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Supplement of

High-resolution global grids of revised Priestley–Taylor and Hargreaves–Samani coefficients for assessing ASCE-standardized reference crop evapotranspiration and solar radiation

Vassilis G. Aschonitis et al.

Correspondence to: Vassilis G. Aschonitis (schvls@unife.it)

Supplementary Material

Indirect verification of the data cleaning that was performed in the derived data from CIMIS database.

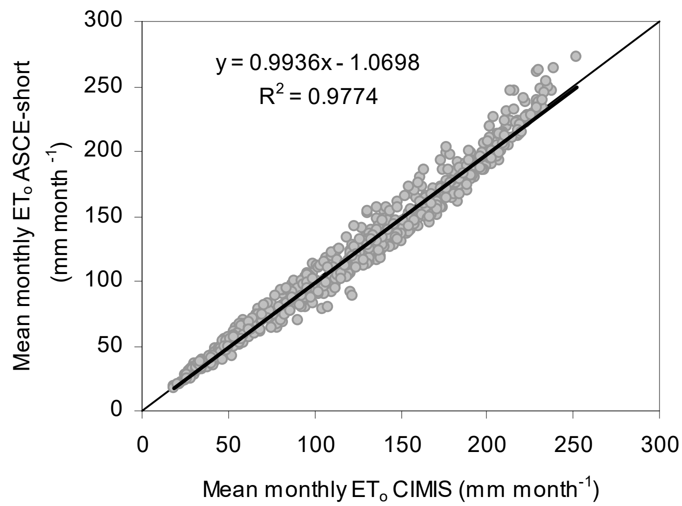

Fig.S1 Comparison between the mean monthly ET_o values of ASCE-short method using the final clean climatic data from CIMIS database versus the provided mean monthly values of ET_o by the database using the CIMIS evapotranspiration method.

General statistics of meteorological stations data (validation data) and comparison with the raster data (calibration data) used for developing the global maps of ET_o with ASCE method.

Table S1. General statistics* of the mean monthly observed values of climatic parameters from the 140 stations of California-USA and Australia that participate in the estimation of reference evapotranspiration with the ASCE method.

Parameter	T_{max}	T_{min}	R_s	RH	u_2	P	ET_o ASCE-short	ET_o ASCE-tall
Unit	°C	°C	MJ m^{-2} d^{-1}	%	m s^{-1}	mm month^{-1}	mm month^{-1}	mm month^{-1}
Average	25.3	11.4	18.8	56.4	2.6	41.5	138.4	190.5
Minimum	5.3	-7.2	4.9	19.0	0.9	0.0	17.9	26.2
Lower quartile	19.7	6.5	13.5	45.5	1.8	11.7	82.2	112.7
Upper quartile	31.1	15.8	24.4	68.2	3.2	50.6	186.9	254.2
Maximum	41.2	26.3	30.1	90.3	6.8	470.4	377.5	563.8
Range	35.9	33.5	25.2	71.3	5.9	470.4	359.6	537.6
Standard deviation	7.1	6.4	6.5	15.4	1.0	51.5	69.5	98.9
Coeff. of variation %	28.11%	56.13%	34.32%	27.36%	37.05%	123.90%	50.17%	51.93%

*The statistics are based on 1680 values (140 stations × 12 months)

