

Supplementary Materials: Detecting Trends in Wetland Extent from MODIS Derived Soil Moisture Estimates

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1. Introduction

This supplementary file contains additional figures and maps, a list (Table S1) of in situ stations from the International Soil Moisture Network (ISMN) used for validating the transformed wetness index (TWI), and a table (S2) comparing the regional performance of TWI with microwave soil moisture products from the Advanced Multichannel Scanning Radiometer (AMSR-E) and the Soil Moisture Ocean Salinity (SMOS) platforms.

2. Figures

Figure S1 illustrates the performance of TWI, AMSR-E, and SMOS for in situ stations representing different land cover and latitudinal regions. Figure S2 shows the same stations, but with the data for each soil moisture product assimilated to the in situ data (unbiased).

For each of the three geographical regions used for studying trends in soil moisture (Southern Africa, South East Asia, and the South Western Amazon basin) the minimum and maximum soil wetness estimated using TWI for the period 2001 to 2016 are shown in small scale maps. Detailed maps of regions with wetlands/peatlands, as indicated in the small scale maps, are shown in large scale map triplets: with the left panel showing the average soil moisture, the center panel the absolute (vol/vol) change for the whole period, and the right panel the wetland/peatland map presented in Reference [1]. The center panel maps only show areas that have experienced a significant change (Mann–Kendall trend statistics with $p < 0.05$) with the actual change calculated from the median slope of a Theil–Sen regression.

Figure S3 shows the estimated minimum and maximum soil moisture content for parts of Southern Africa for the period 2001 to 2016. The wetlands/peatlands indicated in Figure S3 are shown at larger scales in Figures S4 through S9:

- Etosha pans (Namibia): Figure S4.
- Cameia wetlands (Angola): Figure S5.
- Barotse floodplains (Zambia): Figure S6.
- Okavango and Linyanti swamps, and Lake Ngami (Botswana): Figure S7.
- Kafue flats (Zambia): Figure S8.
- Bangweulu Lake and wetlands (Zambia): Figure S9.

Figure S10 shows the minimum and maximum soil moisture content for Indonesia for the period 2001 to 2016. The regions indicated in Figure S10 are shown at larger scales in Figures S11 through S14:

- A. Central Sumatra: Figure S11.
- B. South East Sumatra Figure S12.
- C. Southern Borneo (the Mega Rice project, Kalimantan): Figure S13.
- D. South Western Guinea: Figure S14.

The large scale figures include peatlands mapped by the Indonesian Ministry of Agriculture and prepared by the World Resources Institute. The peatland data are available for download from the Global Forest Watch Open Data Portal (http://data.globalforestwatch.org/datasets/d52e0e67ad21401cbf3a2c002599cf58_10).

Figure S15 shows the minimum and maximum soil moisture content for the South Western Amazon Basin in South America for the period 2001 to 2016. The regions indicated in Figure S15 are shown at larger scales in Figures S16 through S18:

- Pastanza-Marañon (Peru): Figure S16.
- Central Amazon (Brazil): Figure S17.
- South Amazon (across the Bolivian–Brazilian border): Figure S18.

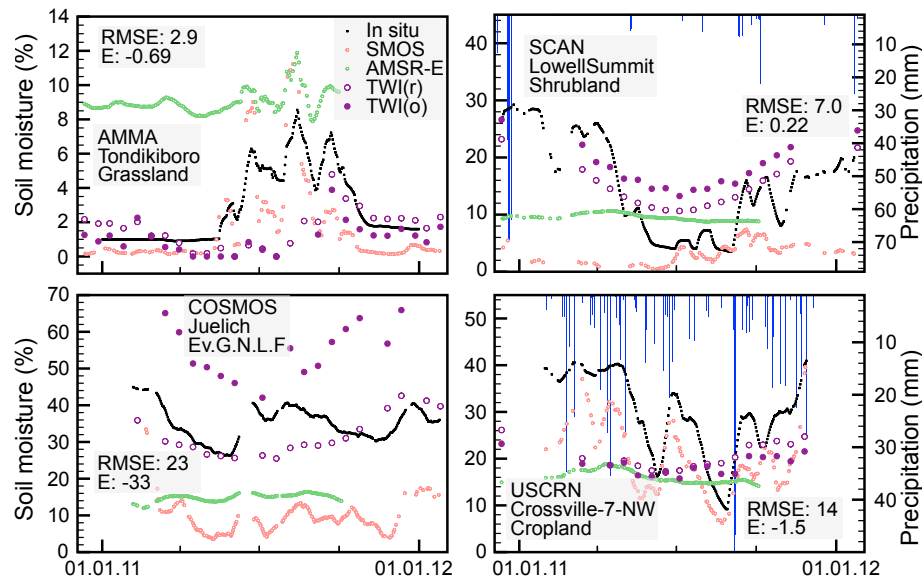


Figure S1. Comparison of in situ and satellite derived soil moisture estimates from SMOS, AMSR-E, and the MODIS transformed wetness index (TWI), with the latter at both its original (o) spatial resolution of 500 m and resampled (r) to 13 km spatial resolution. Soil moisture is shown as volumetric content, expressed as percentage. Rainfall estimates from the ISMN database shown on the upper and right axis (right column panels only). The four panels represent different networks and land cover (from the MODIS land cover product MCD12Q1.v051) as indicated in each graph (Ev.G.N.L.F. = evergreen needleleaf forest). Details about each station are available in the ISMN dataset, and in Table S1. The vertical scale is different in each graph. Legend codes in upper left panel. The random mean square error (RMSE) and model efficiency E for the MODIS TWI model (at original spatial scale) is given in each panel.

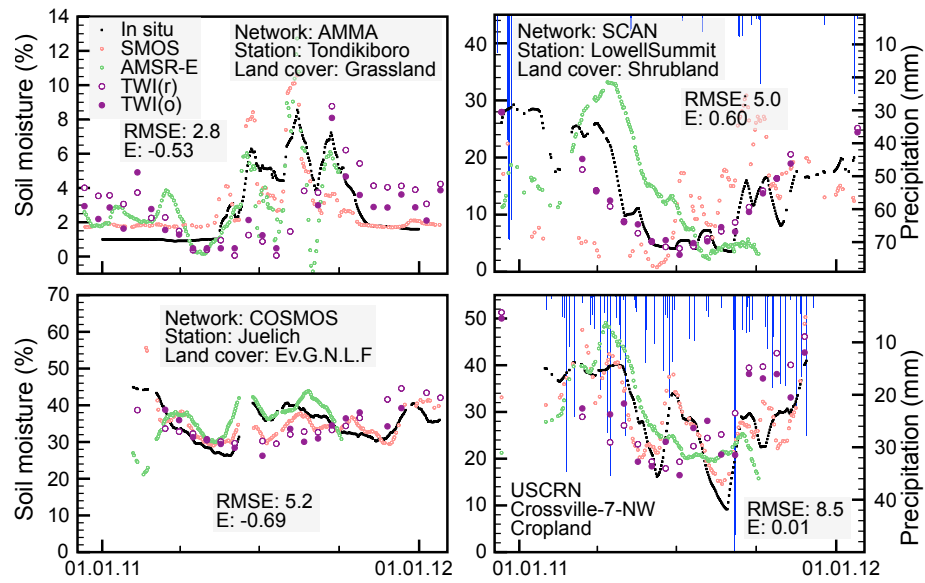


Figure S2. Same time-series and sensors as in Figure S1, but with each soil-moisture product unbiased to the in situ stations (dates with coinciding observations only). Unbiased fit between the MODIS TWI (at original resolution) and the in situ observed soil moisture are indicated in each panel. See Figure S1 for details.

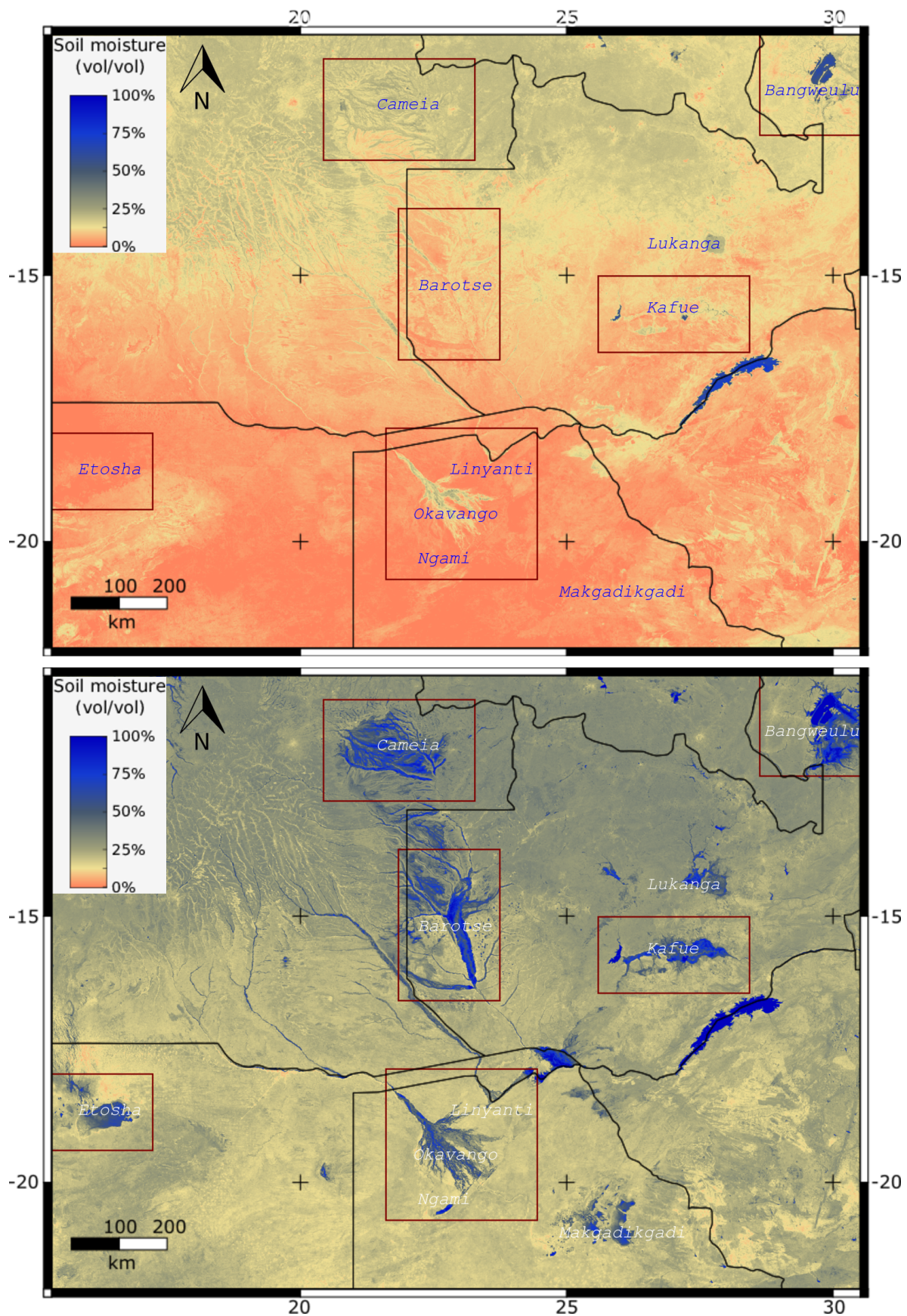


Figure S3. Estimated minimum (top) and maximum (bottom) soil moisture content (volume/volume) for parts of Southern Africa for the period 2001–2016. The minimum and maximum are extracted individually for each pixel using monthly aggregated MODIS transformed wetness index for the period January 2001 to December 2016. All wetland regions outlined (maroon boundaries) are shown in larger scales in other figures.

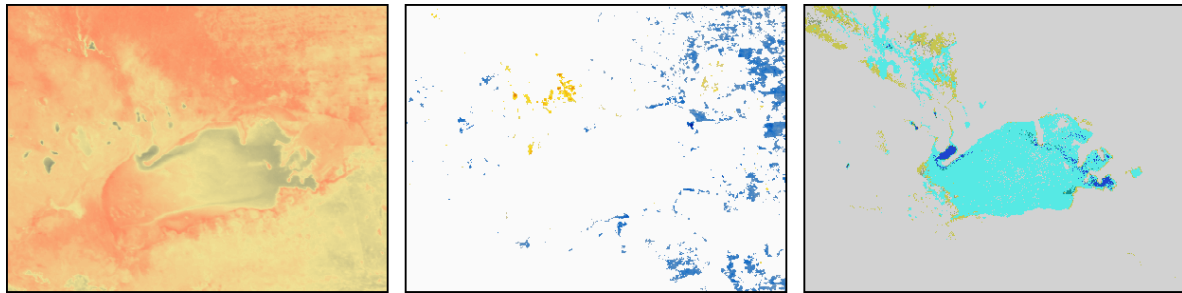


Figure S4. Etosha pans in Namibia, the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. See Figure S6 for legend.

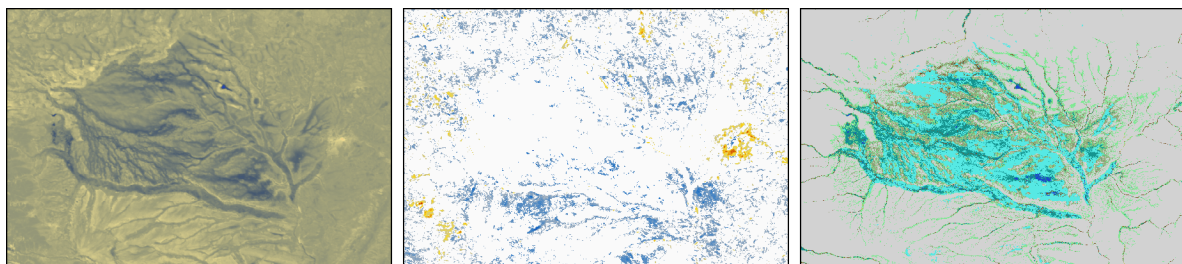


Figure S5. Cameia wetlands in Angola, the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. See Figure S6 for legend.

