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Remote sensing-aided rainfall–runoff modeling in the tropics of Costa Rica

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Supplement

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Figure S2. Statistics of CHIRPS and corrected CHIRPS (CHIRPSc) performance with respect to ground precipitation. a) computed normalized MAE at daily scale, b) computed normalized MAE at monthly scale, c) computed normalized MAE at annual scale and d) confusion matrix of days with rain and days without rain, e) False alarm ratio between ground precipitation and CHIRPS, f) Probability of detection, g) Threat Score. MAE was normalized by the mean of precipitation.

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Qt66)/(0.66-0.33). RC is the streamflow coefficient (mean annual Qt/Prec). AI is the aridity index (mean annual PET/Prec). EI is the evaporative index (mean annual ET/Prec).

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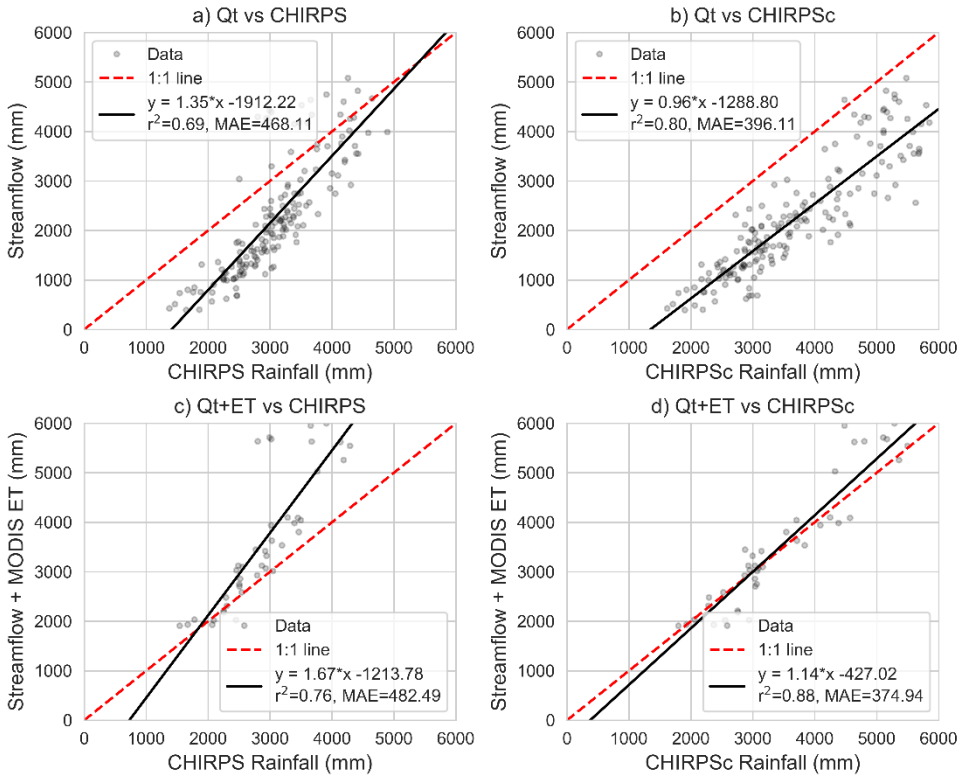
Introduction

This supplementary material contains additional results for the precipitation bias correction. Figures S1 and S2 show the errors obtained by the bias correction technique at different time scales and the comparison of annual streamflow and precipitation.

Tables show detailed model performance results and simulated hydrological signatures for the monitored catchments.



