

Evaluation of 32 Simple Equations Against the Penman-Monteith Method to Estimate the Reference Evapotranspiration in the Hexi Corridor, Northwest China

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Table S1. A summary of mean statistical metrics averaged for each river basin before calibration.

Models	Timescale	Slope			R ²			MAE			RMSE			PBIAS			NSE		
		SLRB	HRBS	SYRBS	SLRB	HRBS	SYRBS	SLRB	HRBS	SYRBS	SLRB	HRBS	SYRBS	SLRB	HRB	SYRBS	SLRB	HRBS	SYRBS
ABT1	Monthly	0.49	0.56	0.57	0.89	0.87	0.87	1.17	0.93	1.01	1.45	1.1	1.17	10.34	−11.25	−19.54	0.66	0.69	0.55
	Daily	0.37	0.44	0.46	0.52	0.52	0.5	1.6	1.44	1.44	2.16	1.79	1.77	5.25	−15.02	−23.44	0.46	0.44	0.34
ABT2	Monthly	0.81	0.92	0.93	0.91	0.88	0.88	1.8	1.02	1.01	1.96	1.15	1.12	37.26	24.96	26.34	0.23	0.63	0.55
	Daily	0.58	0.69	0.73	0.59	0.61	0.63	1.9	1.28	1.18	2.43	1.69	1.57	32.47	19.83	20.49	0.25	0.49	0.48
AHO1	Monthly	0.99	1.1	1.16	0.94	0.92	0.91	0.6	0.73	0.86	0.76	0.91	1.02	2.5	−18.46	−25.43	0.9	0.76	0.54
	Daily	0.76	0.84	0.86	0.75	0.73	0.72	1.14	1.15	1.22	1.54	1.5	1.54	−4.56	−24.06	−31.55	0.71	0.6	0.44
AHO2	Monthly	0.88	0.99	1.03	0.94	0.92	0.91	0.87	1.36	1.48	1	1.46	1.59	−16.63	−41.88	−51.02	0.82	0.39	−0.04
	Daily	0.69	0.76	0.78	0.74	0.74	0.73	1.45	1.67	1.77	1.79	1.95	2.02	−24.13	−47.92	−57.69	0.61	0.32	0.05
ALB	Monthly	2.08	1.98	1.99	0.98	0.99	0.99	3.42	2.69	2.46	4.11	3.29	3.01	−99.45	−83.91	−82.65	−3.09	−2	−2.17
	Daily	2.01	1.96	1.99	0.95	0.97	0.96	2.8	2.28	2.18	3.55	3	2.91	−96.22	−82.72	−83.09	−2.4	−1.51	−1.63
BERT	Monthly	0.72	0.86	0.89	0.93	0.9	0.89	1.47	0.76	0.73	1.7	0.93	0.88	34.48	18.69	15.73	0.52	0.78	0.76
	Daily	0.54	0.64	0.68	0.67	0.68	0.69	1.58	1.05	0.97	2.2	1.5	1.37	30.74	15.92	13	0.43	0.62	0.62
BRO	Monthly	0.58	0.62	0.62	0.74	0.66	0.63	3.38	2.3	2.29	3.52	2.44	2.43	57.38	49.51	52.64	−3.93	−2.12	−3.01
	Daily	0.28	0.37	0.4	0.31	0.37	0.4	3.16	2.2	2.16	3.76	2.7	2.6	52.77	44.92	47.36	−1.24	−0.53	−0.69
BRWE	Monthly	0.22	0.21	0.21	1	1	1	3.28	2.62	2.45	3.82	3.05	2.83	79.44	79.42	79.85	−1.36	−1.36	−1.56