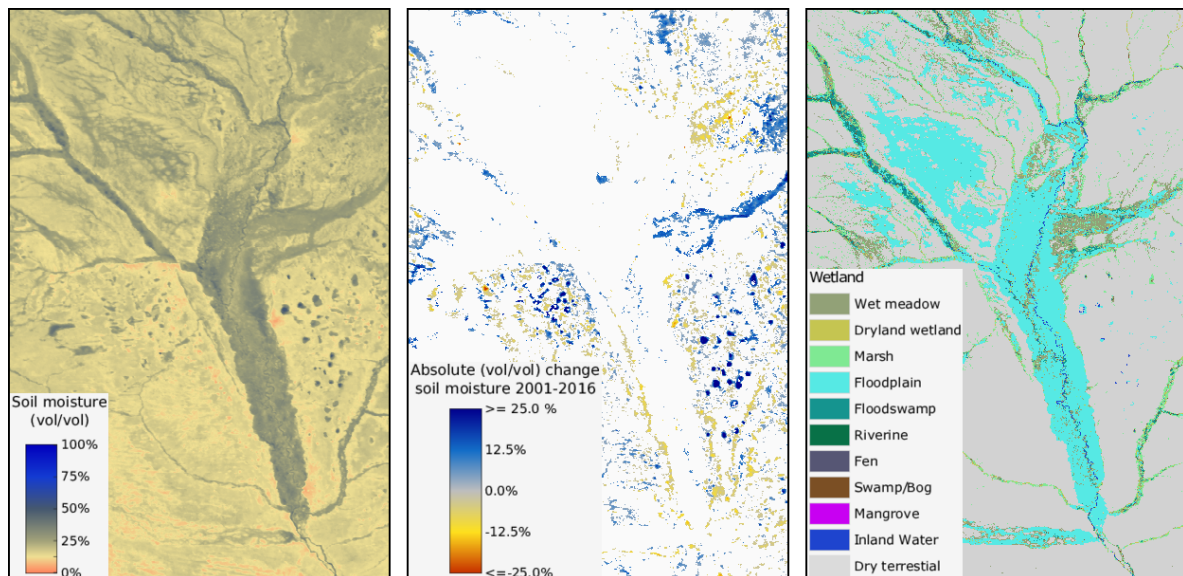


Figure S6. Barotse floodplains in Zambia, the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1].

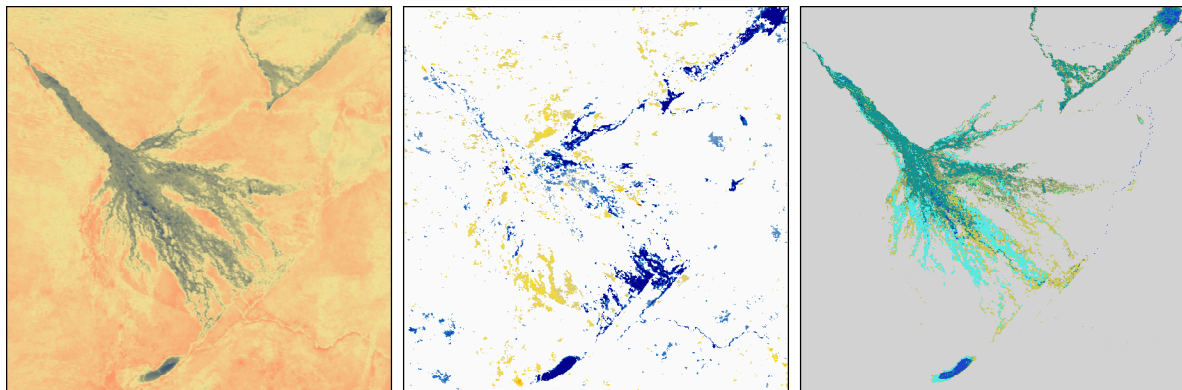


Figure S7. Okavango and Linyanti swamps and Lake Ngami in Botswana, the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. Over the period 2001 to 2016 the Okavango swamps have expanded towards South and East, and retreated in the Western parts. During the same time Lake Ngami has filled up. See Figure S6 for legend.

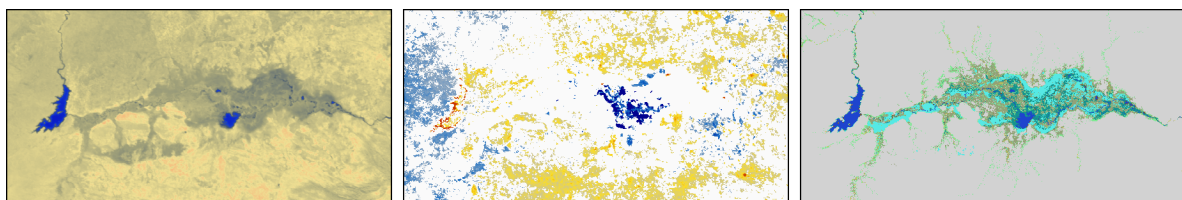


Figure S8. Kafue flats in Zambia, the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. See Figure S6 for legend.

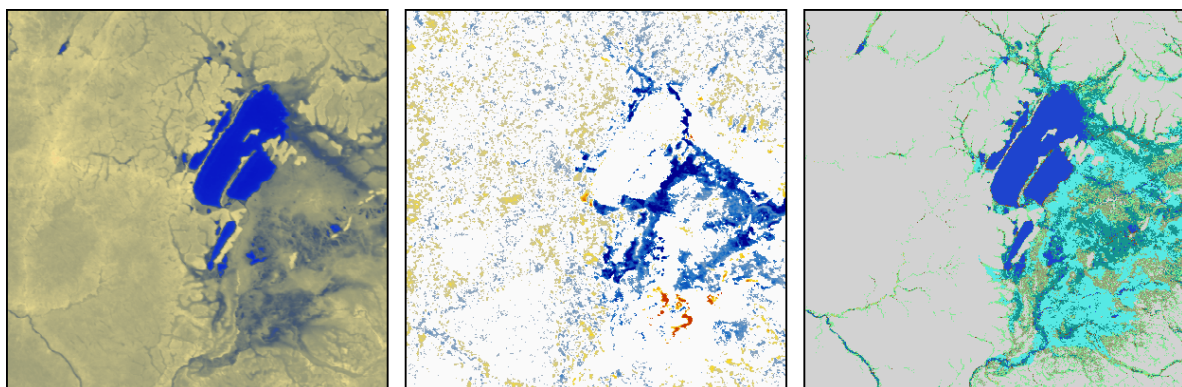


Figure S9. Bangweulu Lake and wetlands in Zambia, the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. See Figure S6 for legend.

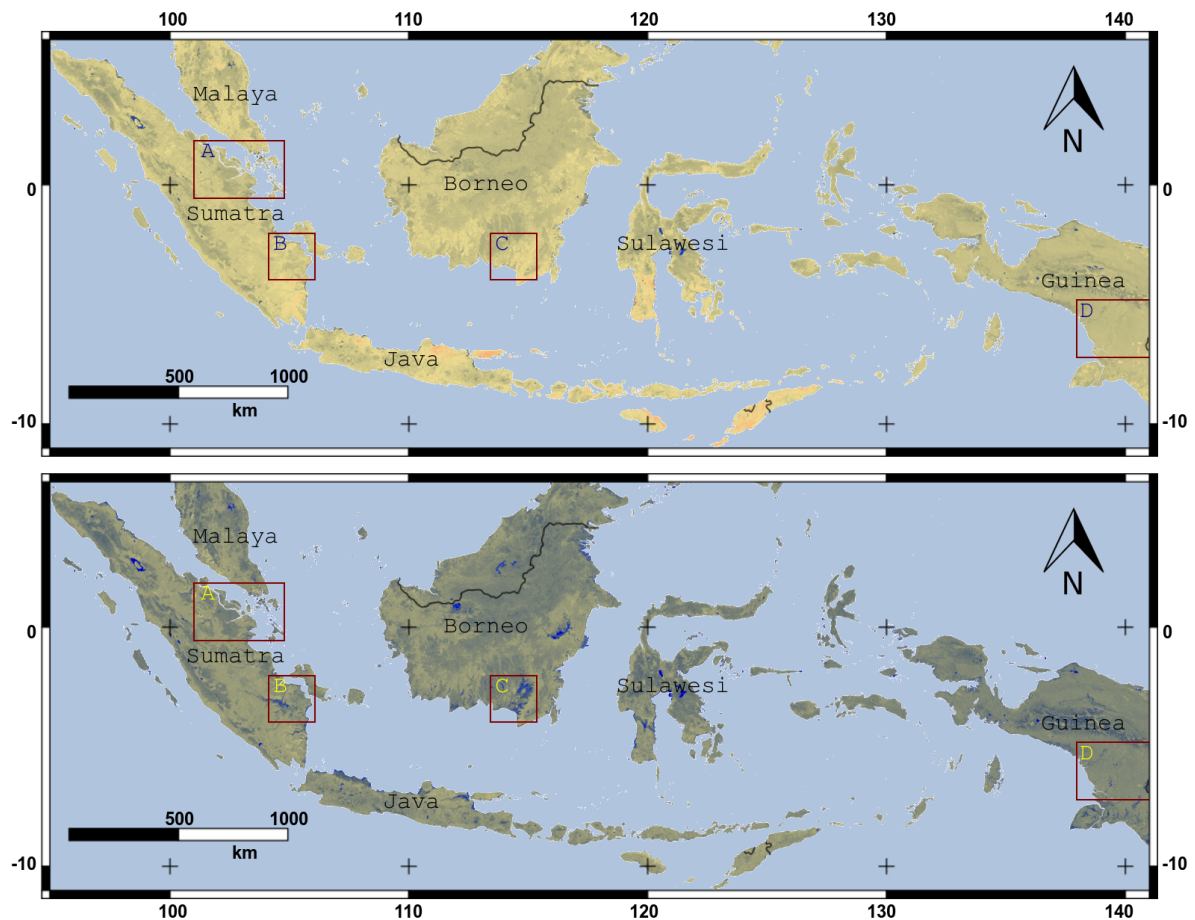


Figure S10. Estimated minimum (top) and maximum (bottom) soil moisture content (volume/volume) for Indonesia for the period 2001–2016. The minimum and maximum are extracted individually for each pixel using monthly aggregated MODIS transformed wetness index for the period January 2001 to December 2016. See Figure S3 for legend. All regions outlined (maroon boundaries) are shown in larger scales in other figures.

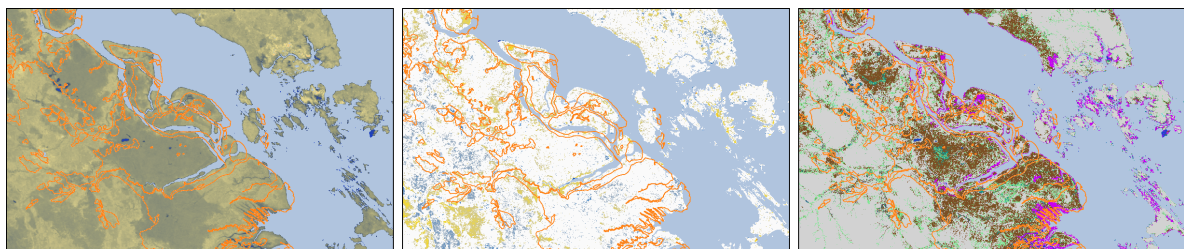


Figure S11. Central Sumatra (A), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. Peat deposits mapped by the Indonesian Ministry of Agriculture and prepared by the World Resources Institute, are outlined in orange. See Figure S6 for legend.

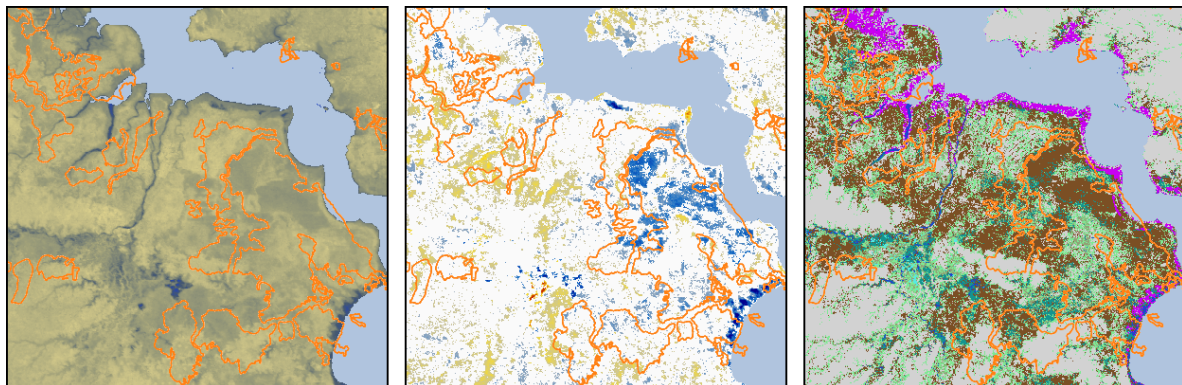


Figure S12. South East Sumatra (B), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. Peat deposits mapped by the Indonesian Ministry of Agriculture and prepared by the World Resources Institute, are outlined in orange. See Figure S6 for legend.

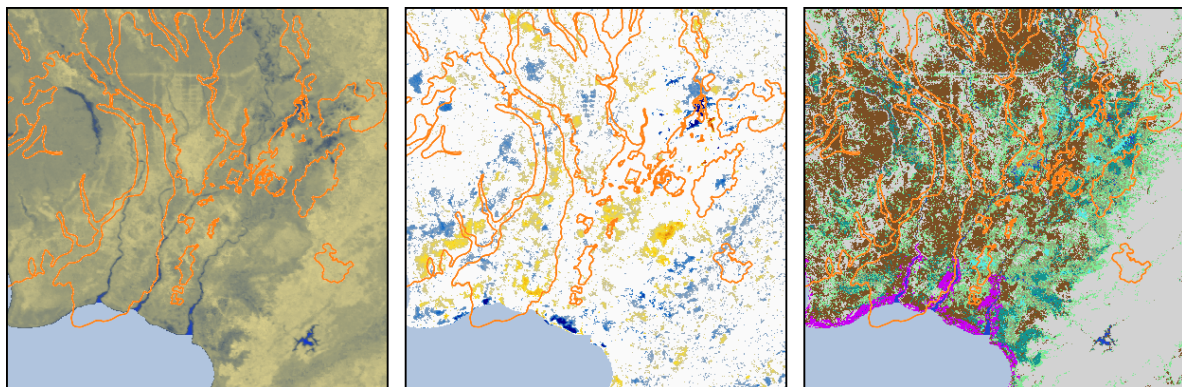


Figure S13. Southern Borneo (C, the Mega Rice project, Kalimantan), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. Peat deposits mapped by the Indonesian Ministry of Agriculture and prepared by the World Resources Institute, are outlined in orange. The Mega Rice project was conducted between 1996 and 1998. See Figure S6 for legend.

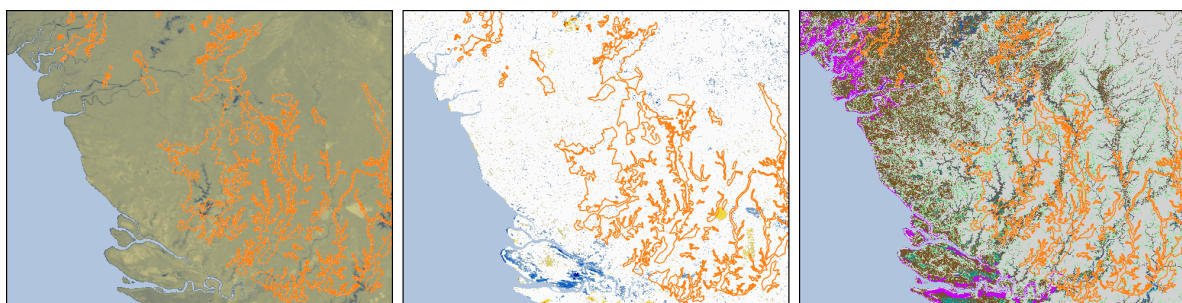


Figure S14. South Western Guinea (D), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. Peat deposits mapped by the Indonesian Ministry of Agriculture and prepared by the World Resources Institute, are outlined in orange. See Figure S6 for legend.

