Table C1: characteristics of all rainfall events used in one or more calibration scenarios.

Event #	Precipitation sum in preceding 72 hr	Precipitation sum (P_sum)	Precipitation duration (D_prec)	Average precipitation intensity (PI_mean)	Highest 30-minute average precipitation intensity (PI_30m)	Runoff volume (QV)	Percentage runoff (QV_ppP)	Peak flow rate (Q_max)	Highest 60-minute average flow rate (Q_60m)	Runoff from green areas [b]	Of which originating from impervious areas [c]	Originating from green areas [d]	Average percentage runoff from green areas [e]
	mm	mm	hr	mm/hr	mm/hr	mm	%	L/s	L/s	mm	mm	mm	%
199	2.4	13.8	41.6	0.3	4.0	1.7	12.4	4.2	3.3	0.06	0.02	0.04	0.3
209	0.2	8.0	9.5	0.8	2.8	0.5	6.9	4.5	2.7				
211	8.3	9.7	22.8	0.4	6.9	1.1	11.1	29.2	11.1				
214	7.3	6.4	12.1	0.5	4.3	0.6	10.1	40.5	8.5				
222	1.1	9.8	12.8	0.8	7.5	0.7	7.2	26.4	13.3				
270	0.0	9.3	38.5	0.2	3.5	1.1	11.3	22.9	8.7				
306	10.1	8.6	9.1	0.9	7.1	0.7	8.5	27.5	9.3				
307	18.3	29.9	37.7	0.8	8.5	4.9	16.2	71.2	42.9	1.27	0.36	0.91	3.0
310	12.7	8.6	10.0	0.9	7.5	1.2	14.0	37.4	17.4	0.17	0.05	0.12	1.4
530	13.8	6.7	2.8	2.4	7.2	0.8	11.2	58.9	13.5				
939	0.6	7.0	25.6	0.3	1.0	0.4	5.7	2.1	1.8				
962	0.0	8.5	11.2	0.8	1.4	2.1	24.9	4.9	4.4	1.09	0.31	0.78	9.2
971	0.2	2.6	18.6	0.1	1.1	0.3	11.3	4.0	2.9				
978	12.7	25.0	65.8	0.4	5.8	4.8	19.1	64.5	16.6	1.77	0.50	1.27	5.1
982	0.0	5.6	3.4	1.7	7.0	0.9	15.8	49.5	17.2	0.21	0.06	0.15	2.7
984	13.1	2.4	6.3	0.4	4.6	1.4	59.1	71.7	14.0	1.12	0.32	0.80	33.7
995	4.8	2.1	8.5	0.2	1.8	0.6	28.6	32.0	9.7	0.35	0.10	0.25	11.9
997	2.2	24.6	49.0	0.5	2.4	5.1	20.7	15.0	6.9	2.14	0.61	1.53	6.2
1001	0.0	35.3	56.6	0.6	8.6	8.8	25.0	56.5	32.5	4.58	1.30	3.28	9.3
1004	22.5	4.2	13.9	0.3	5.9	1.1	25.2	33.3	10.6	0.56	0.16	0.40	9.5
1019	0.5	22.3	49.7	0.4	2.3	4.7	21.2	12.9	9.3	2.06	0.58	1.47	6.6
1028	6.2	2.8	7.0	0.4	1.3	1.2	43.5	6.3	4.2	0.89	0.25	0.64	22.5

a Calculated assuming 100% runoff from impervious areas: a = QV − 0.12 P_sum, where 0.12 is the percentage of directly connected impervious area. (Some of this runoff originated from impervious areas that drained to green areas).
b Calculated as b = a (25 / (25+63)), where 25 and 63 are the percentages of indirectly connected impervious surfaces and green surfaces respectively.
c Calculated as c = a − b
d Calculated as d = c / P_sum

Table C2: calibrated rainfall multipliers and new percentages runoff.