	Daily	0.22	0.21	0.21	0.99	0.98	0.99	3.09	2.53	2.36	3.84	3.16	2.93	79.07	79.19	79.62	−0.75	−0.71	−0.78
DAL1	Monthly	0.84	1.01	1.06	0.92	0.9	0.89	1	0.55	0.6	1.2	0.74	0.79	20.73	1.09	−3.58	0.76	0.86	0.77
	Daily	0.63	0.75	0.78	0.68	0.68	0.68	1.33	0.99	0.96	1.89	1.42	1.35	16.3	−2.11	−6.73	0.58	0.65	0.61
DAL2	Monthly	0.88	1.04	1.09	0.93	0.9	0.89	1.06	0.59	0.63	1.24	0.76	0.81	21.74	2.87	−0.68	0.74	0.85	0.77
	Daily	0.66	0.78	0.82	0.67	0.68	0.69	1.39	1.01	0.97	1.93	1.43	1.35	17.23	−0.49	−3.97	0.56	0.64	0.61
DALT	Monthly	1.46	1.48	1.43	0.98	0.98	0.98	1.63	1.48	1.26	2.06	1.83	1.52	−40.11	−45.13	−41.34	0.25	0.15	0.24
	Daily	1.41	1.43	1.41	0.92	0.93	0.94	1.74	1.58	1.35	2.28	2.06	1.76	−48.26	−50.82	−46.68	0.18	0.19	0.28
DORJ	Monthly	0.52	0.62	0.67	0.92	0.9	0.89	1.8	1.01	0.86	2.19	1.3	1.11	42.93	28.27	23.66	0.22	0.58	0.62
	Daily	0.39	0.46	0.48	0.67	0.67	0.68	1.77	1.19	1.09	2.54	1.76	1.57	39.83	26.1	21.53	0.24	0.47	0.51
HARG	Monthly	0.74	0.86	0.88	0.94	0.9	0.9	1.36	0.7	0.66	1.59	0.87	0.82	31.77	16.4	13.53	0.59	0.81	0.8
	Daily	0.57	0.67	0.7	0.66	0.66	0.67	1.49	1.04	0.96	2.11	1.5	1.38	27.32	12.63	9.55	0.48	0.62	0.61
H-S	Monthly	0.82	0.98	1.02	0.93	0.9	0.89	1.16	0.6	0.62	1.36	0.76	0.79	25.5	7.48	3.99	0.69	0.85	0.79
	Daily	0.62	0.73	0.76	0.67	0.69	0.69	1.42	1	0.94	1.99	1.42	1.33	21.24	4.34	0.91	0.53	0.65	0.63
IRM1	Monthly	0.67	0.79	0.83	0.92	0.89	0.88	1.62	0.84	0.74	1.87	1.03	0.92	35.64	20.94	16.97	0.38	0.72	0.74

IRM2	Daily	0.48	0.57	0.61	0.61	0.62	0.64	1.7	1.15	1.05	2.34	1.63	1.46	31.56	17.3	13.15	0.33	0.54	0.57
	Monthly	0.59	0.71	0.75	0.89	0.87	0.85	1.3	0.7	0.7	1.69	0.94	0.91	29.24	9.27	0.79	0.54	0.78	0.75
JENH	Daily	0.42	0.5	0.53	0.58	0.58	0.58	1.53	1.16	1.14	2.24	1.63	1.54	25.19	6.13	-2.53	0.41	0.54	0.52
	Monthly	1.04	1.14	1.15	0.87	0.81	0.81	1.66	1	0.96	1.82	1.16	1.11	28.84	14.14	13.68	0.16	0.54	0.46
MAHR	Daily	0.68	0.79	0.83	0.54	0.55	0.57	1.96	1.42	1.3	2.41	1.8	1.67	23.82	9.79	9.19	0.2	0.38	0.37
	Monthly	1.19	1.16	1.14	1	1	1	0.51	0.38	0.3	0.71	0.52	0.42	-12.27	-11.2	-8.98	0.91	0.93	0.95
