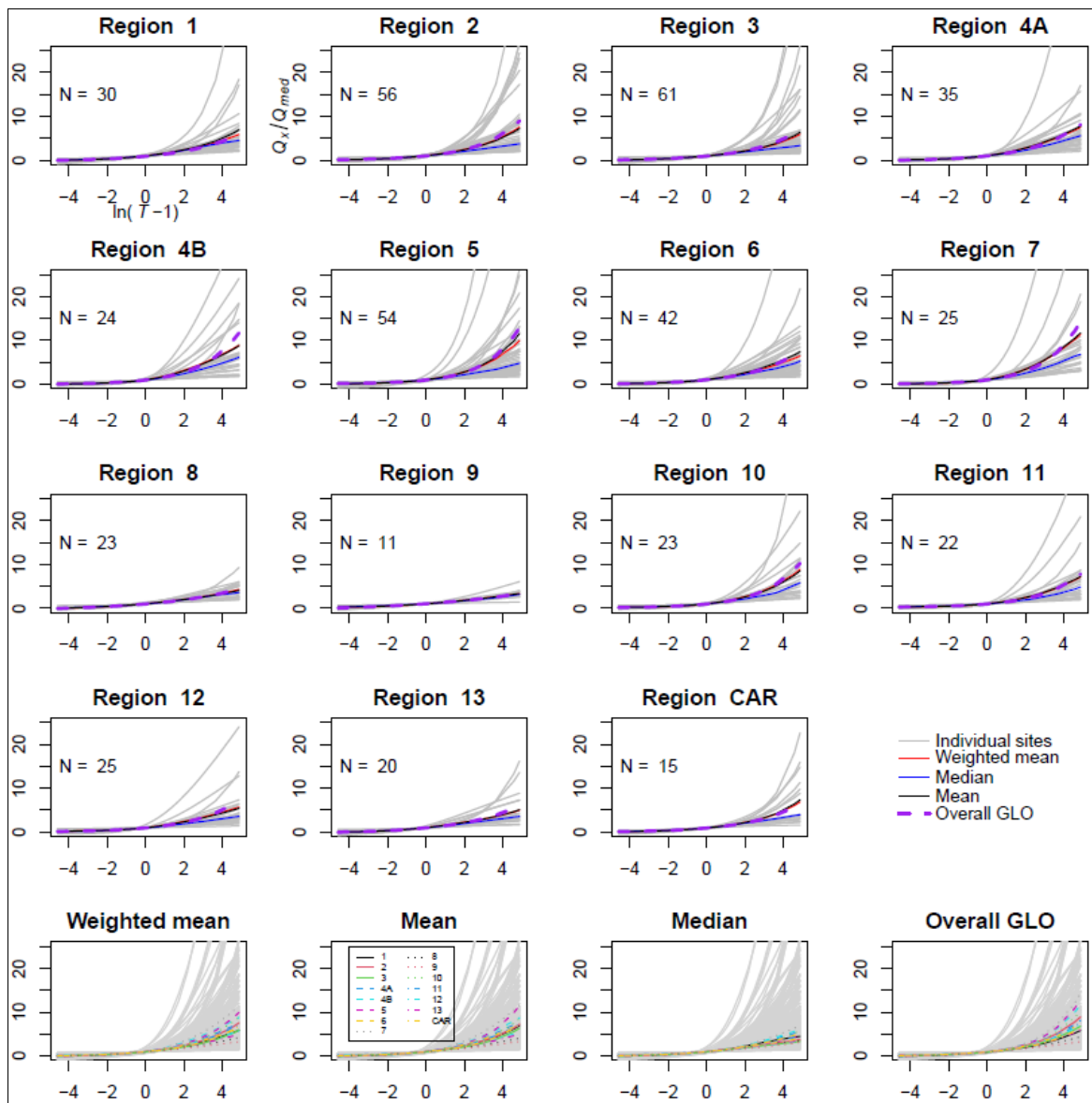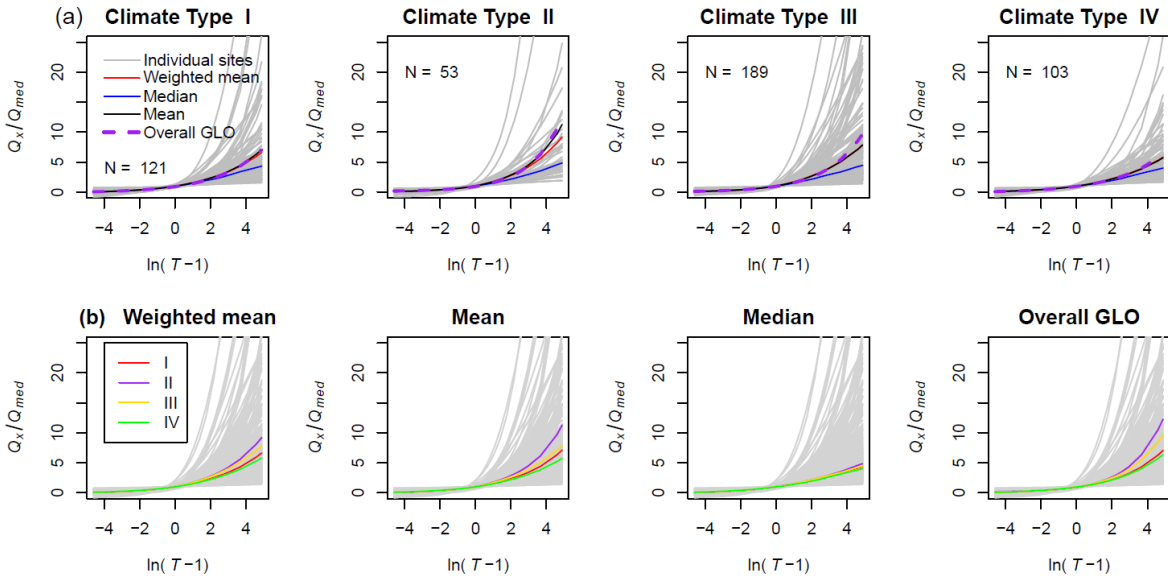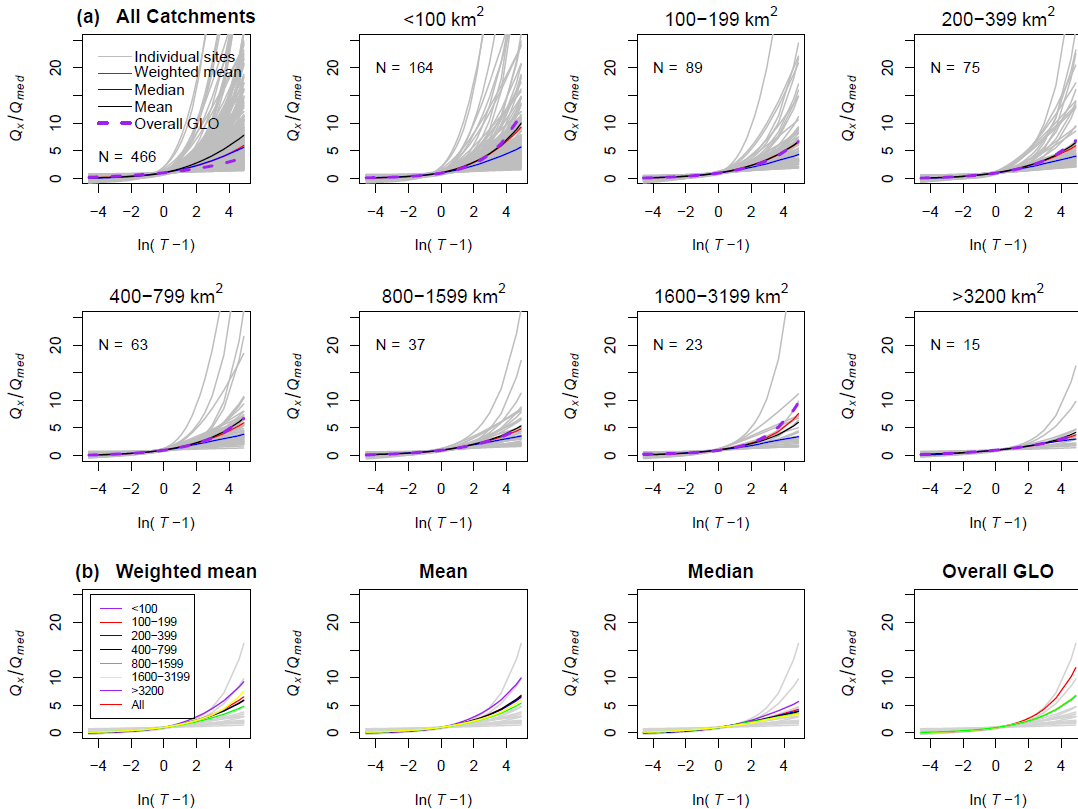
Figure S2. Growth curves for all sites in each region of the Philippines (grey lines) with four methods for calculating a single growth curve for each region. Black line – mean of growth curves for all sites; red line – mean of growth curves for all sites weighted by length of record; blue line – median of growth curves for all sites; and, purple dashed line – GLO curve fitted amalgamated data from all sites within the region. Bottom row shows comparison between the four methods of calculating single growth curves for each region.