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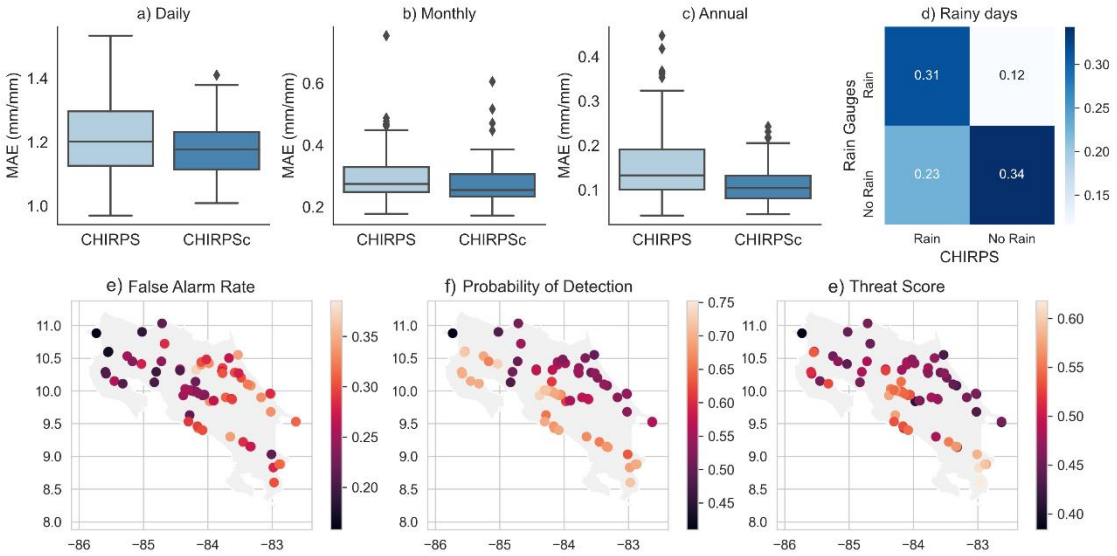

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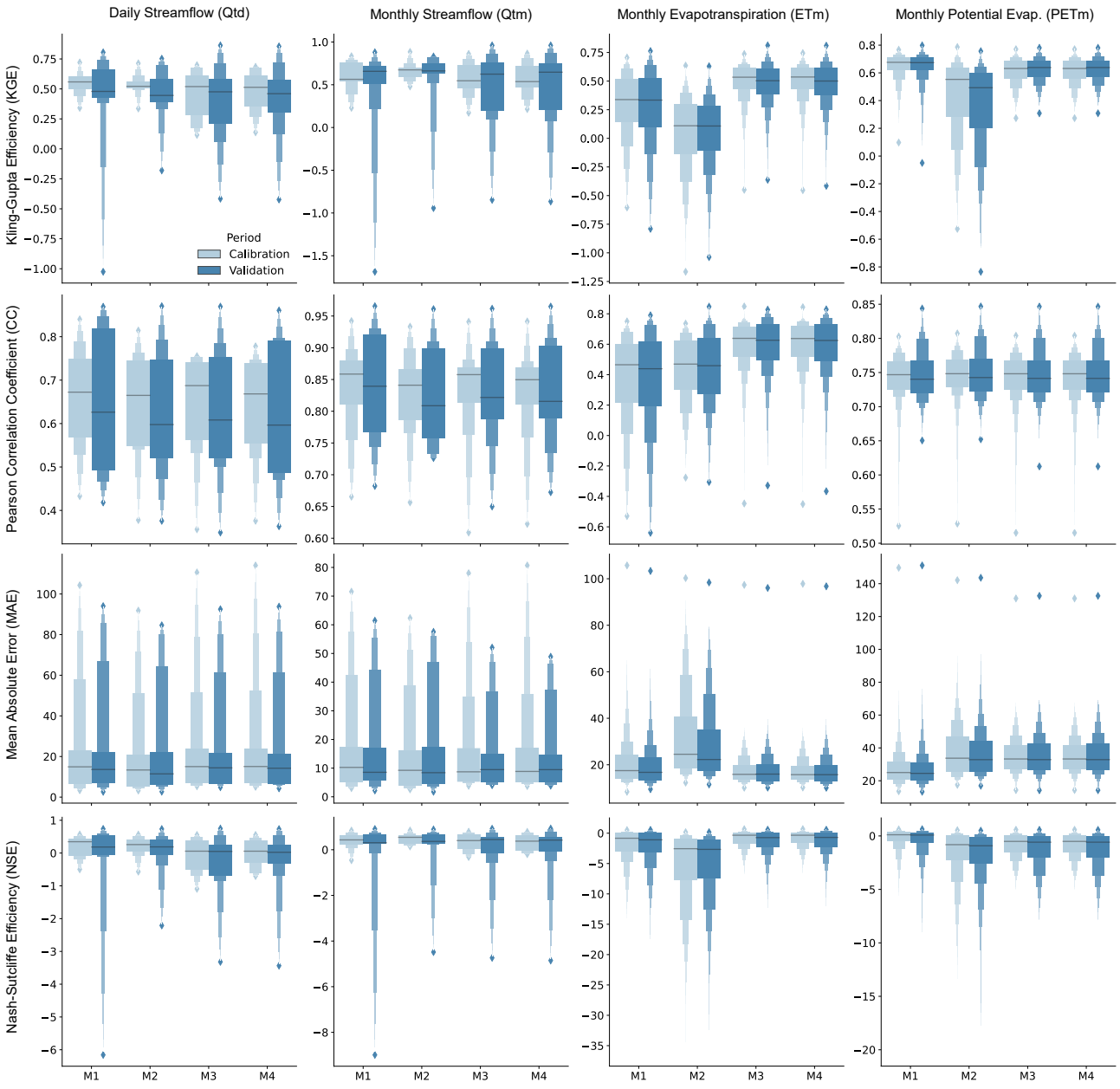