MAK	Daily	1.19	1.18	1.16	1	0.99	0.99	0.54	0.42	0.35	0.8	0.64	0.55	-13.98	-12.41	-10.23	0.91	0.93	0.94
	Monthly	0.22	0.26	0.27	0.89	0.78	0.73	3.93	2.87	2.53	4.32	3.22	2.87	84.14	80.25	79.66	-2.58	-1.88	-1.68
MEY	Daily	0.16	0.2	0.21	0.6	0.56	0.54	3.7	2.8	2.51	4.41	3.42	3.08	83.17	79.23	78.48	-1.47	-1.09	-0.98
	Monthly	1.35	1.38	1.33	0.98	0.96	0.97	1.19	1.2	0.99	1.58	1.52	1.21	-29.58	-36.62	-32.74	0.52	0.41	0.49
OUD	Daily	1.27	1.31	1.29	0.9	0.9	0.93	1.37	1.31	1.1	1.91	1.8	1.49	-37.22	-41.89	-37.71	0.44	0.4	0.48
	Monthly	0.43	0.48	0.49	0.88	0.84	0.83	3.46	2.46	2.24	3.68	2.65	2.42	69.13	62.65	62.42	-2.02	-1.26	-1.29
PENM	Daily	0.3	0.34	0.36	0.57	0.58	0.6	3.21	2.33	2.14	3.82	2.85	2.6	67.08	60.94	60.58	-0.96	-0.5	-0.48
	Monthly	0.72	0.76	0.73	0.93	0.92	0.95	1.32	0.8	0.83	1.58	1.01	1	30.45	22.78	25.46	0.57	0.74	0.64
P-T	Daily	0.62	0.68	0.67	0.77	0.8	0.83	1.4	0.92	0.9	1.91	1.31	1.26	26.49	19.99	22.8	0.57	0.71	0.67
	Monthly	0.22	0.26	0.28	0.87	0.76	0.71	3.48	2.62	2.4	4	3.03	2.76	84.11	79.27	77.73	-1.59	-1.32	-1.4
ROH	Daily	0.17	0.2	0.22	0.64	0.58	0.55	3.25	2.5	2.29	4.08	3.19	2.91	82.93	78.1	76.53	-0.96	-0.74	-0.72
	Monthly	1.48	1.47	1.43	0.98	0.98	0.99	1.67	1.44	1.23	2.09	1.76	1.48	-40.98	-43.68	-40.23	0.25	0.21	0.29
ROM	Daily	1.44	1.44	1.42	0.94	0.95	0.95	1.74	1.53	1.32	2.25	1.98	1.71	-48.66	-49.27	-45.5	0.19	0.24	0.33
	Monthly	1.14	1.18	1.13	0.96	0.96	0.96	0.69	0.62	0.55	0.87	0.82	0.68	-8.48	-16.93	-15.37	0.84	0.82	0.8
TAB1	Daily	1.02	1.07	1.06	0.82	0.84	0.84	1.12	0.98	0.9	1.58	1.4	1.26	-17.55	-24.48	-23.39	0.68	0.65	0.63
	Monthly	1.11	1.32	1.38	0.93	0.9	0.89	0.8	0.95	0.98	1.03	1.31	1.31	-0.42	-24.71	-29.41	0.81	0.5	0.24
TAB2	Daily	0.83	0.99	1.03	0.67	0.69	0.69	1.36	1.32	1.31	1.9	1.88	1.81	-6.15	-28.93	-33.56	0.55	0.37	0.23
	Monthly	1	1.19	1.24	0.93	0.9	0.89	0.82	0.7	0.74	1.02	0.97	0.99	9.3	-12.64	-16.88	0.83	0.73	0.56
TAB3	Daily	0.75	0.89	0.94	0.67	0.69	0.69	1.32	1.13	1.11	1.84	1.6	1.54	4.12	-16.45	-20.63	0.59	0.55	0.46
	Monthly	0.56	0.64	0.66	0.92	0.89	0.89	1.5	0.81	0.72	1.9	1.1	0.96	35.49	20.06	14.84	0.42	0.69	0.72