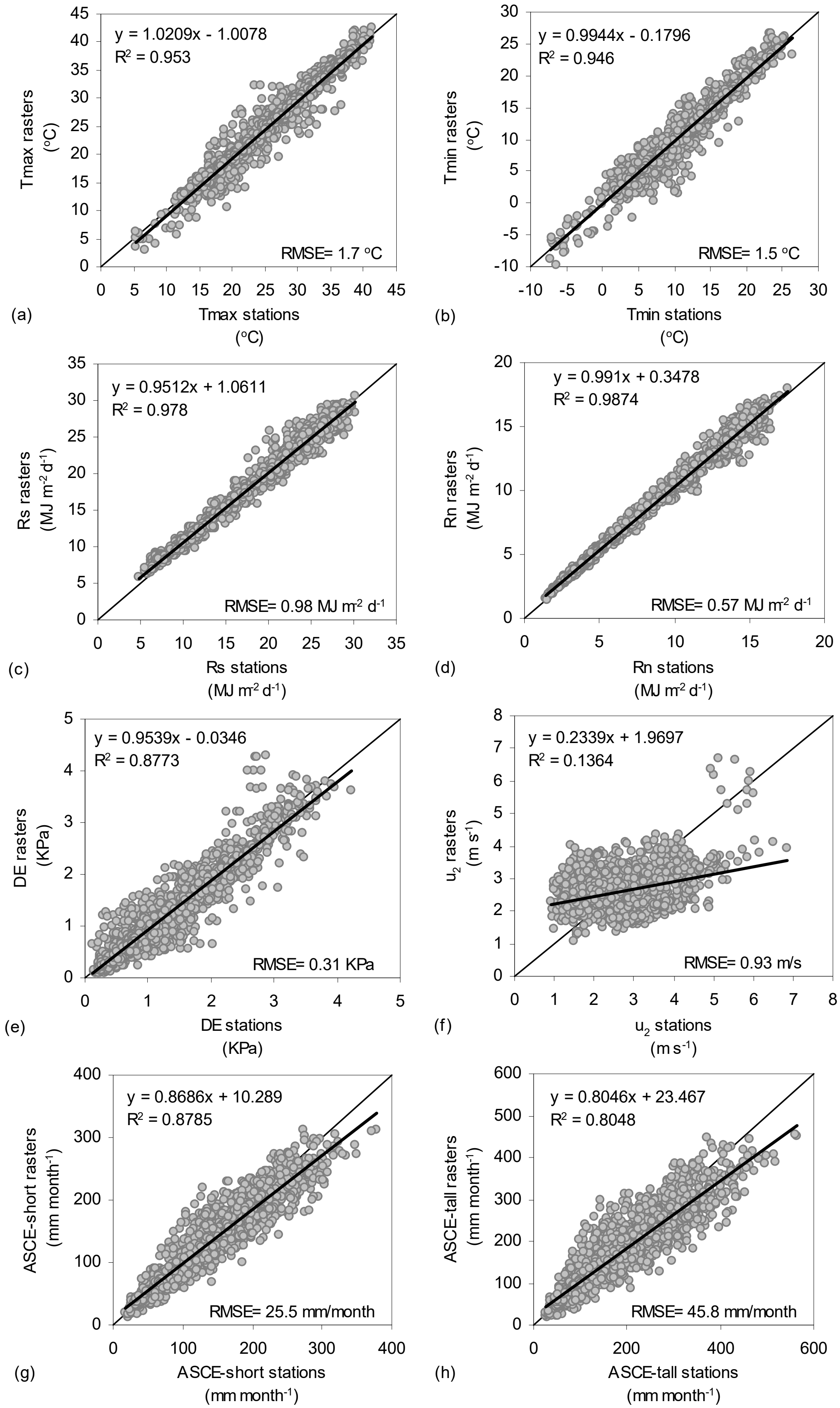

Fig.S2 Comparison of T_{max}, T_{min}, R_s, R_n, *DE* (vapour pressure deficit), u_2, ET_o ASCE-short, and ET_o ASCE-tall between the rasters (0.5 degree resolution) and the stations data.

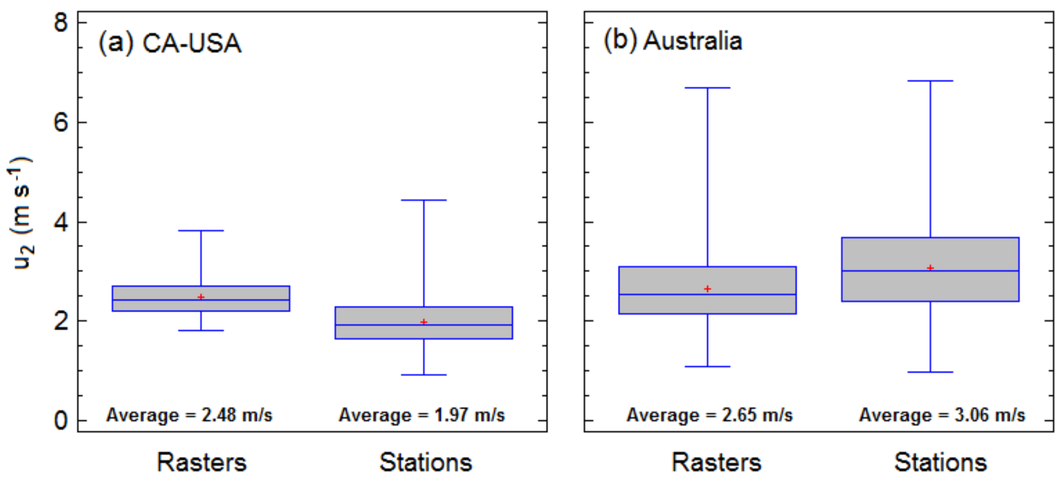

Fig.S3 Comparison of total averages of mean monthly u_2 values through Box-Whisker plots: a) between rasters (Sheffield et al., 2006) and California-USA stations, b) between rasters (Sheffield et al., 2006) and Australia stations.

Extracted values of the p.w.a. coefficients for each station in the validation dataset.

Table S2. Partial weighted averages of mean monthly coefficients (a_{pt}, c_{hs2}, K_{RS}) for each station extracted by the 0.5 degree resolution maps.

No.	Code	Station	Country	a_{pt} p.w.a.s. (0.5 deg)	a_{pt} p.w.a.t. (0.5 deg)	c_{hs2} p.w.a.s. (0.5 deg)	c_{hs2} p.w.a.t. (0.5 deg)	K_{RS} p.w.a. (0.5 deg)
CA-1	006	Davis	USA-CA	1.45	1.93	0.0022	0.0029	0.16
CA-2	002	FivePoints	USA-CA	1.53	2.06	0.0023	0.0030	0.16
CA-3	005	Shafter	USA-CA	1.48	1.97	0.0023	0.0031	0.16
CA-4	007	Firebaugh/Telles	USA-CA	1.48	1.99	0.0022	0.0029	0.15
CA-5	012	Durham	USA-CA	1.49	2.01	0.0024	0.0031	0.16
CA-6	008	Gerber	USA-CA	1.46	1.96	0.0023	0.0031	0.16
CA-7	015	Stratford	USA-CA	1.47	1.95	0.0023	0.0030	0.16
CA-8	019	Castroville	USA-CA	1.20	1.53	0.0023	0.0029	0.18
CA-9	021	Kettleman	USA-CA	1.49	1.99	0.0022	0.0030	0.15
CA-10	027	Zamora	USA-CA	1.45	1.93	0.0022	0.0029	0.16
CA-11	030	Nicolaus	USA-CA	1.45	1.93	0.0022	0.0029	0.16
CA-12	032	Colusa	USA-CA	1.49	2.01	0.0023	0.0030	0.15
CA-13	033	Visalia	USA-CA	1.48	1.96	0.0023	0.0031	0.16
CA-14	035	Bishop	USA-CA	1.71	2.38	0.0026	0.0036	0.15
CA-15	039	Parlier	USA-CA	1.45	1.92	0.0023	0.0030	0.16
CA-16	041	Calipatria/Mulberry	USA-CA	1.79	2.50	0.0025	0.0036	0.15
CA-17	043	McArthur	USA-CA	1.31	1.70	0.0022	0.0029	0.15
CA-18	044	U.C.Riverside	USA-CA	1.68	2.35	0.0025	0.0035	0.16
CA-19	047	Brentwood	USA-CA	1.45	1.94	0.0023	0.0030	0.16
CA-20	049	Oceanside	USA-CA	1.62	2.26	0.0029	0.0040	0.18
CA-21	054	Blackwells Corner	USA-CA	1.49	1.99	0.0022	0.0030	0.15
CA-22	056	Los Banos	USA-CA	1.47	1.95	0.0023	0.0030	0.16
CA-23	061	Orland	USA-CA	1.45	1.94	0.0023	0.0030	0.16
CA-24	062	Temecula	USA-CA	1.62	2.26	0.0029	0.0040	0.18
CA-25	064	Santa Ynez	USA-CA	1.36	1.81	0.0024	0.0032	0.17
CA-26	068	Seeley	USA-CA	1.93	2.76	0.0026	0.0037	0.15
CA-27	070	Manteca	USA-CA	1.43	1.89	0.0023	0.0030	0.16
CA-28	071	Modesto	USA-CA	1.43	1.89	0.0023	0.0030	0.16