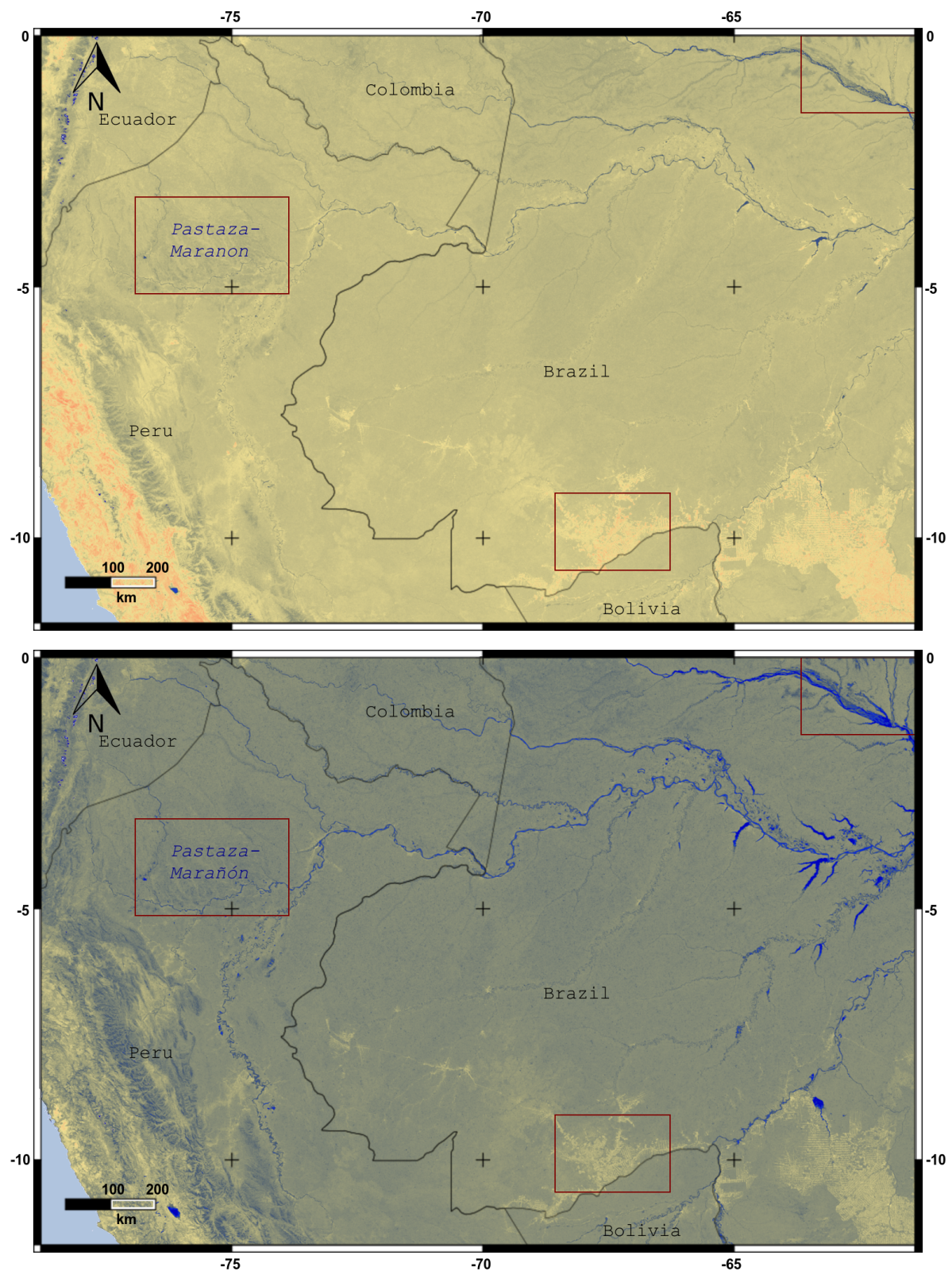


Figure S15. Estimated minimum (top) and maximum (bottom) soil moisture content (volume/volume) for Western Amazon basin for the period 2001–2016. The minimum and maximum are extracted individually for each pixel using monthly aggregated MODIS transformed wetness index for the period January 2001 to December 2016. See Figure S3 for legend. All regions outlined (maroon boundaries) are shown in larger scales in other figures.

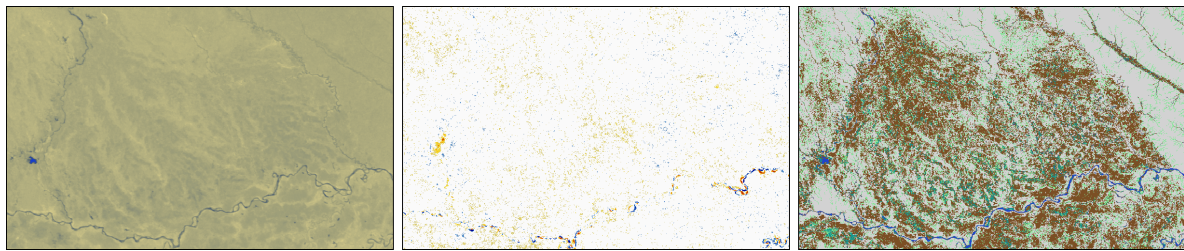


Figure S16. Pastanza-Marañon (Peru), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. Note the drying oxbow lakes in the South East corner. See Figure S6 for legend.

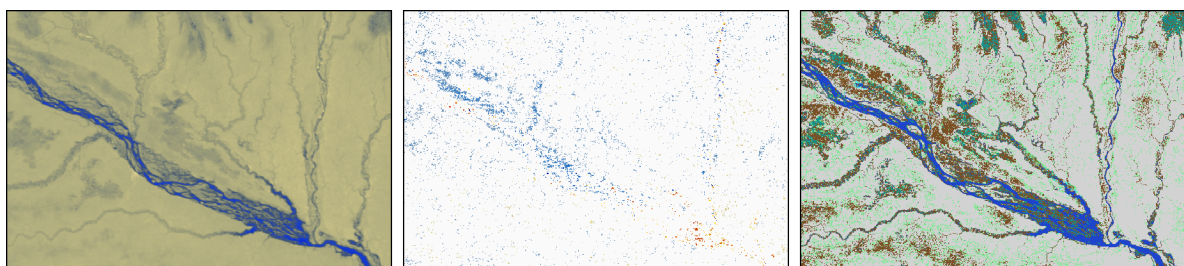


Figure S17. South central Amazon (Brazil), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. See Figure S6 for legend.

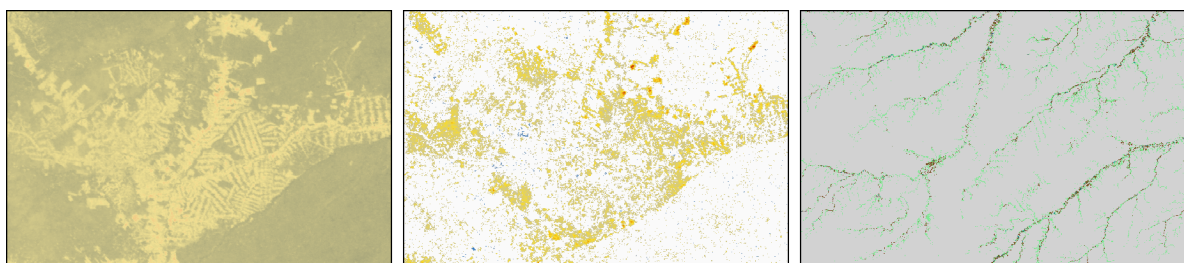


Figure S18. South Western Amazon basin (across the Bolivian-Braslian border), the left panel shows the average transformed wetness index 2001 to 2016, the central panel the absolute change in soil moisture for the same period for areas where the change has been significant (see text), and the right panel the wetland/peatland map presented in [1]. The absolute difference in soil wetness across the border is probably exaggerated due to shading effects in the forest as well as leaf water content. See Figure S6 for legend.

3. Tables

Table S1 shows the per station statistics of fit for the MODIS transformed wetness index(TWI) estimates compared to all in situ stations available from the International Soil Moisture Network (ISMN) for the period 2010-12-03 to 2012-02-02. Only stations with at least 6 coinciding observations (in situ and MODIS TWI) are included. The table presents additional site information derived from different ancillary data sources: terrain ruggedness index (TRI) calculated as suggested by Wilson *et al.* [2] using a kernel of 5 by 5 pixels at 250 m spatial resolution and the Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010) dataset [3]; MODIS land cover product (MCD12Q1 version 051) for 2011 using the International Geosphere-Biosphere Program (IGBP) classification scheme; MODIS product for Vegetation Continuous Fields (MOD44B version 005) percent tree cover (2010).

Table S1. Statistics of fit between soil moisture estimates derived from the MODIS transformed wetness index (TWI) (expressed as volumetric soil moisture - Θ_{TWI}) and global in situ stations for the period 2010-12-03 to 2012-02-02. All in situ stations are available from the International Soil Moisture Network (ISMN). Network and station names are given as they appear in the ISMN database, except that the SNOTEL station names have been converted to lower case. The exact geographic location of each station is available in the ISMN database, the table only indicates the latitudinal region of each station (Trop = tropical [between 23°latitude lines], Subtrop = subtropical [between 23°and 46°latitudes] and Temp = temperate [between 46°and 70°latitudes]. Land Cover is extracted from the MODIS MCD12Q1 product for 2011 (Evg Nl F = Evergreen Needleleaf Forest, Evg Bl F = Evergreen Broadleaf Forest, Mix F = Mixed Forest, O Savan = Open Savanna, W Savan = Woody Savannas, Grassl = Grasslands, Wetl = Permanent Wetlands, Urban = Urban and built-up, CropNat = Cropland/Natural vegetation mosaic). TRI is the terrain ruggedness index, a measure of local variation in topography, and captured from the the Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010) dataset. Percent tree cover (T%) is extracted from the MODIS product MOB44B for 2010. The mean ($\bar{x}$) and standard deviation (σ) are given both for the in situ data, and for MODIS TWI (coinciding observations). The root-mean-square error (RMSE) and model efficiency E are given both for the global MODIS TWI model, and for locally unbiased time series. RMSE is also given with both the in situ data and the MODIS TWI soil moisture estimates standardized by forcing the mean to zero and the variance to unity (z-score). n is the number of coinciding observations (in situ and MODIS TWI).

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
AMMA	Banizoumbou*	Trop	CropNat	0	1.1	2.2	1.8	1.4	1.5	2.3	-0.84	2.3	-0.85	1.32	20
AMMA	Tondikiboro*	Trop	Grassl	0	3.9	2.9	2.3	1.0	1.0	2.9	-0.69	2.8	-0.53	1.21	21
AMMA	Wankama*	Trop	Grassl	0	3.2	1.9	1.8	0.6	0.7	2.1	-0.39	1.8	-0.09	1.02	23
ARM	Ashton*	Subtrop	Grassl	1	4.3	30.4	1.8	13.1	3.0	17.4	-95	1.2	0.51	0.69	24
ARM	Byron*	Subtrop	Grassl	1	1.3	25.5	2.8	12.5	2.2	13.2	-23	2.1	0.41	0.75	24
ARM	ElkFalls*	Subtrop	Grassl	4	1.5	31.3	2.3	14.5	1.7	17.0	-57	2.9	-0.71	1.27	20
ARM	ElReno*	Subtrop	Grassl	6	2.9	29.4	0.7	13.1	1.2	16.4	-539	1.1	-1.43	1.49	11
ARM	Lamont-CF1*	Subtrop	Grassl	4	2.9	18.6	4.7	13.7	2.8	5.6	-0.51	2.9	0.61	0.61	24
ARM	Lamont-CF2														
ARM	Meeker*	Subtrop	Grassl	6	4.4	29.8	2.0	14.9	2.3	15.2	-61	2.7	-0.94	1.36	20
ARM	Okmulgee*	Subtrop	W Savan	38	10.8	24.3	5.5	23.5	3.7	5.5	-0.03	6.2	-0.33	1.13	25
ARM	Pawhuska*	Subtrop	Grassl	20	7.9	29.1	3.2	19.3	2.4	10.8	-11	5.0	-1.61	1.58	24
ARM	Plevna*	Subtrop	Grassl	2	1.6	12.8	2.9	14.5	2.1	2.7	0.08	2.3	0.33	0.79	16
ARM	Towanda*	Subtrop	Grassl	1	3.7	33.1	1.9	12.5	1.2	20.7	-132	2.1	-0.37	1.13	14
ARM	Tyro*	Subtrop	Grassl	3	1.6	33.1	1.1	14.5	1.5	18.6	-321	1.1	-0.14	1.03	16
ARM	Vici*	Subtrop	Grassl	4	4.0	24.6	3.8	14.5	2.6	10.3	-7.0	2.3	0.61	0.61	21
COSMOS	ARM-1*	Subtrop	Cropl	4	3.3	16.0	3.6	12.3	3.3	4.6	-0.67	2.7	0.41	0.75	25