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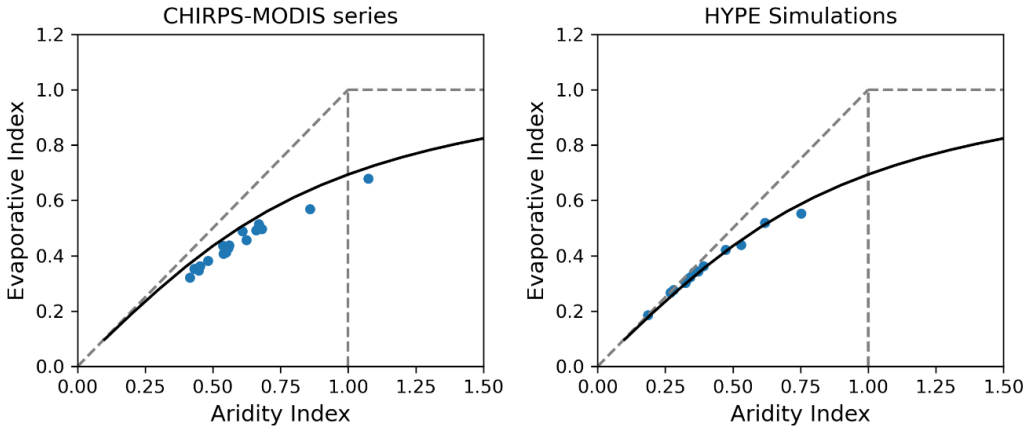

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Statistic	Model	Cariblanco	Oriente	Dos Montanas	Terron Colorado	Guatuso
Mean.Qtd ($m^3 s^{-1}$)	Obs	8.51	28.75	53.65	137.58	26.7
	M1	8.09	29.3	53.69	135.87	28.1
	M2	7.73	28.65	48.98	125.69	25.37
	M3	9.32	33.65	63.29	139.28	29.09
	M4	9.32	33.64	63.25	139.07	29.11
Median.Qtd ($m^3 s^{-1}$)	Obs	7.44	26.1	47.2	127	21
	M1	7.74	29.01	51.86	120.42	19.06
	M2	6.16	27.73	43.23	95.95	15.68
	M3	8.4	31.53	56.67	116.81	20.08
	M4	8.79	32.34	59.75	121.63	21.16
Slope.Qtd ($m^3 s^{-1}$)	Obs	10.05	44.43	78.18	213.41	43.33
	M1	18.99	73	128.03	500.44	97.06
	M2	15.24	69.23	93.46	363.09	68.96
	M3	24.62	76.73	131.15	417.68	75.91
	M4	23.2	76.04	126.09	443.05	80.24
CV.Qtd (-)	Obs	0.74	0.62	0.71	0.64	0.99
	M1	0.83	0.74	0.73	0.9	1.04
	M2	0.99	0.73	0.69	0.88	1.11
	M3	0.99	0.74	0.74	0.83	0.99
	M4	0.87	0.71	0.7	0.82	0.95
SC (-)	Obs	0.66	0.71	0.61	0.54	0.67
	M1	0.62	0.72	0.61	0.53	0.70
	M2	0.59	0.70	0.55	0.49	0.63
	M3	0.72	0.82	0.72	0.54	0.72
	M4	0.72	0.82	0.72	0.54	0.72
AI (-)	Obs	0.3	0.31	0.38	0.44	0.34
	M1	0.4	0.31	0.4	0.41	0.38
	M2	0.44	0.33	0.46	0.49	0.48
	M3	0.28	0.19	0.27	0.37	0.34
	M4	0.28	0.19	0.27	0.37	0.34
EI (-)	Obs	0.25	0.24	0.31	0.35	0.26
	M1	0.38	0.3	0.38	0.36	0.35
	M2	0.41	0.32	0.44	0.41	0.42
	M3	0.28	0.19	0.27	0.35	0.32
	M4	0.28	0.19	0.27	0.35	0.32

