

Table R3.1: Sensitivity of our closure relation evaluated as percent change in total discharge volume compared to the standard runs

catchment	change in model parameters (%)	% change in total discharge volume				
		Ks	Hf	mc	LAI	Ic
L	-25	11.95	6.36	-5.32	2.46	2.48
	25	-6.93	-3.51	4.9	-2.31	-2.31
M	-25	14.07	8.48	-4.99	1.52	1.54
	25	-8.48	-5.06	6.45	-1.2	-1.2
S	-25	18.36	11.05	-5.63	0.64	0.62
	25	-10.25	-6.59	5.51	-0.65	-0.63

Ks= saturated hydraulic conductivity; Hf= matric suction at the wetting front; mc= moisture content; LAI = leaf area index; Ic = interception capacity per leaf area

Table R3.2: Sensitivity of the benchmark model evaluated as percent change in total discharge volume compared to the standard runs

catchment	% change in model parameters	% change in total discharge volume				
		Ks	Hf	mc	LAI	Ic
L	-25	13.79	8.38	-5.36	2.83	2.9
	25	-8.36	-4.87	4.33	-2.73	-2.72
M	-25	17.17	11.92	-7.7	1.74	1.77
	25	-9.84	-6.66	9.52	-1.25	-1.25
S	-25	25.96	20.01	-9.89	0.71	0.71
	25	-12.47	-9.04	13.32	-0.72	-0.7

Ks= saturated hydraulic conductivity; Hf= matric suction at the wetting front; mc= moisture content; LAI = leaf area index; Ic = interception capacity per leaf area

Table R3.3: Ksat (mm/h) measured in the field and values reported in Rawls et al. (1982) which are used for the uncalibrated runs, including the calibrated Ksat values for our closure relation and benchmark model.

Unit type	Number of measurements	min	max	mean	Standard deviation	values used in this study (Rawls et al., 1982)	Calibrated values in proposed closure relation	Calibrated values in benchmark closure relation
Alluvial fan (coarse)	201	9	125	75.76	25.4	4.3	51.8	860
Alluvial fan (fine)	126	15	125	63.8	26.34	2.3	27.8	460
colluvium	10	22	101	67.10	21.85	2.3	27.8	460
River plain	60	10	125	86.98	28.65	4.3	51.8	860

Table R3.4 : statistics of scaling parameters for an event on 17 June 2010

parameters	calibration	min	max	mean	Standard deviation	skewness
a	No calibration	96.79	600.73	189.39	84.34	2.53
	calibration	137.22	589.51	288.48	94.89	0.89
b	No calibration	0.014	0.065	0.037	0.013	0.52
	calibration	0.004	0.065	0.025	0.015	0.905
c	No calibration	0.07	0.25	0.13	0.034	0.5
	calibration	0.08	0.17	0.12	0.022	-0.23

Table R3.5: model sensitivity evaluating as a hydrograph shift at the time of peak discharge from the standard runs (i.e. n=0.03)

catchment	n	Time shift at peak discharge (h)	
		Our closure relation	Benchmark model
L	0.02	-0.12	-0.15
	0.05	0.32	0.43
M	0.02	-0.08	-0.13
	0.05	0.15	0.23
S	0.02	-0.07	-0.03
	0.05	0.08	0.08

n = manning's coefficient

Table R3.6: Discharge measurements (salt dilution method to fit discharge – stage relation) and extrapolation of discharge.

catchment	Number of discharge measurements	Maximum Q measured with salt dilution (m ³ /h)	Max peak discharge in hydrograph (m ³ /h)	Number of events with peak Q not exceeding the max measured Q	Number of events whose peak Q exceeded maximum measured Q			
					Between 1-2 order of magnitude exceedance	Between 2-3 order of magnitude exceedans	Between 3-4 order of magnitude exceedance	More than 4 order of magnitude exceedance
L	19	5328	57991	8	3	2	1	1
M	17	2160	6251	6	-	1	-	-
S	5	345	5150	5	3	1	1	7

Q= discharge