Event #	N_T6	T32S_D_prec	T32S_P_sum	T32S_PI_mean	T32S_Q_60m	T32S_Q_max	T32S_QV_ppP	T6_D_prec	T6_P_sum	T6_PI_30m	T6_PI_mean	T6_Q_60m	T6_Q_max	T6_QV_ppP	Mean	New P	New QV_ppP	Swap stage
199								0.58	0.58						0.58	8.0	**21.4**	
209				0.48							0.48				0.48	3.8	14.3	gray > green
211		0.70	0.70		0.70	0.70									0.70	6.8	**15.8**	gray > green
214						1.16									1.16	7.4	8.7	
222			0.68		0.68						0.68				0.68	6.7	<u>10.6</u>	
270		1.24	1.22				1.28	1.26							1.25	11.7	9.1	
306				0.74							0.70	0.74			0.73	6.3	<u>11.7</u>	
307	1.48		**1.46**	1.48	1.48	1.48		1.48	1.44	1.44	1.52	1.48			1.47	44.0	<u>11.0</u>	green > gray
310				1.06	1.06					1.06	1.06	1.14			1.08	9.2	13.0	
530	1.14			1.10	1.10	1.12	1.04			1.08	1.08		1.14		1.10	7.4	10.2	
939		0.60													0.60	4.2	9.5	
962														0.98	0.98	8.3	**25.4**	
971							1.08								1.08	2.8	10.4	
978	1.38	1.38	**1.34**			1.34		1.40	1.42			1.36	1.38		1.38	34.4	13.9	
982	1.22			1.20							1.26	1.22	1.26		1.23	6.9	12.8	
984					2.02	1.94						2.12	2.00	1.90	2.00	4.8	**29.6**	
995						2.92								2.88	2.90	6.1	9.9	green > gray
997								1.24	1.26						1.25	30.8	16.6	
1001	1.70	1.66	**1.60**		1.64			1.66	1.66	1.60		1.64	1.70	1.64	1.65	58.2	15.1	
1004														0.78	0.78	3.3	**32.3**	
1019	1.46	1.48						1.46	1.44						1.46	32.6	14.5	
1028							1.30								1.30	3.7	**33.4**	

Table C3: Calibration and validation performance of single and two-stage calibration scenarios. HR denotes the high-resolution model, LR the low resolution model. The names of the calibration scenarios are explained in paper III.

Calibration scenario	Calibration (6 events)		Validation (19 events)							
	NSE		# events NSE > 0.5		Mean NSE [a]		Volume error		Peak flow ratio	
	HR	LR	HR	LR	HR	LR	HR	LR	HR	LR
N_T6	0.80	0.84	12	7	0.45	0.21	–0.24	–0.43	0.91	0.50
T6_D_prec	0.74	0.81	11	6	0.43	0.34	–0.25	–0.44	0.91	0.51
T6_P_sum	0.75	0.75	11	8	0.45	0.22	–0.23	–0.38	0.91	0.60
T6_PI_30m	0.74	0.74	9	9	0.29	0.43	–0.24	–0.34	0.98	0.74
T6_PI_mean	0.77	0.77	10	6	0.33	0.38	–0.24	–0.43	0.96	0.59
T6_Q_60m	0.79	0.81	8	6	0.37	0.29	–0.29	–0.46	0.81	0.49
T6_Q_max	0.85	0.86	12	10	0.44	0.49	–0.24	–0.36	0.92	0.64
T6_QV_ppP	0.68	0.65	12	10	0.47	0.37	–0.24	–0.40	0.90	0.66
T32S_D_prec	0.76	0.84	12	10	0.34	0.38	–0.02	–0.05	1.00	0.86
T32S_P_sum	0.83	0.68	10	13	0.34	0.51	–0.15	–0.27	0.99	0.60
T32S_PI_mean	0.83	0.78	13	13	0.44	0.46	–0.16	–0.22	1.00	0.80
T32S_Q_60m	0.79	0.73	10	10	0.33	0.28	–0.13	–0.04	0.99	1.02
T32S_Q_max	0.82	0.80	11	12	0.34	0.33	–0.13	–0.07	0.96	1.03
T32S_QV_ppP	0.70	0.67	11	12	0.46	0.46	–0.26	–0.18	0.87	0.79

[a] mean NSE was calculated after setting NSE of individual events to –1 if NSE was lower than –1, to avoid large influence from negative NSE values.