Table S2. Computed flow metrics for monitored catchments on the Pacific slope. Streamflow period from 1991-2003. PET-ET period from 2001 to 2014. Qtd is daily streamflow. Slope.Qtd corresponds to the flow duration curve slope (Qt33-Qt66)/(0.66-0.33). RC is the streamflow coefficient (mean annual Qt/Prec). AI is the aridity index (mean annual PET/Prec). EI is the evaporative index (mean annual ET/Prec).

Statistic	Model	Providencia	Tacares	Guapinol	Caracucho	El Rey	Rancho Rey	Guardia	Palmar
Mean.Qtd ($m^3 s^{-1}$)	Obs	6.8	11.16	10.52	72.31	34.92	9.52	24.51	301.65
	M1	8.35	10.98	9.39	60.38	29.98	12.07	25.32	312.64
	M2	8.27	10.87	9.34	57.66	29.18	11.25	23.64	306.44
	M3	10.3	13.66	10.38	75.75	36.34	12.66	30.34	353.03
	M4	10.3	13.61	10.33	75.59	36.15	12.62	30.25	352.19
Median.Qtd ($m^3 s^{-1}$)	Obs	4.44	8.35	6.35	50	17.6	6.72	12.6	216
	M1	6.14	6.94	3.82	43.13	16.88	5.54	9.11	264.58
	M2	5.39	6.99	5.07	38.36	18.49	7.47	13.11	236.48
	M3	7.39	9.26	6.09	58.96	20.59	8.74	12.49	299.49
	M4	8.07	9.14	4.82	60.19	19.03	7.47	10.83	301.87
Slope.Qtd ($m^3 s^{-1}$)	Obs	12.27	18.11	20.15	133.19	63.02	10.09	20.76	687.88
	M1	22.58	34.91	25.92	166.87	78.79	28.85	51.15	972.81
	M2	13.92	22.84	22.58	90.28	60.29	24.86	30.71	699.81
	M3	33.63	40.65	25.42	187.28	88.75	26.42	46.49	959.84
	M4	31.56	44.28	25.86	201.09	96.28	26.92	42.32	1018.52
CV.Qtd (-)	Obs	0.96	0.68	1.39	1.01	1.39	1.12	2.08	1.04
	M1	0.98	1	1.21	0.95	1.15	1.2	1.68	0.92
	M2	0.93	1.02	1.11	0.89	1.1	0.95	1.39	0.9
	M3	1.03	1.01	1.06	0.83	1.08	0.89	1.42	0.85
	M4	0.95	1.01	1.08	0.82	1.09	0.91	1.42	0.85
RC (-)	Obs	0.48	0.53	0.59	0.62	0.58	0.38	0.36	0.58
	M1	0.60	0.52	0.53	0.53	0.50	0.48	0.38	0.60
	M2	0.59	0.52	0.52	0.50	0.49	0.44	0.35	0.59
	M3	0.74	0.65	0.58	0.66	0.61	0.50	0.46	0.68
	M4	0.74	0.65	0.58	0.66	0.61	0.50	0.46	0.68
AI (-)	Obs	0.54	0.52	0.73	0.54	0.66	0.8	0.94	0.51
	M1	0.56	0.63	0.67	0.54	0.69	0.68	0.87	0.47
	M2	0.56	0.66	0.7	0.58	0.74	0.76	0.97	0.49
	M3	0.33	0.39	0.53	0.36	0.47	0.63	0.72	0.35
	M4	0.33	0.39	0.53	0.36	0.47	0.63	0.72	0.35
EI (-)	Obs	0.39	0.42	0.54	0.41	0.51	0.53	0.6	0.39
	M1	0.45	0.5	0.5	0.47	0.53	0.56	0.63	0.4
	M2	0.46	0.5	0.5	0.5	0.54	0.6	0.65	0.42
	M3	0.31	0.36	0.44	0.34	0.42	0.53	0.54	0.33
	M4	0.31	0.37	0.44	0.34	0.42	0.54	0.54	0.33