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
COSMOS	AustinCary*	Subtrop	Evg Bl F	48	1.5	7.0	2.0	34.5	2.1	27.7	-223	3.1	-1.80	1.57	8
COSMOS	Biosphere*	Subtrop	O Shrubl	3	10.6	6.8	1.1	14.5	3.0	8.1	-53	0.9	0.35	0.78	20
COSMOS	Bondville*	Subtrop	Cropl	0	1.7	41.4	2.5	16.7	3.9	25.2	-105	3.8	-1.40	1.50	17
COSMOS	Brookings*	Subtrop	Cropl	5	1.8	12.5	5.3	15.4	2.0	4.8	0.12	3.2	0.60	0.60	12
COSMOS	ChestnutRidge*	Subtrop	Dec Bl F	61	23.3	28.7	4.5	25.2	3.8	7.1	-1.6	6.6	-1.32	1.48	19
COSMOS	CoastalSageUCI*	Subtrop	C Shrubl	10	31.1	17.9	6.3	23.0	3.2	7.4	-0.46	6.3	-0.06	1.00	20
COSMOS	Coweeta*	Subtrop	Mix F	67	45.5	22.9	1.1	29.5	2.2	6.8	-49	0.8	0.32	0.76	6
COSMOS	DesertChaparral*	Subtrop	O Shrubl	0	8.5	6.8	2.8	9.5	1.9	3.7	-0.87	2.8	-0.07	1.01	20
COSMOS	FortPeck*	Temp	Grassl	2	4.4	24.8	9.4	18.3	1.6	10.6	-0.36	8.9	0.04	0.94	14
USCRN	Wolf-Point-29-ENE														
COSMOS	FreemanRanch*	Subtrop	Savan	19	5.5	33.4	5.9	24.6	3.9	9.4	-2.0	3.2	0.64	0.55	6
COSMOS	GLEES*	Subtrop	Grassl	34	18.3	17.1	5.7	31.0	5.4	16.9	-9.4	9.8	-2.52	1.74	7
COSMOS	HarvardForest*	Subtrop	Mix F	71	9.5	38.6	2.7	29.8	6.3	11.2	-17	3.9	-1.16	1.42	16
COSMOS	HauserFarmNorth*	Subtrop	O Shrubl	6	3.4	32.0	3.9	17.9	3.2	14.8	-15	4.8	-0.69	1.25	14
COSMOS	HauserFarmSouth*	Subtrop	Cropl	5	2.0	24.1	3.5	18.6	3.4	8.1	-4.7	6.2	-2.28	1.75	14
COSMOS	Howland*	Subtrop	Mix F	67	3.7	46.5	0.8	39.5	8.6	10.8	-234	1.2	-1.67	1.51	7
COSMOS	IowaValidation*	Subtrop	Cropl	0	1.9	20.3	4.3	19.0	5.4	5.8	-0.95	5.0	-0.43	1.17	23
COSMOS	IslandDairy*	Trop	CropNat	23	13.1	35.7	1.7	22.2	4.8	14.2	-73	1.5	0.20	0.88	26
COSMOS	JERC*	Subtrop	W Savan	42	2.4	5.6	1.7	29.9	2.6	24.5	-236	2.3	-1.15	1.37	8
COSMOS	Juelich*	Temp	Evg Nl F	74	7.2	33.6	4.1	55.5	7.6	23.3	-33	5.2	-0.69	1.26	16
COSMOS	Kendall*	Subtrop	Grassl	3	4.8	5.3	0.8	14.6	1.7	9.3	-139	0.5	0.54	0.64	9
COSMOS	KLEE*	Trop	Grassl	8	0.9	34.5	8.6	18.6	2.6	17.4	-3.7	7.6	0.09	0.88	7
COSMOS	ManitouForest*	Subtrop	W Savan	27	12.7	12.3	4.1	28.3	5.4	17.2	-18	5.3	-0.76	1.30	24
	ManitouForestTower														
COSMOS	MarshallCO*	Subtrop	Grassl	2	7.1	11.5	3.9	16.6	1.8	6.9	-2.2	6.0	-1.45	1.53	25
COSMOS	Metolius*	Subtrop	Evg Nl F	60	10.3	15.8	5.0	41.9	7.2	27.2	-31	6.1	-0.59	1.21	14
COSMOS	MorganMonroe*	Subtrop	Dec Bl F	70	6.6	39.6	2.5	28.4	6.0	12.5	-28	2.8	-0.40	1.12	10
COSMOS	MountLemmon*	Subtrop	O Shrubl	25	45.1	19.2	6.8	31.1	7.9	14.6	-3.8	7.7	-0.34	1.13	22
COSMOS	Mozark*	Subtrop	Dec Bl F	61	5.6	27.8	6.9	27.6	4.6	10.0	-1.2	11.9	-2.14	1.72	17
COSMOS	MpalaNorth*	Trop	O Shrubl	1	6.1	11.7	4.3	11.9	3.4	3.5	0.23	3.9	0.08	0.90	9
COSMOS	NebField3*	Subtrop	Cropl	0	0.8	35.6	6.5	16.1	3.8	20.6	-9.8	7.8	-0.56	1.21	16
COSMOS	P301*	Subtrop	Evg Nl F	52	16.7	9.7	2.7	42.8	10.9	35.0	-186	4.0	-1.40	1.49	14
COSMOS	ParkFalls*	Subtrop	Mix F	50	4.9	12.7	2.3	31.9	6.6	20.6	-88	3.7	-1.86	1.59	9
COSMOS	Pe-de-Gigante*	Trop	Evg Bl F	59	9.1	8.8	2.5	24.6	3.5	16.7	-50	4.3	-2.43	1.75	9
COSMOS	RanchoNoTengo*	Subtrop	O Shrubl	1	4.1	2.5	0.8	12.6	1.9	10.2	-205	0.4	0.75	0.47	9

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
COSMOS	ReynoldsCreek*	Subtrop	Grassl	9	43.0	13.2	4.5	24.3	3.8	11.3	-6.4	1.6	0.86	0.35	7
COSMOS	Rietholzbach*	Temp	CropNat	21	28.0	35.0	3.6	21.3	5.7	15.2	-18	4.9	-0.99	1.38	22
COSMOS	Rosemount*	Subtrop	Cropl	5	1.2	17.4	5.3	18.1	1.2	5.0	0.02	6.4	-0.61	1.21	12
COSMOS	SanPedro*	Subtrop	O Shrubl	8	4.9	10.1	5.3	16.6	3.3	8.2	-1.5	6.0	-0.37	1.15	23
COSMOS	SantaRitaCriosote*	Subtrop	O Shrubl	0	7.2	5.6	2.8	10.4	3.1	5.5	-3.0	2.8	0.01	0.98	26
COSMOS	SavannahRiver*	Subtrop	Mix F	47	2.5	5.6	1.6	34.4	2.2	29.0	-396	2.8	-2.72	1.80	8
COSMOS	ShaleHills*	Subtrop	Dec Bl F	60	16.3	19.7	2.0	33.9	5.4	14.8	-61	1.6	0.31	0.77	7
COSMOS	SilverSword*	Trop	O Shrubl	2	56.7	27.9	6.4	33.3	4.9	7.8	-0.56	6.2	0.02	0.97	26
COSMOS	SMAP-OK*	Subtrop	Grassl	8	5.1	13.2	3.0	16.4	2.1	4.0	-0.87	2.6	0.19	0.88	26
COSMOS	Soaproot*	Subtrop	Evg Nl F	54	14.7	16.8	3.6	38.7	8.0	23.6	-44	5.2	-1.21	1.43	14
COSMOS	Sterling*	Subtrop	CropNat	7	1.9	26.1	3.6	19.5	2.9	7.4	-3.5	3.7	-0.12	1.03	21
COSMOS	TenderfootCreek*	Temp	Evg Nl F	60	28.9	20.3	9.9	43.6	6.8	27.1	-7.6	16.6	-2.18	1.67	8
COSMOS	Toulouse*	Subtrop	Cropl	20	2.2	13.1	4.7	26.3	4.8	14.2	-8.7	5.0	-0.20	1.07	20
COSMOS	UMBS*	Subtrop	Dec Bl F	52	2.1	9.0	2.1	26.9	1.9	18.0	-88	1.4	0.48	0.67	7
COSMOS	UVA*	Subtrop	Mix F	60	4.3	17.1	0.7	28.7	1.3	11.6	-297	1.1	-1.74	1.53	7
COSMOS	VCNPCZO*	Subtrop	Evg Nl F	41	33.4	33.6	7.2	28.4	9.7	7.4	-0.22	4.0	0.64	0.56	8
COSMOS	WindRiver*	Subtrop	Evg Nl F	68	20.7	32.1	2.9	44.3	7.9	13.9	-23	2.8	-0.00	0.96	13
CTP_SMTMN	L01*	Subtrop	Grassl	0	3.5	17.3	8.1	11.5	3.0	8.8	-0.28	7.2	0.15	0.89	13
CTP_SMTMN	L02*	Subtrop	Grassl	1	17.7	33.7	10.6	11.8	3.4	23.4	-4.4	8.7	0.26	0.82	10
CTP_SMTMN	L03*	Subtrop	Grassl	0	15.3	24.1	9.0	11.7	2.3	14.4	-1.7	5.8	0.55	0.64	13
CTP_SMTMN	L04-M02*	Subtrop	Grassl	1	13.8	30.4	13.7	11.9	2.5	21.7	-1.7	8.0	0.63	0.59	13
CTP_SMTMN	L05-M06*	Subtrop	Grassl	1	26.6	27.4	10.1	12.9	2.5	16.9	-2.0	9.5	0.03	0.94	13
CTP_SMTMN	L07-M13*	Subtrop	Grassl	0	12.8	20.0	9.7	12.8	2.3	10.7	-0.33	7.4	0.36	0.77	13
CTP_SMTMN	L08-M14*	Subtrop	Grassl	1	1.2	26.4	10.2	14.8	4.3	13.7	-0.93	6.9	0.51	0.67	13
CTP_SMTMN	L09-M16*	Subtrop	Grassl	2	18.2	20.3	9.8	15.1	2.6	9.2	0.06	5.8	0.63	0.59	13
CTP_SMTMN	L10-M17*	Subtrop	Grassl	1	5.5	13.8	4.0	11.7	2.1	4.4	-0.26	4.6	-0.42	1.15	14
CTP_SMTMN	L11-M21*	Subtrop	Grassl	2	1.1	25.3	10.5	16.0	3.1	12.5	-0.55	8.1	0.35	0.77	13
CTP_SMTMN	L12-M22*	Subtrop	Grassl	2	3.8	17.9	9.4	14.4	2.9	8.4	0.13	7.9	0.24	0.83	11
CTP_SMTMN	L13*	Subtrop	Grassl	1	6.0	21.0	10.9	15.2	3.4	10.0	0.09	6.7	0.59	0.61	13
CTP_SMTMN	L14*	Subtrop	Grassl	1	6.0	17.9	9.6	14.4	2.8	7.7	0.30	3.8	0.83	0.40	13
CTP_SMTMN	L15*	Subtrop	Grassl	1	6.6	31.8	6.6	17.1	2.2	15.8	-5.7	7.0	-0.33	1.07	7
CTP_SMTMN	L16*	Subtrop	Grassl	1	7.2	27.9	3.2	17.5	1.1	10.6	-12	2.1	0.51	0.65	7
CTP_SMTMN	L18*	Subtrop	Grassl	1	8.7	14.9	8.9	15.1	2.9	6.8	0.37	6.4	0.44	0.72	14
CTP_SMTMN	L19*	Subtrop	Grassl	2	13.0	35.0	7.1	12.8	2.9	22.8	-10	5.2	0.40	0.73	10

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
CTP_SMTMN	L20*	Subtrop	Grassl	2	2.7	25.4	8.1	18.9	2.7	8.7	-0.34	5.1	0.54	0.63	7
CTP_SMTMN	L21*	Subtrop	Grassl	2	15.7	22.4	9.0	18.2	2.4	8.9	-0.08	9.2	-0.15	1.02	11
CTP_SMTMN	L22*	Subtrop	Grassl	2	8.8	32.0	14.0	14.0	2.4	22.0	-1.7	14.6	-0.20	1.04	11
CTP_SMTMN	L23*	Subtrop	Grassl	3	8.3	24.0	8.5	13.9	1.5	12.7	-1.5	9.2	-0.30	1.09	11
CTP_SMTMN	L25*	Subtrop	Grassl	1	22.6	43.9	12.1	14.6	2.7	31.0	-6.3	10.4	0.18	0.86	10
CTP_SMTMN	L26*	Subtrop	Grassl	2	15.1	36.2	10.3	12.8	2.6	24.9	-5.9	9.3	0.05	0.90	7
CTP_SMTMN	L27*	Subtrop	Grassl	1	11.6	33.4	7.2	16.8	4.9	17.1	-5.1	4.0	0.66	0.56	13
CTP_SMTMN	L28*	Subtrop	Grassl	2	10.5	31.9	4.2	18.9	1.7	13.4	-11	2.4	0.59	0.58	6
CTP_SMTMN	L29*	Subtrop	Grassl	1	13.5	39.6	8.0	18.3	1.5	22.4	-8.3	8.2	-0.24	1.02	6
CTP_SMTMN	L30*	Subtrop	Grassl	3	17.1	18.6	3.3	19.2	2.8	3.1	0.03	3.3	-0.09	1.00	13
CTP_SMTMN	L31*	Subtrop	Grassl	2	7.7	41.9	2.7	19.8	1.7	22.4	-83	4.2	-1.91	1.56	6
CTP_SMTMN	L32*	Subtrop	Grassl	1	1.8	19.1	6.7	14.0	2.6	7.5	-0.35	6.1	0.10	0.91	14
CTP_SMTMN	L33*	Subtrop	Grassl	1	15.3	22.0	7.8	17.0	4.3	8.2	-0.19	7.6	-0.01	0.97	14
CTP_SMTMN	L34*	Subtrop	Grassl	2	11.7	21.8	8.4	15.8	3.3	8.5	-0.13	5.9	0.47	0.70	14
CTP_SMTMN	L35*	Subtrop	Grassl	2	4.7	24.6	10.8	14.3	2.1	13.6	-0.73	7.1	0.52	0.66	12
CTP_SMTMN	L36*	Subtrop	Grassl	1	8.4	14.9	4.7	14.1	1.9	4.0	0.22	4.5	0.05	0.94	13
CTP_SMTMN	L37*	Subtrop	Grassl	1	8.0	16.3	7.6	11.9	2.4	7.6	-0.08	6.6	0.18	0.87	13
CTP_SMTMN	L38*	Subtrop	Grassl	1	2.9	16.4	7.4	11.3	1.9	8.3	-0.34	7.3	-0.05	0.98	13
CTP_SMTMN	M01*	Subtrop	Grassl	1	22.3	32.2	5.6	12.9	1.8	19.8	-14	5.6	-0.20	1.01	7
CTP_SMTMN	M04*	Subtrop	Grassl	0	21.7	33.1	5.2	13.5	1.0	20.1	-16	5.0	-0.08	0.96	7
CTP_SMTMN	M05*	Subtrop	Grassl	1	22.5	33.7	6.9	16.8	2.3	18.1	-7.1	8.2	-0.66	1.19	7
CTP_SMTMN	M07-S01*	Subtrop	Grassl	0	21.8	36.7	5.4	15.9	1.9	21.1	-18	4.0	0.35	0.74	6
CTP_SMTMN	M08*	Subtrop	Grassl	0	4.9	20.7	5.7	16.5	2.6	5.5	-0.11	3.4	0.58	0.60	7
CTP_SMTMN	M09*	Subtrop	Grassl	1	19.7	27.7	4.9	14.8	1.6	13.5	-7.8	4.2	0.14	0.86	7
CTP_SMTMN	M11-S09*	Subtrop	Grassl	1	9.1	31.3	3.7	13.9	1.3	17.7	-26	3.1	0.16	0.85	7
CTP_SMTMN	M15*	Subtrop	Grassl	1	23.5	31.9	6.2	14.5	2.3	18.0	-8.8	3.6	0.61	0.58	7
CTP_SMTMN	M18*	Subtrop	Grassl	2	10.8	24.2	4.5	14.6	2.0	10.2	-5.1	4.0	0.04	0.89	6
CTP_SMTMN	M19*	Subtrop	Grassl	1	12.9	25.1	4.6	15.8	1.6	10.5	-5.1	6.8	-1.51	1.47	7
CTP_SMTMN	M20*	Subtrop	Grassl	1	22.0	31.0	5.5	17.5	1.8	14.0	-6.8	3.2	0.58	0.59	6
FLUXNET															
AMERIFLUX	TonziRanch*	Subtrop	Savan	13	5.4	18.7	8.1	22.4	4.6	6.1	0.40	4.7	0.65	0.57	18
FMI	Maws*	Temp	W Savan	34	3.6	9.3	2.9	41.0	5.7	32.3	-131	4.0	-1.02	1.35	11
HYDROL-NET	Hydrol-NetPerugia	Subtrop	Urban	10	10.3	20.7	7.2	20.5	3.6	5.5	0.39	6.0	0.28	0.83	21
_PERUGIA	WEUF*														
OZNET	Alabama*	Subtrop	Cropl	13	3.8	13.4	3.9	15.7	2.9	5.0	-0.91	5.2	-0.99	1.31	7