Figure S3. (a) Growth curves for all sites in each climate type of the Philippines (grey lines) with four methods for calculating a single growth curve for each climate type (N is the number of sites of each climate type). Black line – mean of growth curves for all sites; red line – mean of growth curves for all sites weighted by length of record; blue line – median of growth curves for all sites; and, purple dashed line – GLO curve fitted amalgamated data from all sites within each climate type. (b) Comparison between the four methods of calculating single growth curves for catchments within each climate type. Grey lines are growth curves for all individual sites.


Figure S4. (a) Growth curves for all catchments within catchment area bins indicated (grey lines) with four methods for calculating a single growth curve for each region. Black line – mean of growth curves for all sites; red line – mean of growth curves for all sites weighted by length of record; blue line – median of growth curves for all sites; and, purple dashed line – GLO curve fitted amalgamated data from all sites within each catchment

area bin. (b) Comparison between the four methods of calculating single growth curves for within each catchment area bin.

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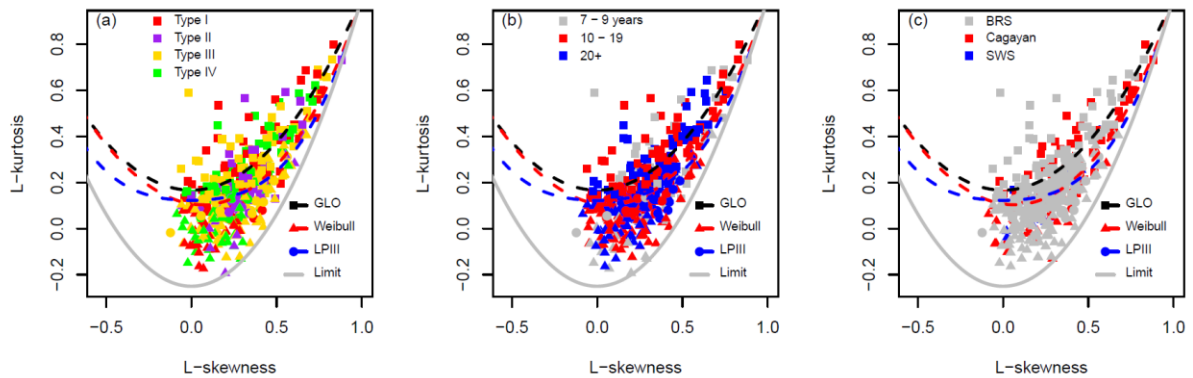
Figure S5. Relationships between L-skewness and L-kurtosis compared with theoretical curves (Hosking and Wallis, 1997). Data classified by: (a) climate zone; (b) length of data record; and, (c) data source. In all cases there is overlap between the best-fit curve type and the classification variable with no obvious clustering of catchments
40   according to climate type, record length or data source. Data points are coloured according to the classification variable, with symbol shape indicating the best-fit curve.
