

**Table S1.** Established comparison of the IDF relationship estimated through different methods for station 2072 for different return periods.

Return period	Method	IDF (mm/hr) Station 2072				
		10 (min)	20 (min)	30 (min)	60 (min)	120 (min)
10 years	(A)	38.3	28.1	22.3	14.6	10.5
	(C)	48.0	38.0	26.0	16.0	13.0
	(H)	59.1	41.2	31.7	20.0	13.0
	(I)	57.7	41.4	32.9	21.2	13.2
25 years	(A)	44.3	32.4	25.6	16.7	12.0
	(C)	57.0	40.0	31.0	20.0	15.0
	(H)	70.0	47.9	37.4	23.8	15.2
	(I)	68.1	48.8	38.8	25.06	15.59
50 years	(A)	48.7	35.5	28.0	18.19	13.08
	(C)	64.0	45.0	35.0	22.0	18.0
	(H)	78.3	53.7	41.9	25.8	17.0
	(I)	76.0	54.5	43.3	28.0	17.4
100 years	(A)	53.1	38.7	30.4	19.7	14.2
	(C)	71.0	50.0	38.0	24.0	20.0
	(H)	86.6	59.4	46.2	29.2	19.0
	(I)	83.9	60.1	47.8	30.9	19.2

(A) Estimated from pluviograph records using Gumbel (equation 1).

(C) Estimated from isohyetal map of the SCT.

(H) Estimated from the average of IDF developed by methods A, B, C, D, E, F, and G.

(I) Estimated from Chen equation using the (*R*) ratio proposed (equation 8).

**Table S2.** Established comparison of IDF relationship estimated through different methods for the station 2036 for different return periods.

Return period	Method	IDF (mm/hr) Station 2036				
		10 (min)	20 (min)	30 (min)	60 (min)	120 (min)
10 years	(A)	32.9	24.9	20.8	14.6	10.4
	(C)	74.0	49.0	34.0	24.0	19.0
	(H)	67.7	48.0	37.5	24.8	16.4
	(I)	76.7	54.9	43.7	28.3	17.7
25 years	(A)	37.5	28.5	23.8	16.7	11.9
	(C)	93.0	62.0	43.0	30.0	24.0
	(H)	82.9	58.8	45.9	30.3	20.1
	(I)	93.9	67.2	53.5	34.6	21.6
50 years	(A)	41.0	31.1	26.0	18.2	13.1
	(C)	107.0	71.0	49.0	35.0	28.0
	(H)	94.3	66.9	52.1	34.5	22.9
	(I)	107.0	76.6	60.9	39.5	24.7
100 years	(A)	44.4	33.7	28.2	19.7	14.2
	(C)	121.0	81.0	55.0	40.0	31.0
	(H)	105.7	75.0	58.3	38.8	25.5
	(I)	120.1	86.0	68.4	44.3	27.7

(A) Estimated from pluviograph records using Gumbel (equation 1).

(C) Obtained from the isohyetal map of the SCT.

(H) Estimated from the average of IDF developed by methods A, B, C, D, E, and F.

(I) Estimated from the Chen equation using the proposed ( $R$ ) ratio (equation 8).

**Table S3.** Established comparison of the IDF relationship estimated through different methods for the station 2035 for different return periods.

Return period	Method	IDF (mm/hr) Station 2035				
		10 (min)	20 (min)	30 (min)	60 (min)	120 (min)
10 years	(A)	57.5	40.4	33.0	21.5	11.9
	(C)	60.0	40.0	30.0	23.0	16.0
	(H)	61.6	43.5	34.4	22.9	14.2
	(I)	63.6	45.6	36.2	23.2	14.2
25 years	(A)	74.5	52.6	42.8	27.8	15.1
	(C)	78.0	57.0	42.0	29.0	21.0
	(H)	76.1	54.9	44.1	27.8	17.3
	(I)	76.8	55.1	43.7	28.0	17.2
50 years	(A)	87.1	61.7	50.0	32.5	17.5
	(C)	90.0	65.0	50.0	35.0	24.0
	(H)	86.4	61.1	48.4	31.5	19.6
	(I)	86.8	62.3	49.4	31.7	19.4
100 years	(A)	99.6	70.7	57.2	37.1	19.8
	(C)	110.0	75.0	60.0	40.0	28.0
	(H)	99.4	70.1	55.0	36.1	22.7
	(I)	96.9	69.5	55.1	35.3	21.7

(A) Estimated from pluviograph records using Gumbel (equation 1).

(C) Obtained from the isohyetal map of the SCT.

(H) Estimated from the average of IDF developed by methods A, B, C, D, E, and F.

(I) Estimated from the Chen equation using the (*R*) ratio proposed (equation 8).