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
OZNET	Benwerrin*	Subtrop	Cropl	10	10.7	21.6	5.6	15.1	2.4	8.5	-1.7	6.9	-0.77	1.23	7
OZNET	Bundure*	Subtrop	Grassl	4	0.4	18.2	5.2	18.0	4.2	4.5	0.14	4.9	-0.02	0.93	7
OZNET	Canberra-Airport*	Subtrop	Urban	8	4.6	10.0	1.8	19.8	3.7	10.9	-40	2.9	-2.04	1.64	9
OZNET	Cheverelis*	Subtrop	Cropl	6	1.9	24.3	8.3	20.8	3.8	8.1	-0.10	8.8	-0.32	1.06	7
OZNET	Cooma-Airfield*	Subtrop	Grassl	5	7.2	13.0	1.9	17.4	2.2	4.9	-6.7	2.0	-0.24	1.05	9
OZNET	Cootamundra-Aero*	Subtrop	Grassl	8	4.2	8.7	2.1	16.1	2.7	8.1	-16	2.7	-0.94	1.31	9
OZNET	Dry-Lake*	Subtrop	Grassl	2	0.5	15.4	6.2	16.3	3.1	5.8	-0.01	7.0	-0.46	1.12	7
OZNET	Ginninderra-K4*	Subtrop	Cropl	7	9.3	25.7	1.2	15.5	2.7	10.5	-88	1.6	-1.13	1.35	7
OZNET	Griffith-Aerodrome*	Subtrop	O Shrubl	5	0.7	13.9	0.9	18.7	3.7	6.1	-53	1.3	-1.46	1.48	9
OZNET	Hay-AWS*	Subtrop	O Shrubl	3	0.8	18.4	4.5	19.8	8.6	10.3	-4.8	6.9	-1.57	1.51	9
OZNET	Keenan*	Subtrop	Cropl	14	19.0	17.2	4.0	19.1	1.3	4.5	-0.51	5.9	-1.52	1.47	7
OZNET	Kyeamba-Mouth*	Subtrop	Cropl	15	1.4	21.9	9.3	16.9	3.9	7.9	0.17	5.5	0.61	0.59	9
OZNET	Kyeamba-Station*	Subtrop	Cropl	24	14.8	20.5	4.3	16.6	2.3	6.8	-2.0	7.3	-2.41	1.71	7
OZNET	Rochedale*	Subtrop	Cropl	18	27.0	12.5	2.4	15.0	2.2	3.8	-1.9	2.8	-0.64	1.21	9
OZNET	S-Coleambally*	Subtrop	O Shrubl	8	0.8	23.6	7.3	19.5	3.1	7.5	-0.26	7.7	-0.34	1.06	6
OZNET	Samarra*	Subtrop	Cropl	10	4.4	14.4	8.4	16.0	2.7	9.0	-0.33	12.5	-1.58	1.49	7
OZNET	Spring-Bank*	Subtrop	Cropl	3	0.7	18.5	6.7	12.9	2.1	8.1	-0.72	7.3	-0.37	1.08	7
OZNET	Strathvale*	Subtrop	W Savan	20	39.2	8.3	2.2	21.0	2.7	12.9	-38	2.2	-0.10	0.99	9
OZNET	Uri-Park*	Subtrop	Cropl	2	0.8	10.3	3.2	9.9	2.4	4.5	-1.4	5.0	-2.07	1.60	6
OZNET	West-Wyalong-Air*	Subtrop	Grassl	8	3.1	16.4	2.7	16.7	2.6	3.2	-0.53	3.2	-0.57	1.18	9
OZNET	Wollumbi*	Subtrop	Cropl	9	3.6	15.2	9.2	14.3	2.4	7.2	0.27	6.8	0.35	0.73	6
OZNET	Wynella*	Subtrop	Cropl	3	0.9	11.7	3.5	11.4	2.6	4.2	-0.73	4.7	-1.18	1.35	6
OZNET	Yamma-Road*	Subtrop	Grassl	2	0.8	11.8	5.5	14.7	3.1	5.7	-0.24	5.8	-0.29	1.05	7
OZNET	Yammacoona*	Subtrop	Cropl	2	1.2	19.4	7.0	13.9	2.8	9.2	-1.0	10.0	-1.37	1.43	7
OZNET	Yanco-Research-Stn*	Subtrop	Cropl	5	5.4	12.0	3.2	15.4	3.5	4.4	-1.2	2.7	0.17	0.86	9
REMEDIHUS	Canizal*	Subtrop	Cropl	1	4.0	22.2	6.1	13.2	4.3	9.5	-1.6	3.1	0.73	0.51	25
REMEDIHUS	Carretoro*	Subtrop	Cropl	0	2.1	4.1	2.8	11.9	4.4	8.2	-7.8	1.5	0.70	0.54	24
REMEDIHUS	CasaPeriles*	Subtrop	Cropl	1	6.3	13.5	3.8	14.0	3.8	4.6	-0.54	4.6	-0.55	1.21	16
REMEDIHUS	ConcejodelMonte*	Subtrop	Cropl	0	2.9	16.5	6.0	12.9	3.7	5.2	0.22	3.7	0.60	0.62	24
REMEDIHUS	ElCoto*	Subtrop	Cropl	0	7.4	2.5	1.1	10.5	4.4	8.8	-66	0.9	0.36	0.78	24
REMEDIHUS	ElTomillar*	Subtrop	Cropl	0	3.0	3.2	0.8	10.2	3.6	7.8	-94	1.1	-0.75	1.29	22
REMEDIHUS	Granja-g*	Subtrop	Cropl	1	9.1	12.9	5.2	12.2	3.4	3.9	0.41	4.3	0.31	0.82	25
REMEDIHUS	Guarena*	Subtrop	Cropl	0	1.6	17.5	7.5	10.9	3.4	8.2	-0.28	4.2	0.66	0.57	18
REMEDIHUS	Guarrati*	Subtrop	Cropl	2	3.4	23.9	10.5	11.7	3.5	14.5	-1.0	6.9	0.54	0.66	17

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
REMEDHUS	LaAtalaya*	Subtrop	Cropl	0	5.9	28.7	6.8	12.6	4.1	16.5	-5.2	3.5	0.72	0.52	22
REMEDHUS	LaCruzdeElias*	Subtrop	Cropl	1	4.0	18.3	5.7	12.2	5.8	7.3	-0.74	3.9	0.50	0.69	24
REMEDHUS	LasArenas*	Subtrop	Cropl	0	8.8	15.6	6.0	11.8	4.2	6.7	-0.29	6.2	-0.10	1.03	24
REMEDHUS	LasBodegas*	Subtrop	Cropl	3	8.3	13.8	4.8	16.8	6.1	4.7	-0.01	3.0	0.58	0.63	23
REMEDHUS	LasBrozas*	Subtrop	O Shrubl	0	5.4	8.7	2.4	12.6	3.9	5.5	-4.5	2.8	-0.48	1.19	23
REMEDHUS	LasTresRayas*	Subtrop	Cropl	1	5.2	2.8	2.2	14.5	4.7	12.1	-31	1.2	0.70	0.54	19
REMEDHUS	LasVacas*	Subtrop	Cropl	0	5.5	10.3	5.7	14.3	4.7	5.3	0.13	3.6	0.58	0.63	25
REMEDHUS	LasVictorias*	Subtrop	Cropl	0	7.5	3.8	1.9	11.2	4.3	8.2	-19	1.6	0.25	0.85	23
REMEDHUS	LlanosdeLaBoveda*	Subtrop	O Shrubl	0	4.1	20.0	8.2	12.7	4.3	9.2	-0.29	5.4	0.56	0.65	24
REMEDHUS	Paredinas*	Subtrop	Cropl	0	8.8	2.9	2.2	10.3	3.1	7.7	-12	1.4	0.58	0.63	23
SCAN	AAMU-jtg*	Subtrop	W Savan	34	9.5	24.4	6.3	23.9	4.3	4.3	0.51	4.5	0.44	0.72	16
SCAN	Abrams*	Subtrop	Cropl	3	2.1	14.3	3.8	14.5	3.6	2.6	0.51	2.7	0.49	0.70	19
SCAN	AdamsRanch#1*	Subtrop	O Shrubl	4	5.3	10.1	4.8	13.5	3.7	5.3	-0.26	4.5	0.09	0.94	26
SCAN	Alcalde*	Subtrop	Grassl	0	10.2	11.6	4.5	11.5	4.3	3.7	0.29	3.8	0.26	0.84	24
SCAN	AlkaliMesa*	Subtrop	Grassl	1	6.2	12.3	4.9	11.1	3.1	4.5	0.10	5.0	-0.11	1.03	19
SCAN	AllenFarms*	Subtrop	CropNat	23	8.6	28.6	8.0	21.5	3.2	9.4	-0.44	6.5	0.32	0.81	23
SCAN	Ames*	Subtrop	Cropl	0	1.4	31.6	6.6	17.8	3.9	15.6	-5.0	9.0	-0.97	1.37	18
SCAN	BeasleyLake*	Subtrop	Cropl	0	0.4	36.3	5.8	12.7	3.1	24.8	-20	9.6	-2.18	1.65	7
SCAN	BraggFarm*	Subtrop	Cropl	15	2.4	26.1	2.6	18.7	3.6	7.8	-9.0	1.8	0.47	0.70	15
SCAN	BroadAcres*	Subtrop	Cropl	5	1.8	31.6	4.8	23.0	4.5	10.4	-4.0	6.1	-0.73	1.27	14
SCAN	BuffaloJump*	Subtrop	Grassl	0	7.9	12.6	5.9	16.4	2.4	6.3	-0.24	6.0	-0.11	1.02	17
SCAN	Bushland#1*	Subtrop	Grassl	3	2.2	10.5	6.9	10.7	4.1	4.4	0.58	4.5	0.56	0.65	26
SCAN	CacheJunction*	Subtrop	Grassl	0	1.1	27.6	9.5	17.2	3.6	13.3	-1.1	9.8	-0.13	1.04	19
SCAN	CaveValley*	Subtrop	Grassl	3	22.2	1.0	0.7	14.2	2.9	13.5	-377	0.9	-0.58	1.20	11
SCAN	CentraliaLake*	Subtrop	Cropl	3	5.8	16.7	4.9	15.8	2.3	5.0	-0.11	6.2	-0.69	1.27	25
SCAN	Charkiln*	Subtrop	C Shrubl	18	23.0	12.4	6.9	34.3	7.2	22.5	-11	4.5	0.52	0.65	8
SCAN	ChickenRidge*	Subtrop	Grassl	2	19.1	9.0	6.6	17.3	1.8	11.1	-2.1	11.2	-2.13	1.71	15
SCAN	Circleville*	Subtrop	Cropl	3	3.2	21.8	7.7	16.7	2.2	8.9	-0.43	9.6	-0.65	1.25	19
SCAN	ConradAgRc*	Temp	Cropl	3	5.1	27.4	8.9	14.2	4.2	16.6	-2.8	13.1	-1.33	1.47	13
SCAN	CrescentLake#1*	Subtrop	Cropl	5	1.8	12.9	6.9	16.7	3.2	9.4	-0.96	11.5	-1.93	1.67	19
SCAN	Crossroads*	Subtrop	Grassl	2	1.2	6.6	3.7	8.0	2.6	3.4	0.12	3.4	0.12	0.92	19
SCAN	Cullman-NAHRC*	Subtrop	Cropl	19	5.3	22.7	9.0	20.6	3.2	7.3	0.31	7.0	0.36	0.78	24
SCAN	DeeRiverRanch*	Subtrop	CropNat	9	0.9	19.1	10.4	19.1	3.4	7.9	0.38	7.2	0.49	0.70	20
SCAN	Dexter*	Subtrop	Cropl	1	1.0	22.1	2.4	19.6	3.9	5.5	-4.6	3.6	-1.42	1.50	16

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SCAN	Eastland*	Subtrop	Grassl	0	3.2	18.7	7.2	13.8	5.3	6.6	0.12	4.8	0.54	0.67	22
SCAN	EastviewFarm*	Subtrop	Cropl	6	3.6	32.6	4.6	17.1	2.4	15.9	-12	3.8	0.28	0.83	24
SCAN	Enterprise*	Subtrop	Cropl	7	1.7	10.7	5.5	17.4	3.8	8.0	-1.3	4.9	0.15	0.90	21
SCAN	Ephraim*	Subtrop	Cropl	4	8.4	10.7	4.3	15.7	2.3	6.3	-1.3	4.7	-0.26	1.09	19
SCAN	ErosDataCenter*	Subtrop	Cropl	4	4.5	26.5	7.2	16.2	2.3	12.9	-2.4	11.0	-1.48	1.52	16
SCAN	EvergladesArs*	Subtrop	Cropl	4	0.7	10.8	2.6	10.6	2.2	2.8	-0.21	3.0	-0.40	1.15	16
SCAN	FortAssiniboine#1*	Temp	Grassl	2	11.2	12.3	8.1	16.1	1.9	8.4	-0.15	9.4	-0.44	1.16	15
SCAN	FortReno#1*	Subtrop	Grassl	2	1.7	18.6	6.9	12.9	1.8	7.9	-0.39	4.6	0.53	0.67	24
SCAN	Fortuna*	Trop	Urban	5	4.0	48.1	2.5	16.8	3.1	31.4	-174	2.1	0.23	0.83	9
SCAN	Geneva#1*	Subtrop	CropNat	10	4.7	28.0	8.6	20.6	4.4	11.0	-0.72	9.7	-0.35	1.13	19
SCAN	GlacialRidge*	Temp	Cropl	5	1.1	14.0	7.0	17.8	1.5	8.3	-0.50	10.9	-1.61	1.57	17
SCAN	GoodwinCreekPast*	Subtrop	W Savan	28	2.8	32.2	5.3	20.7	2.6	12.9	-5.1	7.2	-0.89	1.35	26
SCAN	GoodwinCreekTimb*	Subtrop	W Savan	26	5.2	28.7	3.6	22.1	2.4	7.3	-3.3	3.6	-0.04	1.00	26
SCAN	Goshute*	Subtrop	Grassl	0	8.0	17.9	7.3	18.6	4.5	6.4	0.20	7.3	-0.04	1.00	22
SCAN	Grantsville*	Subtrop	Grassl	0	3.4	11.2	7.7	12.8	3.7	5.8	0.39	5.8	0.39	0.76	16
SCAN	GreenRiver*	Subtrop	Grassl	2	3.5	9.0	4.0	12.1	3.4	4.9	-0.58	4.0	-0.07	1.01	19
SCAN	GrouseCreek*	Subtrop	Grassl	4	20.3	6.9	5.9	22.0	4.1	16.9	-7.6	8.8	-1.33	1.49	22
SCAN	GuilarteForest*	Trop	Evg Bl F	76	45.2	40.9	9.6	26.9	6.9	18.5	-2.9	13.9	-1.22	1.44	15
SCAN	HalsCanyon*	Subtrop	Grassl	0	4.0	2.6	2.4	13.7	3.0	11.5	-23	2.4	-0.04	1.00	23
SCAN	HarmsWay*	Subtrop	Grassl	6	12.4	12.2	5.2	17.1	4.0	7.2	-1.0	5.8	-0.31	1.11	19
SCAN	HartselleUSDA*	Subtrop	CropNat	50	1.8	35.7	7.0	27.0	3.9	10.2	-1.3	5.6	0.29	0.80	10
SCAN	HayfordPeak*	Subtrop	O Shrubl	0	31.7	23.0	6.1	9.8	1.2	14.2	-5.1	5.8	-0.01	0.95	9
SCAN	Hodges*	Subtrop	Mix F	52	26.9	26.3	3.9	27.8	7.1	6.3	-1.7	3.9	-0.05	1.00	21
SCAN	Holden*	Subtrop	Grassl	2	2.0	8.0	3.8	15.8	2.2	8.2	-4.0	2.3	0.62	0.60	20
SCAN	HubbardBrook*	Subtrop	Dec Bl F	67	35.5	24.4	2.5	26.0	6.6	5.6	-4.2	2.2	0.21	0.86	17
SCAN	Hytrop*	Subtrop	CropNat	48	4.2	25.4	3.5	22.6	4.0	4.6	-0.84	3.3	0.03	0.96	23
SCAN	Isabela*	Trop	CropNat	13	2.8	36.9	6.8	16.7	3.3	21.3	-9.3	8.3	-0.57	1.23	23
SCAN	IsbellFarms*	Subtrop	Cropl	14	6.3	18.4	5.3	15.8	2.8	5.3	-0.03	5.3	-0.05	1.00	21
SCAN	IslandDairy*	Trop	Evg Bl F	27	12.2	40.1	5.3	21.5	4.5	19.4	-13	6.0	-0.33	1.13	25
SCAN	Jordan*	Temp	Grassl	1	5.7	22.4	10.9	16.8	1.7	11.4	-0.19	11.6	-0.23	1.07	15
SCAN	JordanValleyCwma*	Subtrop	Grassl	5	10.4	10.7	7.3	20.7	3.6	11.4	-1.6	5.9	0.30	0.81	15
SCAN	JornadaExpRange*	Subtrop	O Shrubl	0	1.7	3.1	3.4	7.9	3.3	5.3	-1.5	2.4	0.51	0.69	26
SCAN	Kainaliu*	Trop	CropNat	24	30.5	24.2	4.8	21.8	2.0	5.9	-0.61	7.2	-1.41	1.51	20
SCAN	KemoleGulch*	Trop	Grassl	1	25.0	11.9	5.8	17.2	3.1	9.0	-1.6	9.3	-1.71	1.61	23