CA-29	077	Oakville	USA-CA	1.37	1.82	0.0023	0.0030	0.16
CA-30	075	Irvine	USA-CA	1.65	2.29	0.0027	0.0038	0.17
CA-31	078	Pomona	USA-CA	1.72	2.39	0.0027	0.0038	0.16
CA-32	080	Fresno State	USA-CA	1.45	1.92	0.0023	0.0030	0.16
CA-33	083	Santa Rosa	USA-CA	1.24	1.63	0.0021	0.0027	0.16
CA-34	084	Browns Valley	USA-CA	1.45	1.93	0.0024	0.0031	0.17
CA-35	085	Hopland F.S.	USA-CA	1.38	1.87	0.0021	0.0028	0.15
CA-36	086	Lindcove	USA-CA	1.48	1.96	0.0023	0.0031	0.16
CA-37	087	Meloland	USA-CA	1.91	2.71	0.0025	0.0036	0.14
CA-38	088	Cuyama	USA-CA	1.37	1.81	0.0025	0.0033	0.17
CA-39	091	Tulelake F.S.	USA-CA	1.39	1.81	0.0022	0.0029	0.15
CA-40	092	Kesterson	USA-CA	1.47	1.95	0.0023	0.0030	0.16
CA-41	094	Goletta foothills	USA-CA	1.37	1.81	0.0025	0.0033	0.17
CA-42	099	Santa Monica	USA-CA	1.63	2.24	0.0027	0.0037	0.17
CA-43	103	Windsor	USA-CA	1.28	1.68	0.0021	0.0028	0.16
CA-44	104	De Laveaga	USA-CA	1.20	1.53	0.0023	0.0029	0.18
CA-45	105	Westlands	USA-CA	1.48	1.97	0.0023	0.0030	0.16
CA-46	106	Sanel Valley	USA-CA	1.10	1.39	0.0019	0.0024	0.16
CA-47	57	Buntingville	USA-CA	1.55	2.11	0.0023	0.0031	0.15
CA-48	90	Alturas	USA-CA	1.33	1.74	0.0023	0.0030	0.15
CA-49	151	Ripley	USA-CA	2.01	2.88	0.0028	0.0040	0.16
CA-50	183	Owens Lake North	USA-CA	1.43	1.89	0.0026	0.0034	0.17
CA-51	147	Otay Lake	USA-CA	1.71	2.39	0.0026	0.0037	0.15
CA-52	175	Palo Verde II	USA-CA	1.98	2.84	0.0027	0.0038	0.15
CA-53	135	Blynthe NE	USA-CA	2.01	2.88	0.0028	0.0040	0.16
CA-54	155	Bryte	USA-CA	1.45	1.93	0.0022	0.0029	0.16
CA-55	159	Monrovia	USA-CA	1.72	2.39	0.0027	0.0038	0.16
CA-56	161	Patterson	USA-CA	1.48	1.98	0.0023	0.0030	0.16
CA-57	174	Long Beach	USA-CA	1.52	2.08	0.0029	0.0040	0.20
CA-58	173	Torrey Pines	USA-CA	1.62	2.26	0.0029	0.0040	0.18
CA-59	150	Miramar	USA-CA	1.62	2.26	0.0029	0.0040	0.18
CA-60	153	Escondido SPV	USA-CA	1.62	2.24	0.0025	0.0035	0.16
A-1	32040	Townsville Aero	Australia	1.28	1.66	0.0026	0.0033	0.19
A-2	33307	Woolshed	Australia	1.28	1.66	0.0026	0.0033	0.19
A-3	2056	Kununurra Aero	Australia	1.56	2.11	0.0025	0.0034	0.18
A-4	35264	Emerald	Australia	1.29	1.63	0.0021	0.0027	0.16
A-5	24024	Loxton R.C.	Australia	1.63	2.21	0.0024	0.0032	0.15
A-6	74037	Yanco AG.I.	Australia	1.48	1.95	0.0023	0.0031	0.16
A-7	74258	Deniliquin Airp.AWS	Australia	1.49	1.99	0.0023	0.0030	0.16
A-8	75041	Griffith Airp.AWS	Australia	1.51	2.02	0.0024	0.0032	0.16
A-9	76031	Mildura Airp.	Australia	1.67	2.30	0.0025	0.0034	0.16
A-10	24048	Renmark Apt.1	Australia	1.63	2.21	0.0024	0.0032	0.15
A-11	40082	University of QLD G.	Australia	1.27	1.63	0.0021	0.0027	0.16
A-12	40922	Kingaroy Airp.	Australia	1.23	1.56	0.0021	0.0026	0.16
A-13	41359	Oakey Aero	Australia	1.23	1.55	0.0021	0.0026	0.16
A-14	41522	Dalby Airp.	Australia	1.26	1.60	0.0021	0.0026	0.16
A-15	41525	Warwick	Australia	1.22	1.55	0.0021	0.0027	0.16
A-16	41529	Toowoomba Airp.	Australia	1.25	1.58	0.0021	0.0026	0.16
A-17	80091	Kyabram	Australia	1.43	1.88	0.0022	0.0030	0.16
A-18	81049	Tatura I.S.A.	Australia	1.43	1.88	0.0022	0.0030	0.16
A-19	81124	Yarrawonga	Australia	1.39	1.80	0.0022	0.0028	0.15
A-20	81125	Shepparton Airp.	Australia	1.43	1.88	0.0022	0.0030	0.16
A-21	41175	Applethorpe	Australia	1.20	1.49	0.0021	0.0026	0.16
A-22	81123	Bendigo Airp.	Australia	1.43	1.89	0.0023	0.0030	0.15
A-23	85072	East sale Airp.	Australia	1.34	1.80	0.0023	0.0031	0.16
A-24	85279	Bairnsdale Airp.	Australia	1.40	1.88	0.0024	0.0032	0.16
A-25	85280	Morwell L.V.Airp.	Australia	1.38	1.86	0.0023	0.0031	0.15