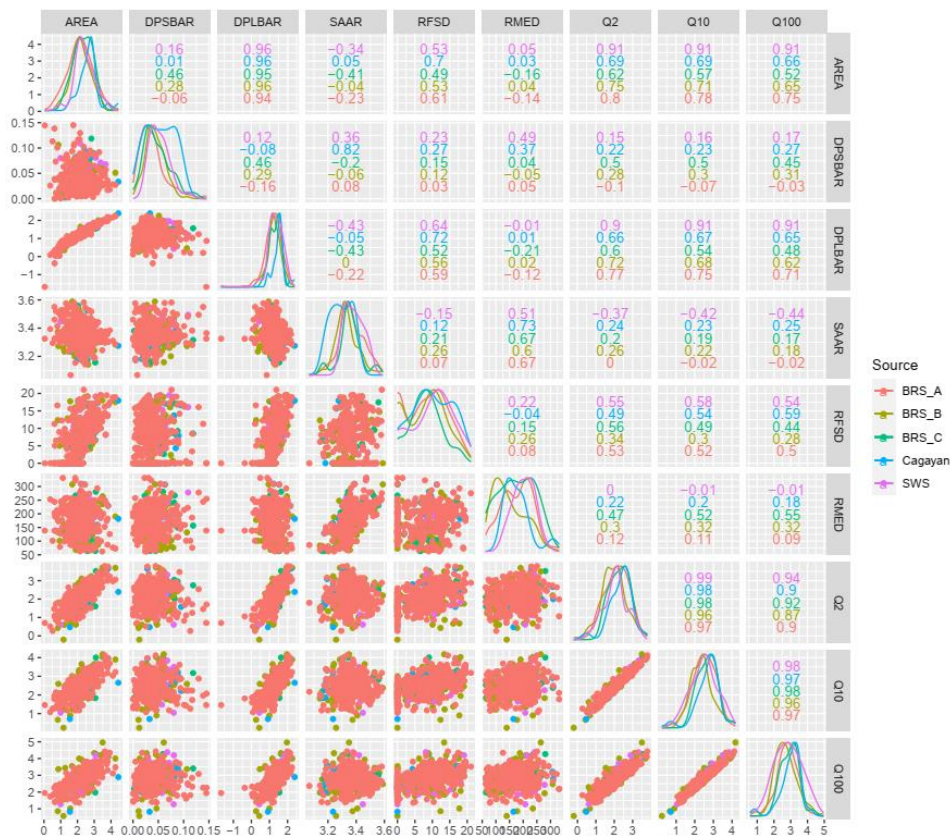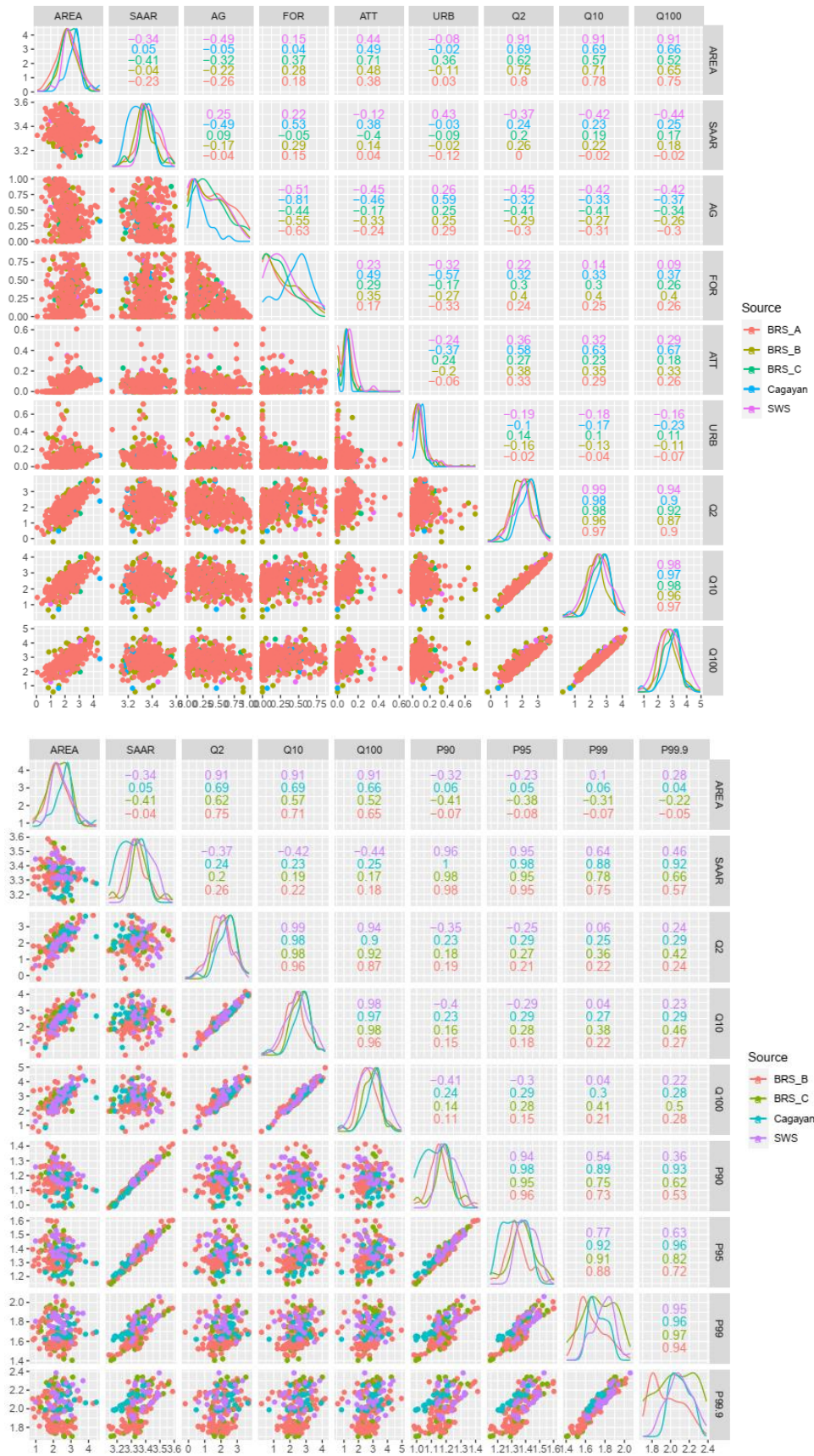
45 **Figure S6.** Cross-correlations between all variables used in the analysis. Note that several variables have been transformed prior to plotting, either Log10 (*AREA*, *DPLBAR*, *SAAR*, Q_{MED}, Q_2, Q_{10}, Q_{100}) or square root (*ATT*, *RFSD*, *URB*). See Table 4 for details. Points are colour coded by data source. Plots on the diagonal are probability

density functions of the variables. Numbers on the upper right of each figure are correlation coefficients, also
coloured by data source.
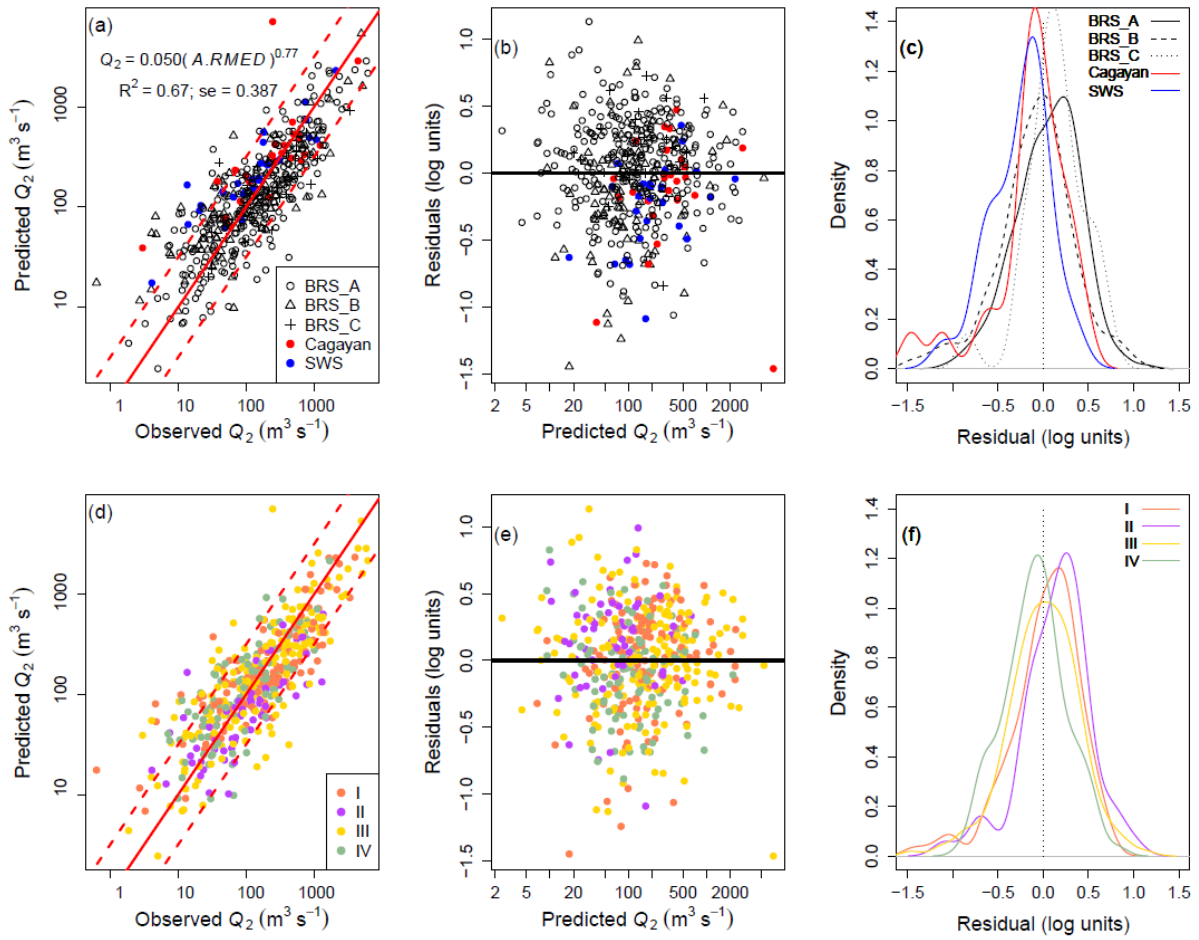
Figure S7. Observed values, prediction and residuals for Q_2 as a function of catchment area (A) multiplied by