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SCAN	KoptisFarms*	Subtrop	Cropl	11	0.9	9.9	5.2	16.3	3.0	7.7	-1.4	4.9	0.03	0.94	12
SCAN	Ku-nesa*	Subtrop	CropNat	28	8.2	25.5	9.8	20.8	2.0	11.7	-0.50	16.7	-2.04	1.71	25
SCAN	KyleCanyon*	Subtrop	O Shrubl	27	53.6	10.2	5.2	31.9	6.3	22.0	-18	3.6	0.50	0.69	22
SCAN	Lehman*	Subtrop	Grassl	2	1.5	6.7	3.1	5.6	1.6	3.3	-0.22	3.9	-0.67	1.24	12
SCAN	Levelland*	Subtrop	Grassl	1	1.6	9.3	4.3	8.6	2.7	3.6	0.26	4.0	0.10	0.93	25
SCAN	Lind#1*	Temp	Grassl	1	11.6	9.6	7.0	16.1	3.9	7.7	-0.25	3.8	0.70	0.54	24
SCAN	LittleRedFox*	Subtrop	Cropl	3	4.8	10.1	4.9	15.1	2.1	6.9	-1.1	6.1	-0.61	1.23	18
SCAN	LittleRiver*	Subtrop	Cropl	16	2.6	8.8	1.5	20.2	3.4	11.7	-66	1.2	0.30	0.82	22
SCAN	LittleWashita#1*	Subtrop	Grassl	1	4.0	21.8	5.6	11.2	2.6	11.2	-3.3	3.8	0.52	0.68	23
SCAN	Livingston-UWA*	Subtrop	W Savan	20	3.3	31.4	3.6	18.7	2.7	12.9	-13	2.4	0.50	0.68	13
SCAN	LosLunasPmc*	Subtrop	O Shrubl	0	4.0	5.1	3.9	9.9	2.2	5.6	-1.2	3.1	0.31	0.81	22
SCAN	LovellSummit*	Subtrop	O Shrubl	10	31.3	15.1	8.1	19.7	4.3	7.0	0.22	5.0	0.60	0.62	25
SCAN	LovelockNnr*	Subtrop	Grassl	0	12.4	13.1	6.8	18.4	5.0	7.4	-0.22	5.7	0.27	0.84	23
SCAN	LyeBrook*	Subtrop	Mix F	64	13.4	29.5	4.6	33.9	8.4	7.1	-1.6	3.1	0.49	0.69	13
SCAN	LynhartRanch*	Subtrop	Cropl	4	0.9	6.9	2.0	18.6	3.5	12.1	-39	1.9	0.03	0.96	23
SCAN	MahantangoCk*	Subtrop	CropNat	6	11.5	21.9	6.6	20.9	3.2	6.1	0.11	7.2	-0.24	1.08	19
SCAN	MammothCave*	Subtrop	Dec Bl F	65	11.7	25.3	7.8	27.2	4.5	7.5	0.04	8.5	-0.24	1.09	25
SCAN	ManaHouse*	Trop	Cropl	3	19.2	6.9	2.0	13.6	3.7	7.5	-14	2.0	-0.05	1.00	23
SCAN	Mandan#1*	Temp	Cropl	4	4.9	30.0	7.2	15.6	2.2	15.4	-4.0	4.5	0.57	0.63	13
SCAN	Manderfield*	Subtrop	Grassl	2	3.3	9.6	6.9	14.7	2.8	7.6	-0.30	6.2	0.13	0.91	19
SCAN	MarbleCreek*	Subtrop	O Shrubl	1	36.1	3.4	2.0	16.3	2.1	13.1	-45	1.9	0.06	0.92	10
SCAN	MaricaoForest*	Trop	Evg Bl F	77	58.6	16.6	4.0	27.9	4.6	13.6	-11	6.9	-2.18	1.74	20
SCAN	Mason#1*	Subtrop	Cropl	1	1.1	9.1	4.4	16.5	2.9	8.9	-3.3	5.7	-0.74	1.29	19
SCAN	Mayday*	Subtrop	Cropl	1	0.6	39.9	6.4	14.0	5.4	27.1	-18	8.6	-0.92	1.34	17
SCAN	McalisterFarm*	Subtrop	CropNat	4	2.3	31.0	7.8	17.1	3.5	15.3	-3.1	7.4	0.06	0.95	24
SCAN	MccrackenMesa*	Subtrop	Grassl	0	3.2	15.9	4.6	12.5	4.2	4.8	-0.14	3.5	0.41	0.75	19
SCAN	Milford*	Subtrop	Cropl	3	1.2	16.7	8.8	16.5	2.3	7.1	0.31	6.5	0.41	0.75	19
SCAN	Moccasin*	Temp	Grassl	5	1.9	19.1	10.5	18.0	4.7	9.5	0.12	11.4	-0.26	1.09	15
SCAN	MollyCaren#1*	Subtrop	Cropl	2	1.4	33.9	5.7	18.0	3.2	16.9	-8.3	6.7	-0.49	1.19	20
SCAN	Morgan*	Subtrop	Cropl	3	24.2	15.6	8.1	17.5	1.6	7.8	0.01	9.4	-0.44	1.16	17
SCAN	MorrisFarms*	Subtrop	W Savan	16	1.5	3.9	4.5	21.9	4.7	18.6	-17	4.7	-0.15	1.05	24
SCAN	MountainHome*	Subtrop	Cropl	5	9.5	24.5	5.7	15.6	2.1	11.1	-3.0	9.2	-1.72	1.61	20
SCAN	MountMansfield*	Subtrop	Mix F	54	44.3	33.7	3.4	25.2	4.9	10.2	-9.1	4.4	-0.92	1.32	10
SCAN	Nephi*	Subtrop	Grassl	0	8.7	21.9	7.3	12.7	3.5	10.5	-1.2	5.2	0.45	0.72	20

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SCAN	NewbyFarm*	Subtrop	CropNat	9	2.5	19.2	8.4	15.3	2.0	8.1	0.01	7.0	0.26	0.83	15
SCAN	NorthIssaquena*	Subtrop	Cropl	1	0.6	37.3	3.2	15.6	4.5	22.2	-50	4.2	-0.81	1.31	18
SCAN	NPiedmontArec*	Subtrop	Cropl	24	15.7	27.0	6.4	21.1	2.1	8.2	-0.75	6.7	-0.14	1.05	25
SCAN	Nunn#1*	Subtrop	Grassl	0	3.5	21.2	3.2	13.4	1.1	8.4	-6.2	3.8	-0.49	1.19	20
SCAN	Onward*	Subtrop	Cropl	2	1.0	32.0	3.1	16.2	3.9	16.3	-29	3.4	-0.31	1.12	26
SCAN	Panguitch*	Subtrop	Grassl	6	4.2	8.2	5.3	18.5	2.1	12.3	-4.7	9.3	-2.34	1.76	15
SCAN	ParkValley*	Subtrop	Grassl	0	3.4	4.2	3.6	15.3	2.3	11.3	-9.4	2.3	0.57	0.64	21
SCAN	PeeDee*	Subtrop	W Savan	27	4.9	13.2	5.3	22.5	4.2	10.1	-2.8	4.5	0.24	0.85	21
SCAN	PerdidoRivFarms*	Subtrop	W Savan	31	3.1	17.6	4.5	19.1	3.9	3.3	0.41	3.1	0.49	0.69	15
SCAN	Perthshire*	Subtrop	Cropl	2	0.4	31.8	9.1	17.1	4.5	16.2	-2.3	7.2	0.34	0.80	22
SCAN	Phillipsburg*	Subtrop	Cropl	1	3.2	17.3	3.1	15.9	1.4	3.4	-0.30	3.9	-0.69	1.27	24
SCAN	PineNut*	Subtrop	O Shrubl	3	22.9	5.7	4.1	18.8	4.9	13.9	-11	4.0	0.04	0.96	24
SCAN	PorterCanyon*	Subtrop	Cropl	5	28.6	13.3	10.1	21.7	3.6	11.5	-0.39	7.9	0.35	0.78	15
SCAN	PowderMill*	Subtrop	CropNat	38	2.7	16.2	6.5	24.0	2.7	9.1	-1.1	4.4	0.50	0.68	13
SCAN	PowellGardens*	Subtrop	CropNat	20	2.7	30.8	10.1	19.5	1.9	15.8	-1.5	17.1	-1.99	1.69	24
SCAN	PrairieView#1*	Subtrop	Grassl	6	1.3	6.5	4.9	10.7	3.3	4.7	-0.04	1.7	0.87	0.35	12
SCAN	Price*	Subtrop	Grassl	1	6.8	4.3	3.0	11.9	2.8	7.9	-6.1	2.1	0.49	0.70	25
SCAN	Princeton#1*	Subtrop	CropNat	6	3.3	30.8	6.4	17.0	3.6	15.3	-4.9	8.1	-0.64	1.26	25
SCAN	PuaAkala*	Trop	Mix F	23	21.8	32.7	6.8	25.0	4.8	10.1	-1.3	7.4	-0.26	1.10	24
SCAN	ReynoldsHomestead*	Subtrop	Dec Bl F	52	9.3	24.0	5.9	25.8	4.4	5.0	0.27	5.1	0.23	0.86	25
SCAN	RiverRoadFarms*	Subtrop	Cropl	5	2.4	8.7	4.1	16.4	3.4	8.1	-3.2	2.8	0.49	0.69	20
SCAN	RockSpringsPa*	Subtrop	CropNat	5	6.6	22.5	5.9	17.8	3.1	7.6	-0.78	7.4	-0.68	1.26	19
SCAN	RogersFarm#1*	Subtrop	Cropl	1	5.1	22.9	5.2	14.4	2.6	10.6	-3.3	7.9	-1.43	1.52	21
SCAN	SandHollow*	Subtrop	O Shrubl	0	23.3	3.2	1.5	8.7	2.7	5.9	-15	1.3	0.19	0.88	20
SCAN	SandyRidge*	Subtrop	Cropl	1	0.5	17.8	2.6	20.0	6.3	6.0	-4.5	2.7	-0.14	1.04	18
SCAN	Scott*	Subtrop	Cropl	0	0.8	32.3	6.2	15.5	3.6	17.7	-7.7	6.8	-0.28	1.10	17
SCAN	SellersLake#1*	Subtrop	Mix F	51	2.6	2.5	1.5	31.3	5.2	29.3	-417	2.1	-1.19	1.44	17
SCAN	Selma*	Subtrop	W Savan	30	2.8	4.7	1.3	23.5	3.1	19.0	-220	1.8	-1.08	1.37	11
SCAN	Sevilleta*	Subtrop	Grassl	0	2.2	4.2	3.0	10.9	3.1	7.4	-5.2	3.2	-0.13	1.04	26
SCAN	ShagbarkHills*	Subtrop	Cropl	0	5.2	25.5	8.4	13.8	3.8	15.6	-2.8	13.9	-1.97	1.66	14
SCAN	Shenandoah*	Subtrop	CropNat	48	28.6	31.4	7.8	23.9	3.5	9.7	-0.63	6.7	0.23	0.86	22
SCAN	Sidney*	Temp	Grassl	1	1.2	17.2	7.4	14.5	3.0	8.1	-0.27	10.0	-0.91	1.34	18
SCAN	SilverCity*	Subtrop	Cropl	5	0.6	28.1	6.1	16.2	3.1	12.8	-3.5	5.2	0.25	0.85	25
SCAN	SilverSword*	Trop	Grassl	3	62.4	20.1	6.2	38.6	5.9	19.3	-9.0	5.8	0.09	0.93	26