A-26	85296	Mount Moornapa	Australia	1.43	1.94	0.0023	0.0031	0.15
A-27	90035	Colac	Australia	1.46	2.00	0.0024	0.0033	0.16
A-28	9538	Dwellingup	Australia	1.36	1.80	0.0023	0.0031	0.17
A-29	9617	Bridgetown	Australia	1.32	1.73	0.0022	0.0029	0.16
A-30	23373	Nuriootpa Pirsa	Australia	1.54	2.07	0.0024	0.0032	0.16
A-31	26021	Mount Gambier Aero	Australia	1.38	1.85	0.0024	0.0032	0.16
A-32	26091	Coonawarra	Australia	1.49	2.03	0.0023	0.0032	0.15
A-33	66062	Sydney (Obs.Hill)	Australia	1.18	1.52	0.0022	0.0029	0.17
A-34	33002	Ayr DPI Res.St.	Australia	1.22	1.54	0.0023	0.0029	0.18
A-35	7176	Newman Aero	Australia	2.04	2.94	0.0031	0.0044	0.18
A-36	13017	Giles	Australia	2.18	3.20	0.0032	0.0046	0.17
A-37	11052	Forrest	Australia	1.78	2.52	0.0027	0.0038	0.15
A-38	11003	Eucla	Australia	1.68	2.39	0.0029	0.0041	0.17
A-39	12071	Salmon Gums	Australia	1.65	2.28	0.0027	0.0038	0.16
A-40	7045	Meekatharra Airp.	Australia	1.98	2.84	0.0031	0.0044	0.18
A-41	1025	Doongan	Australia	1.38	1.82	0.0027	0.0035	0.19
A-42	2012	Halls Creek Airp.	Australia	1.72	2.39	0.0025	0.0034	0.17
A-43	13015	Carnegie	Australia	2.12	3.09	0.0030	0.0044	0.17
A-44	3080	Curtin Aero	Australia	1.59	2.17	0.0026	0.0036	0.18
A-45	6022	Gascoyne Junction	Australia	1.97	2.83	0.0029	0.0041	0.17
A-46	9789	Esperance	Australia	1.53	2.12	0.0027	0.0038	0.17
A-47	91223	Marrawah	Australia	1.10	1.47	0.0023	0.0030	0.19
A-48	18106	Nullarbor	Australia	1.77	2.52	0.0027	0.0039	0.16
A-49	16090	Coober Pedy Airp.	Australia	2.05	2.98	0.0030	0.0044	0.17
A-50	16085	Marla Police St.	Australia	2.05	2.98	0.0030	0.0044	0.17
A-51	13011	Warburton Airfield	Australia	2.19	3.22	0.0031	0.0046	0.17
A-52	15528	Yuendumu	Australia	2.14	3.13	0.0032	0.0046	0.17
A-53	15666	Rabbit Flat	Australia	2.15	3.14	0.0029	0.0042	0.16
A-54	14829	Lajamanu Airp.	Australia	1.85	2.63	0.0026	0.0036	0.17
A-55	15135	Tennant Creek Airp.	Australia	2.05	2.98	0.0031	0.0045	0.18
A-56	37010	Camooweal Township	Australia	1.93	2.78	0.0027	0.0038	0.16
A-57	14707	Wollogorang	Australia	1.56	2.12	0.0028	0.0037	0.19
A-58	14938	Mango Farm	Australia	1.37	1.79	0.0023	0.0030	0.17
A-59	69134	Batemans Bay	Australia	1.19	1.51	0.0021	0.0027	0.16
A-60	14198	Jabiru Airp.	Australia	1.28	1.60	0.0023	0.0028	0.18
A-61	28008	Lockhart River Airp.	Australia	1.27	1.63	0.0026	0.0033	0.19
A-62	34084	Charters Towers Airp.	Australia	1.27	1.60	0.0022	0.0028	0.17
A-63	29038	Kowanyama Airp.	Australia	1.29	1.65	0.0024	0.0030	0.19
A-64	32078	Ingham Composite	Australia	1.34	1.76	0.0025	0.0032	0.18
A-65	40854	Logan City W.T.P.	Australia	1.33	1.79	0.0023	0.0031	0.17
A-66	8095	Mullewa	Australia	1.78	2.51	0.0027	0.0038	0.16
A-67	8251	Kalbarri	Australia	1.58	2.18	0.0028	0.0038	0.18
A-68	8225	Eneabba	Australia	1.82	2.60	0.0029	0.0041	0.17
A-69	7139	Paynes Find	Australia	1.81	2.54	0.0027	0.0038	0.17
A-70	10007	Bencubbin	Australia	1.61	2.20	0.0025	0.0034	0.16
A-71	10092	Merredin	Australia	1.62	2.21	0.0025	0.0035	0.16
A-72	12038	Kalgoorlie-Boulder Airp.	Australia	1.79	2.52	0.0028	0.0040	0.17
A-73	16098	Tarcoola Aero	Australia	1.95	2.80	0.0028	0.0041	0.16
A-74	18195	Minnipa Pirsa	Australia	1.73	2.44	0.0027	0.0038	0.16
A-75	46126	Tibooburra Airp.	Australia	2.02	2.92	0.0029	0.0042	0.17
A-76	48245	Boorke Airp. AWS	Australia	1.68	2.30	0.0025	0.0034	0.16
A-77	55325	Tamworth Airp. AWS	Australia	1.21	1.48	0.0020	0.0024	0.15
A-78	38026	Birdsville Airp.	Australia	2.36	3.52	0.0032	0.0047	0.16
A-79	30161	Richmond Airp.	Australia	1.64	2.25	0.0024	0.0033	0.16
A-80	33013	Collinsville Airp.	Australia	1.38	1.81	0.0024	0.0031	0.17