median daily maximum rainfall (*RMED*). (a)-(c) stratified by data source, (d)-(f) by climate type. (a),(d) are
predicted vs. observed values, with 1:1 (solid), 1:2 and 2:1 (dashed) lines shown. Residuals (b) and (e) are
normally distributed and show no systematic variation with predicted Q_2. Density plots of residuals (c), (f)
confirm the absence of systematic variation with data source and climate type.
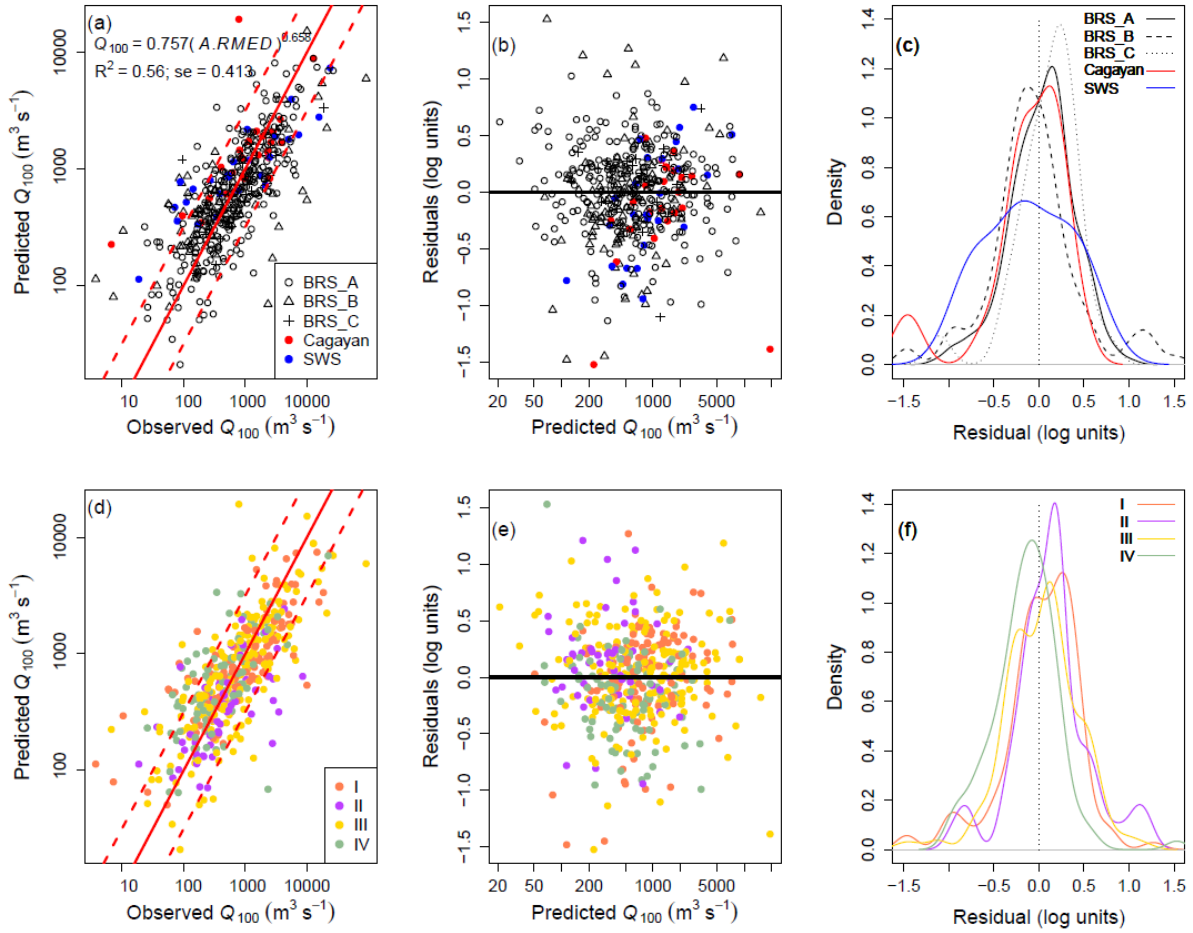
Figure S8. Observed values, prediction and residuals for Q_{100} as a function of catchment area (A) multiplied by median daily maximum rainfall (*RMED*). (a)-(c) stratified by data source, (d)-(f) by