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SCAN	Spickard*	Subtrop	CropNat	24	5.2	27.9	11.2	15.7	1.4	16.5	-1.3	15.7	-1.06	1.40	22
SCAN	SplitMountain*	Subtrop	Cropl	3	5.2	10.9	5.2	16.2	2.4	7.3	-1.1	6.3	-0.54	1.20	18
SCAN	Spooky*	Subtrop	O Shrubl	0	3.1	4.5	2.4	5.3	3.2	2.8	-0.51	2.3	0.03	0.95	16
SCAN	StanleyFarm*	Subtrop	CropNat	46	27.5	28.2	8.5	22.3	2.2	10.4	-0.56	11.9	-1.04	1.40	23
SCAN	Starkville*	Subtrop	W Savan	35	3.7	46.3	4.2	22.7	1.2	23.9	-36	4.8	-0.50	1.16	9
SCAN	SudduthFarms*	Subtrop	W Savan	50	6.7	16.1	7.7	25.1	4.2	10.9	-1.1	6.9	0.15	0.90	23
SCAN	SunleafNursery*	Subtrop	CropNat	22	2.9	25.0	3.6	22.8	3.9	4.7	-0.81	4.0	-0.29	1.11	22
SCAN	TidewaterArec*	Subtrop	CropNat	9	2.0	22.4	7.4	19.0	2.7	7.1	0.03	7.0	0.07	0.95	24
SCAN	TNCFortBayou*	Subtrop	W Savan	25	3.0	16.7	6.8	20.7	2.3	7.5	-0.26	7.8	-0.38	1.15	24
SCAN	Torrington#1*	Subtrop	Grassl	0	6.6	8.7	3.5	15.0	2.0	7.0	-3.3	3.6	-0.12	1.03	18
SCAN	TroughSprings*	Subtrop	O Shrubl	12	19.9	17.4	5.0	22.3	5.0	6.8	-0.95	4.8	0.03	0.96	22
SCAN	TuleValley*	Subtrop	O Shrubl	0	9.7	22.2	4.3	17.3	4.4	6.8	-1.6	4.7	-0.25	1.09	19
SCAN	Tunica*	Subtrop	Cropl	3	0.7	30.0	5.5	17.6	6.2	13.8	-5.6	5.7	-0.13	1.04	26
SCAN	Tuskegee*	Subtrop	W Savan	13	1.9	10.3	3.0	19.9	3.2	10.3	-12	3.7	-0.64	1.25	23
SCAN	UAPBCampus-PB*	Subtrop	W Savan	38	3.6	17.9	10.3	22.2	3.7	8.7	0.22	7.1	0.49	0.69	15
SCAN	UAPBDewitt*	Subtrop	Cropl	7	0.8	23.9	12.4	18.3	3.4	11.2	0.11	8.6	0.48	0.70	14
SCAN	UAPBEarle*	Subtrop	Cropl	4	0.6	30.2	10.3	21.0	6.3	12.4	-0.51	9.4	0.13	0.91	23
SCAN	UAPBLonokeFarm*	Subtrop	Cropl	5	0.8	25.7	9.2	23.4	5.0	7.2	0.35	7.4	0.31	0.80	14
SCAN	UAPBMarianna*	Subtrop	Cropl	2	0.9	31.5	5.0	14.6	5.4	17.5	-12	4.2	0.25	0.84	19
SCAN	UAPBPointRemove*	Subtrop	Cropl	12	2.5	19.3	8.5	18.3	3.1	6.8	0.33	6.9	0.30	0.82	19
SCAN	Vance*	Subtrop	Cropl	5	1.2	38.0	4.6	17.5	3.9	21.2	-22	5.6	-0.57	1.20	13
SCAN	Vermillion*	Subtrop	Grassl	3	14.4	2.5	3.0	19.8	5.6	17.9	-37	3.0	-0.05	0.99	13
SCAN	Violet*	Temp	Grassl	0	3.3	16.4	7.9	13.2	2.9	7.2	0.11	7.2	0.12	0.91	16
SCAN	Wabeno#1*	Subtrop	Dec Bl F	63	11.6	20.0	5.1	23.7	5.3	8.5	-2.0	7.5	-1.30	1.47	15
SCAN	WaimeaPlain*	Trop	Grassl	13	5.6	21.2	6.4	13.9	2.3	9.0	-1.0	5.6	0.20	0.88	23
SCAN	Wakulla#1*	Subtrop	Mix F	43	1.6	5.6	2.1	27.6	4.9	22.6	-126	2.6	-0.65	1.24	16
SCAN	WalnutGulch#1*	Subtrop	O Shrubl	2	5.1	4.7	2.9	14.0	3.4	10.1	-11	3.5	-0.53	1.21	26
SCAN	WardFarm*	Temp	Cropl	17	1.2	28.9	4.9	18.3	2.7	12.2	-5.8	7.7	-1.68	1.55	10
SCAN	Watkinsville#1*	Subtrop	W Savan	10	2.8	22.2	6.4	19.0	2.6	6.4	-0.06	6.5	-0.09	1.02	25
SCAN	Wedowee*	Subtrop	W Savan	30	5.5	16.5	5.6	25.4	3.9	10.4	-2.6	6.2	-0.26	1.10	24
SCAN	WestSummit*	Subtrop	Grassl	1	3.4	15.3	4.4	14.2	4.6	4.2	0.06	4.0	0.15	0.90	20
SCAN	WillowWells*	Subtrop	O Shrubl	2	1.6	2.8	2.5	8.2	3.2	6.3	-5.8	2.9	-0.40	1.16	26
SCAN	WTARS*	Subtrop	Grassl	12	4.0	23.0	12.0	16.6	2.9	12.0	-0.05	9.9	0.29	0.82	23
SCAN	YoumansFarm*	Subtrop	CropNat	23	1.8	11.6	4.2	18.3	3.0	7.6	-2.5	4.2	-0.04	1.00	25

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SMOSMANIA	Barnas*	Subtrop	Mix F	48	49.6	15.7	5.0	40.3	18.2	28.2	-33	2.6	0.72	0.52	21
SMOSMANIA	Berzeme*	Subtrop	CropNat	33	20.5	14.8	8.0	28.8	3.4	16.4	-3.5	11.4	-1.18	1.41	12
SMOSMANIA	CabrieriesdAvignon*	Subtrop	Grassl	4	4.7	17.3	9.1	17.5	3.5	6.7	0.43	6.2	0.51	0.69	24
SMOSMANIA	Condom*	Subtrop	Cropl	6	9.7	32.1	7.6	19.6	4.8	14.0	-2.5	7.1	0.10	0.93	25
SMOSMANIA	CreondArmagnac*	Subtrop	Cropl	13	2.0	13.0	3.6	19.4	4.9	7.6	-3.7	3.4	0.06	0.95	25
SMOSMANIA	LaGrandCombe*	Subtrop	Evg Nl F	43	31.9	10.0	3.4	38.2	5.1	28.3	-71	1.9	0.66	0.57	23
SMOSMANIA	Lahas*	Subtrop	Cropl	5	9.9	30.3	9.6	21.4	6.6	11.1	-0.39	7.1	0.43	0.74	25
SMOSMANIA	LezignanCorbieres*	Subtrop	Cropl	3	1.0	10.5	4.3	18.9	3.6	9.1	-3.7	3.8	0.19	0.88	22
SMOSMANIA	Mazan-Abbaye*	Subtrop	CropNat	25	28.2	22.0	15.2	25.8	5.1	12.4	0.29	11.5	0.39	0.76	20
SMOSMANIA	Mejannes-le-Clap*	Subtrop	W Savan	25	5.6	21.6	10.1	22.4	5.2	6.3	0.59	5.7	0.66	0.57	24
SMOSMANIA	Montaut*	Subtrop	Cropl	12	8.0	30.3	8.0	20.1	4.7	12.3	-1.4	7.8	0.02	0.97	24
SMOSMANIA	Mouthoumet*	Subtrop	CropNat	17	9.9	20.8	4.5	22.3	4.5	3.5	0.37	3.1	0.49	0.70	22
SMOSMANIA	Narbonne*	Subtrop	W Savan	24	10.8	20.6	5.7	26.9	5.8	7.5	-0.82	4.0	0.48	0.70	24
SMOSMANIA	PeyrusseGrande*	Subtrop	Cropl	8	8.3	25.5	6.4	19.5	5.2	7.1	-0.28	3.8	0.62	0.60	25
SMOSMANIA	Pezenas*	Subtrop	Cropl	2	5.7	18.0	7.9	17.0	4.3	4.9	0.61	4.3	0.70	0.54	23
SMOSMANIA	Prades-le-Lez*	Subtrop	W Savan	16	6.4	19.8	6.7	23.4	4.7	5.0	0.42	3.4	0.72	0.52	23
SMOSMANIA	Sabres*	Subtrop	Grassl	17	2.7	9.2	4.1	23.9	4.8	14.9	-14	2.0	0.73	0.48	7
SMOSMANIA	SaintFelixdeLaura.*	Subtrop	Cropl	5	14.9	27.6	4.3	23.9	5.3	8.5	-3.2	6.8	-1.74	1.58	11
SMOSMANIA	Savenes*	Subtrop	Cropl	5	1.5	18.6	7.3	20.2	5.4	5.4	0.42	5.6	0.38	0.77	23
SMOSMANIA	Urgons*	Subtrop	Cropl	21	5.8	25.8	8.5	20.4	4.3	9.3	-0.29	9.0	-0.20	1.06	16
SMOSMANIA	Villevielle*	Subtrop	Cropl	3	5.9	20.7	12.3	19.6	4.3	8.6	0.50	5.5	0.80	0.44	24
SNOTEL	Aguacanyon*	Subtrop	Grassl	19	31.0	19.9	9.7	22.7	4.8	8.8	0.15	9.6	-0.03	0.99	22
SNOTEL	Anchorriverdivide*	Temp	O Shrubl	17	23.4	31.9	9.5	28.7	8.8	9.9	-0.21	9.7	-0.16	1.02	9
SNOTEL	Anniesprings*	Subtrop	Evg Nl F	36	17.8	9.6	5.6	34.9	5.2	26.5	-23	8.5	-1.48	1.50	11
SNOTEL	Arapahoridge*	Subtrop	Evg Nl F	39	35.7	25.3	9.5	34.5	6.2	13.0	-1.1	10.7	-0.43	1.13	9
SNOTEL	Arrow*	Subtrop	Evg Nl F	19	22.6	7.5	6.5	27.0	5.1	20.9	-11	8.3	-0.91	1.28	7
SNOTEL	Atlantasummit*	Subtrop	Grassl	21	69.1	9.4	4.2	25.7	7.2	18.2	-19	5.7	-1.02	1.36	12
SNOTEL	Bakerbuttesmt*	Subtrop	Evg Nl F	51	24.9	21.4	4.4	42.9	4.7	21.6	-27	2.3	0.67	0.54	7
SNOTEL	Baldy*	Subtrop	W Savan	25	6.5	16.9	8.1	23.6	5.9	9.8	-0.51	7.9	0.02	0.97	24
SNOTEL	Bannersummit*	Subtrop	Evg Nl F	42	27.4	15.1	9.5	33.8	5.0	21.1	-4.4	12.0	-0.76	1.27	12
SNOTEL	Bearriverrs*	Subtrop	Grassl	24	21.1	18.6	5.5	22.9	3.6	9.0	-1.8	9.5	-2.09	1.72	24
SNOTEL	Beaverdams*	Subtrop	O Shrubl	15	50.2	28.8	9.7	19.0	2.1	14.4	-1.3	16.1	-1.90	1.65	17
SNOTEL	Beaverdivide*	Subtrop	Grassl	26	26.2	24.6	6.2	22.6	3.5	9.1	-1.2	11.3	-2.46	1.81	20
SNOTEL	Beaverpass*	Temp	Evg Nl F	68	54.7	40.1	1.5	51.5	8.5	14.5	-104	2.4	-1.94	1.67	20

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Benlomonpeak*	Subtrop	W Savan	44	51.5	22.7	7.4	31.6	8.3	14.0	-2.7	10.1	-0.96	1.36	18
SNOTEL	Benlomontrail*	Subtrop	Grassl	25	40.3	18.1	4.9	22.5	4.0	7.8	-1.6	7.0	-1.13	1.42	20
SNOTEL	Berrycreek*	Subtrop	Grassl	25	76.4	22.3	5.5	24.3	4.8	7.2	-0.95	7.4	-1.05	1.35	9
SNOTEL	Berthoudsummit*	Subtrop	Grassl	20	51.8	16.4	4.5	24.6	2.5	9.8	-4.1	6.7	-1.33	1.46	12
SNOTEL	Bigbend*	Subtrop	Grassl	4	16.1	23.4	8.8	16.7	1.9	11.4	-0.78	13.6	-1.55	1.55	18
SNOTEL	Bigcreeksum*	Subtrop	Grassl	17	137.0	15.5	5.7	27.5	5.2	14.9	-6.3	9.2	-1.78	1.60	13
SNOTEL	Bigflat*	Subtrop	Evg Nl F	33	39.4	24.8	4.7	32.6	7.1	10.5	-4.4	5.3	-0.37	1.14	17
SNOTEL	Bigmeadow*	Subtrop	Evg Nl F	35	47.3	16.4	8.2	34.4	9.5	23.2	-7.3	13.6	-1.87	1.65	21
SNOTEL	Bigsandyopening*	Subtrop	Grassl	22	11.0	11.8	8.6	26.1	2.2	16.5	-3.0	10.8	-0.73	1.26	12
SNOTEL	Bigsandyopening*	Subtrop	Evg Nl F	67	20.6	17.0	9.6	49.8	7.4	35.1	-13	14.1	-1.26	1.46	19
SNOTEL	Birdcreek*	Subtrop	Grassl	18	55.7	9.2	3.5	33.3	7.7	25.5	-57	5.0	-1.25	1.42	10
SNOTEL	Blacksforkjct*	Subtrop	Grassl	26	17.3	22.7	8.0	23.1	3.6	7.7	0.03	9.5	-0.47	1.18	20
SNOTEL	Bluelakes*	Subtrop	Evg Nl F	34	18.7	11.8	4.4	28.4	2.8	17.5	-16	6.8	-1.52	1.53	15
SNOTEL	Bogusbasin*	Subtrop	Grassl	19	63.8	14.4	9.9	23.4	4.1	13.1	-0.87	12.0	-0.56	1.21	15
SNOTEL	Bourne*	Subtrop	Grassl	35	91.2	7.4	5.9	27.5	4.0	21.5	-14	9.0	-1.56	1.51	9
SNOTEL	Boxcreek*	Subtrop	Grassl	18	28.1	17.7	6.9	23.5	4.4	10.8	-1.6	11.0	-1.70	1.59	15
SNOTEL	Brianhead*	Subtrop	Grassl	17	33.7	7.6	3.3	19.8	2.0	12.8	-17	4.6	-1.29	1.38	6
SNOTEL	Brighton*	Subtrop	Evg Nl F	27	49.3	25.4	9.5	26.8	4.0	11.3	-0.48	15.1	-1.67	1.59	20
SNOTEL	Bristleconetrail*	Subtrop	Grassl	13	64.9	23.4	8.0	25.9	7.3	9.7	-0.53	9.8	-0.56	1.21	19
SNOTEL	Brownduck*	Subtrop	Grassl	25	37.5	15.5	11.9	31.3	5.9	21.4	-2.7	18.9	-1.89	1.59	8
SNOTEL	Browntop*	Temp	Water	36	72.7	25.4	5.0	35.5	9.1	15.3	-9.3	8.0	-1.79	1.60	12
SNOTEL	Brumley*	Subtrop	Evg Nl F	36	81.6	5.5	3.6	27.1	5.3	22.4	-40	4.7	-0.75	1.28	17
SNOTEL	Buckflat*	Subtrop	Grassl	20	42.3	30.0	11.4	25.4	2.4	12.6	-0.31	17.2	-1.44	1.52	18
SNOTEL	Buckinghorse*	Temp	Evg Nl F	51	98.0	23.5	9.0	41.7	8.0	23.3	-6.1	15.5	-2.14	1.72	17
SNOTEL	Buckskinjoe*	Subtrop	Grassl	19	52.5	22.3	4.4	25.7	4.0	6.3	-1.3	5.6	-0.81	1.27	9
SNOTEL	Buckskinlower*	Subtrop	Grassl	5	38.1	23.7	9.6	15.0	1.9	12.0	-0.65	8.0	0.27	0.83	17
SNOTEL	Buglake*	Subtrop	Evg Nl F	47	22.1	12.8	10.7	36.4	6.4	27.9	-6.3	18.5	-2.18	1.73	17
SNOTEL	Burnsidelake*	Subtrop	Grassl	26	20.5	18.5	10.7	22.1	3.0	12.4	-0.42	17.3	-1.79	1.62	16
SNOTEL	Burntmountain*	Temp	Evg Nl F	72	39.8	10.9	8.0	42.4	6.1	32.6	-17	9.2	-0.42	1.15	16
SNOTEL	Burromountain*	Subtrop	Grassl	26	22.8	32.1	2.2	24.4	4.0	9.0	-18	3.2	-1.34	1.49	18
SNOTEL	Burtsmillerranch*	Subtrop	Grassl	12	5.0	40.4	3.5	20.3	3.7	20.7	-36	4.8	-0.96	1.37	25
SNOTEL	Butte*	Subtrop	Evg Nl F	26	101.8	16.2	10.1	25.8	5.1	16.3	-1.8	17.2	-2.11	1.71	18
SNOTEL	Campjackson*	Subtrop	CropNat	31	57.5	28.8	6.2	23.9	3.2	9.0	-1.2	9.6	-1.52	1.55	23
SNOTEL	Carsonpass*	Subtrop	Evg Nl F	31	30.9	22.5	5.3	28.8	6.3	12.0	-4.6	9.3	-2.39	1.77	14