Table S3. Ranking of models for each criterion (1 is the best, 12 is the worst).

Model	MAE	RMSE	NRMSE%	PBIAS%	R^2	bR^2	NSE	d	KGE
P-T (Eq.2) with a_{pt}=1.26	12	12	12	12	12	12	12	12	12
P-T (Eq.2) with a_{pt}=p.w.a.s.	9	7	5	7	10	6	5	6	4
H-S (Eq.4b) with c_{hs2}=0.0023	7	9	9	9	9	10	9	9	9
H-S (Eq.4b) with c_{hs2}=p.w.a.s.	4	4	4	2	6	4	4	4	2
DRAL1 (Eq.8)	5	6	7	5	8	8	7	7	6
DRAL2 (Eq.9)	10	8	8	3	11	9	8	8	3
Copais (Eq.10)	3	3	3	6	4	5	3	3	7
VAL1 (Eq.11)	8	10	11	10	7	11	11	10	11
VAL2 (Eq.12)	2	2	2	4	3	2	2	2	5
VAL3 (Eq.13)	1	1	1	1	2	1	1	1	1
AKJ1 (Eq.14)	6	5	6	8	1	3	6	5	8
AKJ2 (Eq.15)	11	11	10	11	5	7	10	11	10

Analysis of Dc (distance from the coastline) and DT (difference between max and min monthly temperature) effects on K_{RS} coefficient.

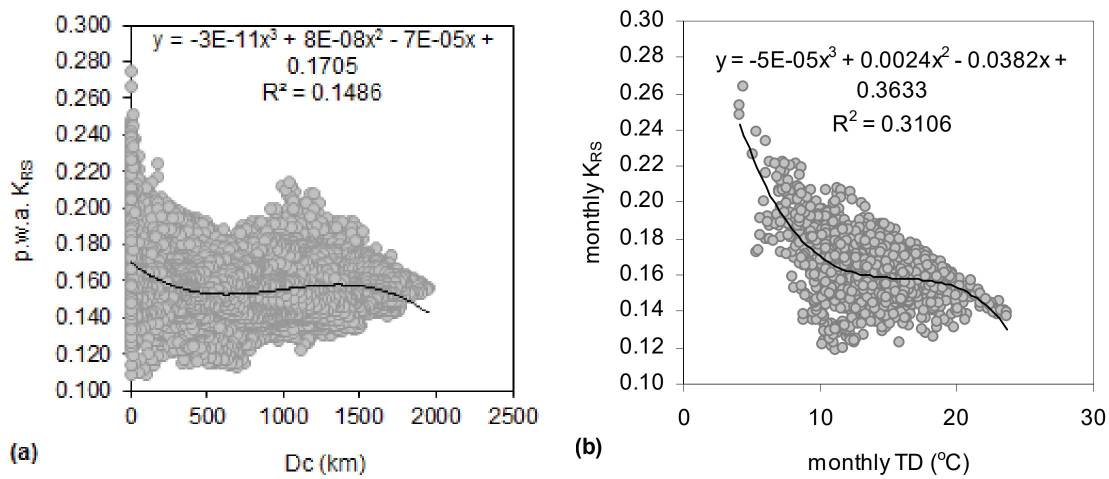

Fig.S4 Correlation between **(a)** p.w.a. K_{RS} and *Dc* (59031 observations derived by 0.5 degree resolution maps, all regions included except Greenland that showed extremely high K_{RS} values in inland areas, see Fig.7 in the manuscript) and (b) monthly K_{RS} and monthly *TD* values (1680 mean monthly observations derived by the 140 stations of Table 1 in the manuscript).

Example case using the Hargreaves-Samani method of evapotranspiration for the stations of California with revised coefficients.

