

Table S1. The CN Lookup attributes

Land use values	Description	HSG A	HSG B	HSG C	HSG D
1	Forest	37	60	73	80
2	Grassland	49	69	79	84
3	Cropland	71	81	87	90
4	Built-up	61	75	83	87
5	Wetlands	10	10	10	10
6	Water bodies	10	10	10	10

Table S2. Estimation of loss and transform model parameter values for calibration

No	SB	CN	S	I _a	T _{Lag} (min)
1	W1230	81.412	57.91	11.58	58.8
2	W1140	85.488	42.92	8.58	96.6
3	W960*	83.516	50.13	10	68.4
4	W1290	86.156	40.64	8.13	66.6
5	W900	86.792	38.61	7.72	57
6	W720	82.778	52.83	10.57	75.6
7	W870	84.935	44.96	8.99	87.6
8	W690	85.293	43.69	8.74	80.4
Mean	-	84.538	46.45	9.29	73.88

Table S3. Initial values of calibration parameters for reaches

Reach name	length (m)	slope	Muskingum coefficients (K and X)	
R20	1179.8	0.011036	0.09	0.48
R60	18265.3	0.01188	1.34	0.499
R80	3056.2	0.004254	0.3	0.48
R90	7000.9	0.018712	0.44	0.498
R110	4507.5	0.010871	0.33	0.496
R130	2857.6	0.003849	0.29	0.47
R160	11293.9	0.00425	1.13	0.494
R170	462.2	0.015257	0.03	0.474
R190	13384.8	0.001793	1.7	0.485
R290	16709.7	0.00377	1.7	0.495
R330	6998.2	0.001143	1.02	0.45
R380	25294.1	0.000672	4.38	0.471
R410	21476.6	0.000792	3.41	0.473
R420	6137.6	0.016782	0.4	0.498
R440*	736.9	0.002714	0.08	0.34

R450	37835.8	0.002432	4.5	0.496
R470	4826.7	0.007459	0.39	0.43
R490	4964.4	0.004029	0.5	0.486
R500	1403.6	0.04346	0.07	0.497
R520	5888.6	0.004585	0.56	0.49
R540	11562.7	0.000865	1.84	0.453
R590	11966.4	0.000501	2.28	0.41
R650	36844.8	0.016882	2.42	0.499
Mean	-	-	1.27	0.47

* sub-basin and reach at the outlet

Table S4. Time of streamflow peak for each event

Events	Start and End date	Time to peak
1	LR: 21/03 - 18/05/2011	07 April 2011
2	SR: 06/09 - 15/11/2011	20 October 2011
3	LR: 10/03 - 27/05/2012	25 April 2012
4	SR: 13/09 - 19/11/2012	08 November 2012
5	LR: 15/03 - 12/05/2013	07 May 2013
6	SR: 09/09 - 13/11/2013	19 October 2013
7	LR: 11/03 - 14/05/2014	07 May 2014
8	SR: 12/09 - 15/11/2014	11 October 2014
9	LR: 20/03 - 18/05/2015	14 May 2015
10	SR: 23/09 - 22/11/2015	11 October 2014
11	LR: 24/03 - 22/05/2016	13 April 2016
12	SR: 12/09 - 15/11/2016	11 November 2016
13	LR: 12/03 - 14/05/2017	28 March 2017
14	SR: 18/09 - 23/11/2017	19 October 2017
15	LR: 10/03 - 12/05/2018	23 March 2018
16	SR: 13/09 - 15/11/2018	08 November