TAB4	Daily	0.42	0.49	0.51	0.6	0.6	0.6	1.62	1.15	1.07	2.37	1.69	1.53	31.53	17.02	11.8	0.34	0.51	0.53
	Monthly	0.58	0.67	0.72	0.9	0.87	0.88	2.2	1.28	1.07	2.45	1.5	1.27	46.6	33.87	30.68	-0.15	0.36	0.48
TRAB	Daily	0.4	0.47	0.51	0.58	0.58	0.6	2.1	1.41	1.24	2.78	1.95	1.71	43.4	31.39	27.57	0.04	0.32	0.4
	Monthly	0.13	0.12	0.12	1	1	1	3.63	2.91	2.71	4.24	3.39	3.13	87.93	88.04	88.28	-1.91	-1.91	-2.14
TRAJ	Daily	0.13	0.13	0.13	1	1	0.99	3.42	2.8	2.61	4.27	3.51	3.25	87.71	87.9	88.14	-1.15	-1.11	-1.18
	Monthly	0.67	0.8	0.83	0.93	0.9	0.89	1.66	0.91	0.83	1.92	1.09	0.99	39.56	24.73	21.48	0.39	0.7	0.7
WMO	Daily	0.5	0.59	0.62	0.68	0.68	0.69	1.69	1.12	1.03	2.34	1.59	1.44	36.13	22.21	19.01	0.36	0.57	0.58
	Monthly	0.96	0.92	0.91	1	1	0.99	0.39	0.43	0.43	0.43	0.47	0.47	9.38	12.88	14.29	0.97	0.94	0.92
	Daily	1	0.96	0.94	0.98	0.98	0.98	0.36	0.37	0.37	0.48	0.45	0.45	5.09	9.36	10.94	0.97	0.96	0.95

Table S2. Regression coefficients (Ψ) used to calibrate and validate the 13 ET₀ models on a monthly timescale.

Basin	Station	WMO	MAHR	H-S	BERT	DAL1	DAL2	ROM	AHO1	AHO2	HARG	TAB1	TAB2	IRM2
HRB	Dingxin	1.17	0.94	1.3	1.48	1.22	1.24	0.97	0.99	0.78	1.41	0.96	1.07	1.29
	Gaotai	1.18	0.92	1	1.14	0.92	0.96	0.86	0.74	0.55	1.07	0.74	0.82	0.87
	Jinta	1.18	0.92	1.16	1.32	1.08	1.1	0.84	0.86	0.68	1.27	0.86	0.95	1.14
	Jiuquan	1.19	0.93	1.11	1.27	1.02	1.07	0.81	0.79	0.61	1.21	0.83	0.91	0.99
	Shangdan	1.2	0.94	1.14	1.29	1.05	1.09	0.89	0.83	0.62	1.29	0.84	0.93	1.03
	Zhangye	1.19	0.93	1	1.13	0.91	0.96	0.85	0.75	0.57	1.11	0.74	0.82	0.9
SLRB	Dunhuang	1.15	0.89	1.11	1.27	1.04	1.07	0.77	0.84	0.65	1.24	0.83	0.92	1.14
	Guazhou	1.13	0.92	1.55	1.76	1.41	1.5	0.98	1.11	0.84	1.73	1.15	1.27	1.5
	Mazongshan	1.12	0.96	1.69	1.93	1.56	1.63	1.14	1.17	0.9	1.8	1.26	1.39	1.49
	Yumenzen	1.14	0.94	1.55	1.77	1.42	1.49	1.03	1.06	0.85	1.65	1.15	1.27	1.39
SYRB	Minqin	1.18	0.93	1.26	1.43	1.16	1.2	0.92	0.95	0.72	1.41	0.93	1.03	1.2
	Wuwei	1.19	0.92	0.87	0.99	0.79	0.84	0.74	0.64	0.5	0.96	0.65	0.71	0.78
	Yongchang	1.23	0.98	1.13	1.29	1.02	1.08	1.01	0.79	0.62	1.23	0.84	0.93	0.91