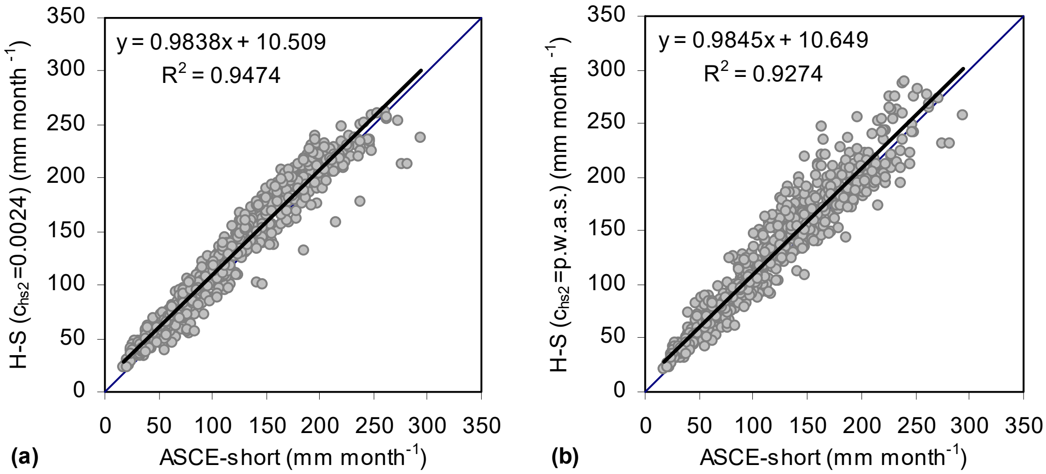

Fig.S5 Comparative 1:1 plots between the results of ASCE-short versus **(a)** the H-S method with c_{hs2}=0.0024 (mean value of p.w.a.s. c_{hs2} coefficients of all California stations obtained from Table S.2), **(b)** the H-S method using the individual values of c_{hs2}=p.w.a.s. for each station of California stations (Table S.2).

Table S4. Statistical criteria from the respective comparisons given in Fig.S5.

		H-S vs. ASCE-short	
Criterion	Optimum value	H-S (Eq.4b) with c_{hs2}=0.0024	H-S (Eq.4b) with c_{hs2}=p.w.a.s.
MAE	0	13.237*	14.297
RMSE	0	16.693*	19.119
NRMSE%	0	26.900*	30.500
PBIAS%	0	-7.100*	-7.200
R^2	1	0.947*	0.927
bR^2	1	0.887*	0.863
NSE	1	0.928*	0.907
d	1	0.982*	0.976
KGE	1	0.924*	0.916

*The asterisk is used to indicate the best value of each criterion.

Attributes of the datasets provided in the context of this study

Table S5. Contents of the database produced in this study (all five resolutions are included: 30 arc-sec, 2.5 arc-min, 5 arc-min, 10 arc-min, 0.5 deg.). The order of contents follows the alphabetical order of file names as they are stored in PANGAEA (https://doi.pangaea.de/10.1594/PANGAEA.868808)

No.	Content/resolution	File name	Method	Comment
1	Re-adjusted Priestley-Taylor coefficient for short ref.crop ETo (rescaled ×100) (unitless)/(30 arc-sec)	apts1_30s.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values). For zero values use the closest non-zero value.
2	Re-adjusted Priestley-Taylor coefficient for tall ref.crop ETo (rescaled ×100) (unitless)/(30 arc-sec)	aptt1_30s.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values). For zero values use the closest non-zero value.
3	Re-adjusted Hargreaves-Samani coefficient for short ref.crop ETo (rescaled ×100,000) (unitless)/(30 arc-sec)	chs2s1_30s.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values). For zero values use the closest non-zero value.
4	Re-adjusted Hargreaves-Samani coefficient for tall ref.crop ETo (rescaled ×100,000) (unitless)/(30 arc-sec)	chs2t1_30s.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values). For zero values use the closest non-zero value.
5	Hargeaves-Samani versus Priestley-Taylor (comparison between original methods versus ASCE-short) (DMADhp) (%)/(30 arc-sec)	dmadhp1_30s.zip	abs(madhs)-abs(madpt), higher negative values suggest better performance of original Hargreaves-Samani ETo method while higher positive values suggest better performance of original Priestley-Taylor ETo method using as reference the ASCE-short	the zip contains 1 raster (ESRI-grid)
6	Mean monthly ASCE-ETo for short reference crop (clipped grass) (mm/month)/(30 arc-sec)	etos1_30s.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
7	Mean monthly ASCE-ETo for tall reference crop (alfalfa) (mm/month)/(30 arc-sec)	etot1_30s.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
8	Re-adjusted coefficient for solar radiation formula of Hargreaves-Samani (rescaled ×1000) (unitless)/(30 arc-sec)	krs1_30s.zip	Re-calibration of Hargreaves-Samani coefficient krs=0.16-0.19 for solar radiation formula (Hargreaves and Samani, 1982, 1985) using solar radiation data (from Sheffield et al., 2006)	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)

9	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani ETo and ASCE-ETo for short ref.crop (%)/(30 arc-sec)	madhs1_30s.zip	100*[(Annual ETo H-S)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo H-S is estimated with the typical value chs2=0.0023	the zip contains 1 raster (ESRI-grid)
10	Expected Mean Annual Difference/Error (MAD%) between original Priestley-Taylor ETo and ASCE-ETo for short ref.crop (%)/(30 arc-sec)	madpt1_30s.zip	100*[(Annual ETo P-T)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo P-T is estimated with the typical value apt=1.26	the zip contains 1 raster (ESRI-grid)
11	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani radiation formula versus solar radiation data (%)/(30 arc-sec)	madrs1_30s.zip	100*[(Annual RS of H-S)-(Annual RS data)]/(Annual RS data), Annual RS H-S is estimated with the typical value krs=0.17 and RS obtained from Sheffield et al. (2006)	the zip contains 1 raster (ESRI-grid)
12	Re-adjusted Priestley-Taylor coefficient for short ref.crop ETo (rescaled ×100) (unitless)/(2.5 arc-min)	apts2_2-5m.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
13	Re-adjusted Priestley-Taylor coefficient for tall ref.crop ETo (rescaled ×100) (unitless)/(2.5 arc-min)	aptt2_2-5m.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
14	Re-adjusted Hargreaves-Samani coefficient for short ref.crop ETo (rescaled ×100,000) (unitless)/(2.5 arc-min)	chs2s2_2-5m.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
15	Re-adjusted Hargreaves-Samani coefficient for tall ref.crop ETo (rescaled ×100,000) (unitless)/(2.5 arc-min)	chs2t2_2-5m.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
16	Hargeaves-Samani versus Priestley-Taylor (comparison between original methods versus ASCE-short) (DMADhp) (%)/(2.5 arc-min)	dmadhp2_2-5m.zip	abs(madhs)-abs(madpt), higher negative values suggest better performance of original Hargreaves-Samani ETo method while higher positive values suggest better performance of original Priestley-Taylor ETo method using as reference the ASCE-short	the zip contains 1 raster (ESRI-grid)
17	Mean monthly ASCE-ETo for short reference crop (clipped grass) (mm/month)/(2.5 arc-min)	etos2_2-5m.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)