climate type. (a),(d) are predicted vs. observed values, with 1:1 (solid), 1:2 and 2:1 (dashed) lines shown. Residuals (b) and (e) are normally distributed and show no systematic variation with predicted Q_{100}. Density plots of residuals (c), (f) confirm the absence of systematic variation with data source and climate type.
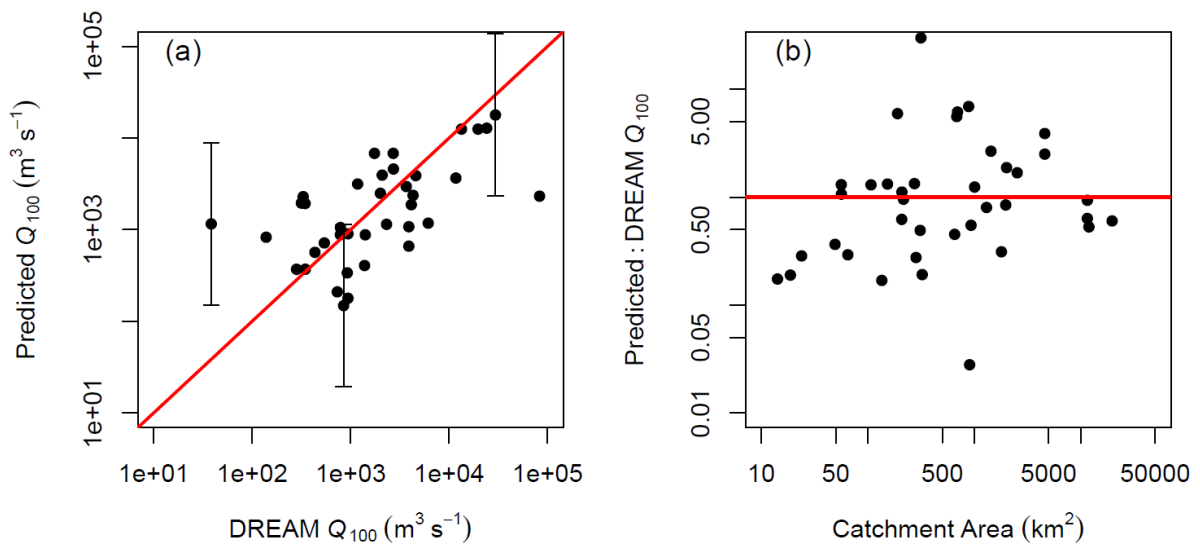
Figure S9. (a) Comparison between Q_{100} estimates based on catchment area (Table 5) and HEC-HMS estimates from the DREAM project. Red line is 1:1 equivalence. (b) Effect of catchment area on the ratio between Q_{100} values from this paper and the DREAM HEC-HMS modelling. Red line shows equal Q_{100} values from both

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methods. DREAM estimates are instantaneous peak flows whereas the estimates herein are daily means. As catchment area increases, equivalence between the two methods would show the Q_{100} ratio increasing towards 1.0 as catchment area increases, with lower values in smaller catchments in which flood peaks are of much less than one day duration. 95% prediction intervals are shown for selected points on (a) to indicate the magnitude of statistical uncertainty in the predictions. These are approximated as ±2s.e., where s.e. is the regression standard error given in Table 5.

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