18	Mean monthly ASCE-ETo for tall reference crop (alfalfa) (mm/month)/(2.5 arc-min)	etot2_2-5m.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
19	Re-adjusted coefficient for solar radiation formula of Hargreaves-Samani (rescaled ×1000) (unitless)/(2.5 arc-min)	krs2_2-5m.zip	Re-calibration of Hargreaves-Samani coefficient krs=0.16-0.19 for solar radiation formula (Hargreaves and Samani, 1982, 1985) using solar radiation data (from Sheffield et al., 2006)	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
20	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani ETo and ASCE-ETo for short ref.crop (%)/(2.5 arc-min)	madhs2_2-5m.zip	100*[(Annual ETo H-S)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo H-S is estimated with the typical value chs2=0.0023	the zip contains 1 raster (ESRI-grid)
21	Expected Mean Annual Difference/Error (MAD%) between original Priestley-Taylor ETo and ASCE-ETo for short ref.crop (%)/(2.5 arc-min)	madpt2_2-5m.zip	100*[(Annual ETo P-T)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo P-T is estimated with the typical value apt=1.26	the zip contains 1 raster (ESRI-grid)
22	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani radiation formula versus solar radiation data (%)/(2.5 arc-min)	madrs2_2-5m.zip	100*[(Annual RS of H-S)-(Annual RS data)]/(Annual RS data), Annual RS H-S is estimated with the typical value krs=0.17 and RS obtained from Sheffield et al. (2006)	the zip contains 1 raster (ESRI-grid)
23	Re-adjusted Priestley-Taylor coefficient for short ref.crop ETo (rescaled ×100) (unitless)/(5 arc-min)	apts3_5m.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
24	Re-adjusted Priestley-Taylor coefficient for tall ref.crop ETo (rescaled ×100) (unitless)/(5 arc-min)	aptt3_5m.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
25	Re-adjusted Hargreaves-Samani coefficient for short ref.crop ETo (rescaled ×100,000) (unitless)/(5 arc-min)	chs2s3_5m.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
26	Re-adjusted Hargreaves-Samani coefficient for tall ref.crop ETo (rescaled ×100,000) (unitless)/(5 arc-min)	chs2t3_5m.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)

27	Hargeaves-Samani versus Priestley-Taylor (comparison between original methods versus ASCE-short) (DMADhp) (%)/(5 arc-min)	dmadhp3_5m.zip	abs(madhs)-abs(madpt), higher negative values suggest better performance of original Hargreaves-Samani ETo method while higher positive values suggest better performance of original Priestley-Taylor ETo method using as reference the ASCE-short	the zip contains 1 raster (ESRI-grid)
28	Mean monthly ASCE-ETo for short reference crop (clipped grass) (mm/month)/(5 arc-min)	etos3_5m.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
29	Mean monthly ASCE-ETo for tall reference crop (alfalfa) (mm/month)/(5 arc-min)	etot3_5m.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
30	Re-adjusted coefficient for solar radiation formula of Hargreaves-Samani (rescaled ×1000) (unitless)/(5 arc-min)	krs3_5m.zip	Re-calibration of Hargreaves-Samani coefficient krs=0.16-0.19 for solar radiation formula (Hargreaves and Samani, 1982, 1985) using solar radiation data (from Sheffield et al., 2006)	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
31	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani ETo and ASCE-ETo for short ref.crop (%)/(5 arc-min)	madhs3_5m.zip	100*[(Annual ETo H-S)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo H-S is estimated with the typical value chs2=0.0023	the zip contains 1 raster (ESRI-grid)
32	Expected Mean Annual Difference/Error (MAD%) between original Priestley-Taylor ETo and ASCE-ETo for short ref.crop (%)/(5 arc-min)	madpt3_5m.zip	100*[(Annual ETo P-T)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo P-T is estimated with the typical value apt=1.26	the zip contains 1 raster (ESRI-grid)
33	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani radiation formula versus solar radiation data (%)/(5 arc-min)	madrs3_5m.zip	100*[(Annual RS of H-S)-(Annual RS data)]/(Annual RS data), Annual RS H-S is estimated with the typical value krs=0.17 and RS obtained from Sheffield et al. (2006)	the zip contains 1 raster (ESRI-grid)
34	Re-adjusted Priestley-Taylor coefficient for short ref.crop ETo (rescaled ×100) (unitless)/(10 arc-min)	apts4_10m.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
35	Re-adjusted Priestley-Taylor coefficient for tall ref.crop ETo (rescaled ×100) (unitless)/(10 arc-min)	aptt4_10m.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)

36	Re-adjusted Hargreaves-Samani coefficient for short ref.crop ETo (rescaled ×100,000) (unitless)/(10 arc-min)	chs2s4_10m.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
37	Re-adjusted Hargreaves-Samani coefficient for tall ref.crop ETo (rescaled ×100,000) (unitless)/(10 arc-min)	chs2t4_10m.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
38	Hargeaves-Samani versus Priestley-Taylor (comparison between original methods versus ASCE-short) (DMADhp) (%)/(10 arc-min)	dmadhp4_10m.zip	abs(madhs)-abs(madpt), higher negative values suggest better performance of original Hargreaves-Samani ETo method while higher positive values suggest better performance of original Priestley-Taylor ETo method using as reference the ASCE-short	the zip contains 1 raster (ESRI-grid)
39	Mean monthly ASCE-ETo for short reference crop (clipped grass) (mm/month)/(10 arc-min)	etos4_10m.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
40	Mean monthly ASCE-ETo for tall reference crop (alfalfa) (mm/month)/(10 arc-min)	etot4_10m.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
41	Re-adjusted coefficient for solar radiation formula of Hargreaves-Samani (rescaled ×1000) (unitless)/(10 arc-min)	krs4_10m.zip	Re-calibration of Hargreaves-Samani coefficient krs=0.16-0.19 for solar radiation formula (Hargreaves and Samani, 1982, 1985) using solar radiation data (from Sheffield et al., 2006)	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
42	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani ETo and ASCE-ETo for short ref.crop (%)/(10 arc-min)	madhs4_10m.zip	100*[(Annual ETo H-S)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo H-S is estimated with the typical value chs2=0.0023	the zip contains 1 raster (ESRI-grid)
43	Expected Mean Annual Difference/Error (MAD%) between original Priestley-Taylor ETo and ASCE-ETo for short ref.crop (%)/(10 arc-min)	madpt4_10m.zip	100*[(Annual ETo P-T)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo P-T is estimated with the typical value apt=1.26	the zip contains 1 raster (ESRI-grid)
44	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani radiation formula versus solar radiation data (%)/(10 arc-min)	madrs4_10m.zip	100*[(Annual RS of H-S)-(Annual RS data)]/(Annual RS data), Annual RS H-S is estimated with the typical value krs=0.17 and RS obtained from Sheffield et al. (2006)	the zip contains 1 raster (ESRI-grid)

45	Re-adjusted Priestley-Taylor coefficient for short ref.crop ETo (rescaled ×100) (unitless)/(0.5 deg)	apts5_0-5d.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
46	Re-adjusted Priestley-Taylor coefficient for tall ref.crop ETo (rescaled ×100) (unitless)/(0.5 deg)	aptt5_0-5d.zip	Re-calibration of Priestley-Taylor coefficient apt=1.26 for ETo method (Priestley and Taylor, 1972) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
47	Re-adjusted Hargreaves-Samani coefficient for short ref.crop ETo (rescaled ×100,000) (unitless)/(0.5 deg)	chs2s5_0-5d.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for short ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
48	Re-adjusted Hargreaves-Samani coefficient for tall ref.crop ETo (rescaled ×100,000) (unitless)/(0.5 deg)	chs2t5_0-5d.zip	Re-calibration of Hargreaves-Samani coefficient chs2=0.0023 for ETo method (Hargreaves and Samani, 1982, 1985) using ASCE-EWRI method (Allen et al., 2005) for tall ref.crop	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
49	Hargeaves-Samani versus Priestley-Taylor (comparison between original methods versus ASCE-short) (DMADhp) (%)/(0.5 deg)	dmadhp5_0-5d.zip	abs(madhs)-abs(madpt), higher negative values suggest better performance of original Hargreaves-Samani ETo method while higher positive values suggest better performance of original Priestley-Taylor ETo method using as reference the ASCE-short	the zip contains 1 raster (ESRI-grid)
50	Mean monthly ASCE-ETo for short reference crop (clipped grass) (mm/month)/(0.5 deg)	etos5_0-5d.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
51	Mean monthly ASCE-ETo for tall reference crop (alfalfa) (mm/month)/(0.5 deg)	etot5_0-5d.zip	ASCE-EWRI method (Allen et al., 2005) using climatic data from Hijmans et al. (2005) and Sheffield et al. (2006)	the zip contains 12 rasters (ESRI-grids) for each month (January is the first month)
52	Re-adjusted coefficient for solar radiation formula of Hargreaves-Samani (rescaled ×1000) (unitless)/(0.5 deg)	krs5_0-5d.zip	Re-calibration of Hargreaves-Samani coefficient krs=0.16-0.19 for solar radiation formula (Hargreaves and Samani, 1982, 1985) using solar radiation data (from Sheffield et al., 2006)	the zip contains 1 raster (ESRI-grid) (partial weighted average of mean monthly values)
53	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani ETo and ASCE-ETo for short ref.crop (%)/(0.5 deg)	madhs5_0-5d.zip	100*[(Annual ETo H-S)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo H-S is estimated with the typical value chs2=0.0023	the zip contains 1 raster (ESRI-grid)

54	Expected Mean Annual Difference/Error (MAD%) between original Priestley-Taylor ETo and ASCE-ETo for short ref.crop (%)/(0.5 deg)	madpt5_0-5d.zip	100*[(Annual ETo P-T)-(Annual ETo ASCE-short)]/(Annual ETo ASCE-short), Annual ETo P-T is estimated with the typical value apt=1.26	the zip contains 1 raster (ESRI-grid)
55	Expected Mean Annual Difference/Error (MAD%) between original Hargreaves-Samani radiation formula versus solar radiation data (%)/(0.5 deg)	madrs5_0-5d.zip	100*[(Annual RS of H-S)-(Annual RS data)]/(Annual RS data), Annual RS H-S is estimated with the typical value krs=0.17 and RS obtained from Sheffield et al. (2006)	the zip contains 1 raster (ESRI-grid)