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Cascade#2*	Subtrop	Grassl	19	28.7	17.7	7.2	21.7	3.4	9.8	-0.95	11.8	-1.81	1.64	22
SNOTEL	Cascademountain*	Subtrop	CropNat	15	64.0	13.3	6.7	19.6	3.4	10.8	-1.8	11.5	-2.21	1.73	14
SNOTEL	Castlevally*	Subtrop	Grassl	21	14.7	20.2	8.6	22.7	3.4	9.4	-0.25	11.8	-0.98	1.38	24
SNOTEL	Cavemountain*	Subtrop	Grassl	12	50.2	14.5	8.4	20.9	4.2	8.4	-0.20	5.5	0.48	0.66	6
SNOTEL	Cayusepass*	Temp	Evg Nl F	30	59.0	11.9	5.5	32.0	6.8	22.2	-18	8.4	-1.70	1.54	8
SNOTEL	Chalkcreek#1*	Subtrop	Grassl	29	19.5	22.4	9.4	25.2	3.9	12.1	-0.71	16.2	-2.07	1.71	22
SNOTEL	Chalkcreek#2*	Subtrop	Grassl	28	33.0	9.9	6.9	23.2	3.4	16.3	-4.9	12.5	-2.45	1.82	23
SNOTEL	Chepeta*	Subtrop	Evg Nl F	45	15.7	17.4	7.0	34.3	4.2	19.4	-7.0	11.9	-2.03	1.70	19
SNOTEL	Chocolategulch*	Subtrop	Evg Nl F	35	52.4	16.6	8.7	29.2	4.0	15.5	-2.6	11.6	-1.02	1.34	9
SNOTEL	Cinnabarpark*	Subtrop	Evg Nl F	34	7.8	17.5	6.2	34.0	4.5	18.9	-9.1	10.7	-2.19	1.71	13
SNOTEL	Clackamaslake*	Subtrop	Evg Nl F	57	12.8	12.8	8.4	43.6	8.7	32.2	-14	9.5	-0.34	1.12	18
SNOTEL	Claytonsprings*	Subtrop	Evg Nl F	23	5.9	20.7	4.7	26.5	4.6	8.9	-2.8	6.8	-1.23	1.45	19
SNOTEL	Clearcreek#1*	Subtrop	Grassl	19	28.1	13.8	9.9	24.0	2.8	15.3	-1.6	17.3	-2.28	1.74	13
SNOTEL	Clearcreek#2*	Subtrop	Evg Nl F	48	67.5	16.3	7.7	36.4	7.1	23.2	-8.6	12.1	-1.60	1.58	23
SNOTEL	Clearlake*	Subtrop	Evg Nl F	58	26.2	28.8	4.0	44.0	6.8	17.1	-19	5.7	-1.14	1.42	19
SNOTEL	Cochetopapass*	Subtrop	Evg Nl F	35	35.6	17.2	6.6	32.4	5.3	16.7	-6.0	7.6	-0.44	1.15	13
SNOTEL	Coldfoot*	Temp	O Shrubl	11	9.9	21.2	10.2	32.8	7.2	18.4	-2.8	16.6	-2.10	1.63	7
SNOTEL	Corralcanyon*	Subtrop	Grassl	13	82.2	7.0	7.2	23.6	3.2	18.4	-6.2	10.5	-1.36	1.47	12
SNOTEL	Crab creek*	Subtrop	Grassl	40	15.2	21.1	8.9	32.7	5.6	16.5	-2.8	14.2	-1.79	1.60	12
SNOTEL	Cratermeadows*	Subtrop	W Savan	45	42.4	21.3	3.7	33.2	6.4	14.3	-17	5.7	-1.88	1.55	6
SNOTEL	Crowcreek*	Subtrop	Grassl	18	25.6	19.8	6.1	21.7	2.7	7.2	-0.54	9.3	-1.55	1.52	11
SNOTEL	Csslab*	Subtrop	Evg Nl F	37	26.8	14.5	6.4	27.8	3.2	15.1	-5.1	9.4	-1.36	1.48	15
SNOTEL	Culebra#2*	Subtrop	Evg Nl F	49	72.2	21.9	8.7	33.1	4.6	13.8	-1.7	9.7	-0.31	1.11	16
SNOTEL	Currantcreek*	Subtrop	Grassl	12	16.3	19.9	9.8	17.9	3.3	12.2	-0.67	17.9	-2.56	1.83	17
SNOTEL	Daniels-Strawberry*	Subtrop	Grassl	19	30.0	12.0	8.0	21.3	3.3	13.2	-1.9	13.0	-1.82	1.64	20
SNOTEL	Diamondpeak*	Subtrop	Grassl	10	76.8	20.6	11.8	20.4	4.2	13.4	-0.39	18.9	-1.76	1.60	14
SNOTEL	Dillscamp*	Subtrop	Grassl	16	38.9	16.7	6.5	22.3	3.1	9.9	-1.5	10.7	-1.88	1.64	14
SNOTEL	Disasterpeak*	Subtrop	Grassl	10	70.1	16.9	8.8	23.0	4.0	11.4	-0.79	12.5	-1.16	1.43	17
SNOTEL	Donkeyreservoir*	Subtrop	Evg Nl F	29	10.9	20.0	5.1	35.3	5.3	16.5	-10	6.0	-0.48	1.18	15
SNOTEL	Dorseybasin*	Subtrop	Grassl	13	46.3	9.8	8.2	17.8	1.9	11.8	-1.3	13.3	-1.92	1.63	11
SNOTEL	Dorseybasin*	Subtrop	Grassl	8	45.8	18.3	11.9	21.8	2.5	12.9	-0.28	18.5	-1.65	1.56	13
SNOTEL	Drybreadpond*	Subtrop	Grassl	11	17.6	16.9	9.0	18.8	2.8	10.4	-0.41	14.9	-1.89	1.65	19
SNOTEL	Dryfork*	Subtrop	Mix F	33	55.6	17.2	8.5	31.4	8.2	19.1	-4.3	12.9	-1.43	1.52	19
SNOTEL	Drylake*	Subtrop	Grassl	19	38.0	18.9	6.6	21.1	3.5	8.6	-0.75	10.6	-1.67	1.60	23

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Eaglesummit*	Temp	O Shrubl	5	57.1	21.6	3.7	24.1	8.9	8.9	-5.8	4.5	-0.76	1.23	7
SNOTEL	Eastrimdivide*	Subtrop	Grassl	21	18.1	15.9	6.0	25.5	2.6	12.2	-3.8	10.3	-2.42	1.71	7
SNOTEL	Eastwillowcreek*	Subtrop	Grassl	13	30.9	23.9	5.4	19.4	3.0	6.5	-0.57	5.4	-0.10	1.00	12
SNOTEL	Ebbettspass*	Subtrop	Evg Nl F	25	44.4	11.0	7.1	25.7	4.7	17.7	-5.6	11.8	-1.91	1.66	20
SNOTEL	Echopeak*	Subtrop	Evg Nl F	26	44.9	16.3	9.0	22.1	4.1	12.2	-0.98	14.3	-1.73	1.58	12
SNOTEL	Efblacksforkgs*	Subtrop	Grassl	28	33.4	35.5	3.0	23.3	4.3	12.6	-18	2.3	0.34	0.77	11
SNOTEL	Fallenleaf*	Subtrop	Evg Nl F	40	11.7	16.5	9.7	34.0	6.8	21.9	-4.3	15.4	-1.64	1.59	23
SNOTEL	Farmington*	Subtrop	Grassl	20	36.7	19.7	4.5	25.6	4.6	9.2	-3.6	7.0	-1.59	1.56	18
SNOTEL	Farmingtonlower*	Subtrop	Mix F	38	44.7	25.7	6.7	36.7	9.6	15.2	-4.4	8.5	-0.68	1.26	17
SNOTEL	Farnsworthlake*	Subtrop	Evg Nl F	37	49.9	36.8	2.5	31.2	4.7	8.0	-9.5	3.9	-1.53	1.55	19
SNOTEL	Fawncreek*	Subtrop	W Savan	36	36.2	21.1	10.1	30.8	5.9	16.3	-1.7	16.2	-1.70	1.60	18
SNOTEL	Fishlakeutah*	Subtrop	Grassl	12	15.7	9.9	5.2	20.1	2.7	11.9	-4.7	7.7	-1.38	1.48	12
SNOTEL	Fivepointslake*	Subtrop	Grassl	25	19.8	28.7	10.2	26.7	5.2	12.9	-0.72	16.6	-1.84	1.62	13
SNOTEL	Forestdalecreek*	Subtrop	Evg Nl F	34	29.6	27.5	10.2	26.8	5.3	13.4	-0.84	17.4	-2.10	1.71	18
SNOTEL	Forestdalecreek*	Subtrop	W Savan	28	9.1	26.3	8.7	26.5	5.4	8.9	-0.09	10.6	-0.53	1.21	25
SNOTEL	Franklinbasin*	Subtrop	Grassl	20	39.9	27.9	6.1	25.8	5.1	10.0	-1.8	10.6	-2.20	1.74	19
SNOTEL	Fremontpass*	Subtrop	Evg Nl F	30	42.2	34.8	5.1	28.8	3.2	8.7	-2.3	7.5	-1.42	1.47	9
SNOTEL	Galenasummit*	Subtrop	Evg Nl F	20	36.9	16.3	10.0	30.3	4.4	17.5	-2.4	13.6	-1.05	1.36	10
SNOTEL	Gardencitysummit*	Subtrop	Evg Nl F	30	24.0	17.4	7.9	24.0	4.7	12.0	-1.4	12.2	-1.53	1.54	18
SNOTEL	Gardnerpeak*	Subtrop	Evg Nl F	28	59.4	9.6	5.3	27.9	5.5	19.4	-13	6.5	-0.59	1.22	15
SNOTEL	Georgecreek*	Subtrop	Grassl	17	22.0	16.7	11.7	27.4	5.5	16.8	-1.3	16.9	-1.34	1.44	9
SNOTEL	Giveout*	Subtrop	Grassl	12	43.3	16.6	7.9	20.6	2.8	8.2	-0.21	9.0	-0.44	1.14	10
SNOTEL	Gobblersknob*	Temp	O Shrubl	3	56.8	10.2	3.2	22.5	2.9	12.5	-17	2.0	0.53	0.64	8
SNOTEL	Goldaxecamp*	Temp	Evg Nl F	40	78.5	12.8	8.0	42.4	6.8	29.8	-16	3.6	0.76	0.45	6
SNOTEL	Grandtarghee*	Subtrop	Grassl	12	50.2	24.8	7.3	19.6	3.2	8.4	-0.61	8.1	-0.51	1.12	6
SNOTEL	Granitecrk*	Temp	W Savan	18	1.5	20.3	3.9	28.7	3.0	10.6	-7.1	7.2	-2.76	1.84	10
SNOTEL	Granitepeak*	Subtrop	Grassl	3	32.5	25.8	7.5	19.9	2.4	10.5	-1.2	12.5	-2.12	1.68	10
SNOTEL	Greenmountain*	Subtrop	Grassl	11	49.8	17.5	9.6	15.4	2.0	10.7	-0.33	16.3	-2.09	1.69	13
SNOTEL	Grousecamp*	Temp	Evg Nl F	52	49.6	15.8	13.5	40.4	6.7	29.4	-4.0	20.7	-1.49	1.53	16
SNOTEL	Gutzpeak*	Subtrop	Grassl	15	34.4	28.4	7.9	19.2	4.5	11.8	-1.4	8.9	-0.34	1.13	21
SNOTEL	Hagansmeadow*	Subtrop	Evg Nl F	44	23.5	11.0	11.1	38.5	8.3	32.3	-7.8	19.2	-2.12	1.73	23
SNOTEL	Happyjack*	Subtrop	Evg Nl F	33	13.8	26.1	10.1	28.0	5.0	8.9	0.21	10.0	-0.01	0.98	24
SNOTEL	Hardscrabble*	Subtrop	Grassl	29	64.6	23.9	9.3	22.4	4.0	11.8	-0.67	16.0	-2.09	1.72	22
SNOTEL	Harrisflat*	Subtrop	Grassl	19	8.4	28.0	5.8	17.4	4.0	12.1	-3.5	6.6	-0.34	1.13	19

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Hartspass*	Temp	Grassl	22	39.8	27.8	12.9	24.8	3.1	12.6	-0.05	16.3	-0.75	1.26	10
SNOTEL	Haydenfork*	Subtrop	Grassl	24	56.3	36.3	4.3	27.3	4.8	11.4	-6.3	6.7	-1.50	1.54	22
SNOTEL	Heavenlyvalley*	Subtrop	Evg Nl F	24	68.7	14.4	1.9	26.6	6.2	14.4	-56	3.6	-2.63	1.86	22
SNOTEL	Hewinta*	Subtrop	Grassl	32	17.3	25.9	7.2	25.9	5.4	10.1	-1.1	11.5	-1.76	1.60	14
SNOTEL	Hickersonpark*	Subtrop	Grassl	16	13.6	28.0	5.4	19.3	2.8	10.5	-3.0	7.2	-0.90	1.34	17
SNOTEL	Highridge*	Subtrop	Evg Nl F	42	35.6	14.2	8.7	34.6	6.5	23.8	-7.3	14.2	-1.94	1.63	11
SNOTEL	Hiltscreek*	Subtrop	Evg Nl F	38	43.2	28.5	9.0	32.1	5.7	10.4	-0.52	11.6	-0.89	1.30	9
SNOTEL	Hole-In-Mountain*	Subtrop	Grassl	10	73.3	21.3	9.9	19.3	3.2	11.6	-0.46	16.5	-1.95	1.67	17
SNOTEL	Hole-In-Rock*	Subtrop	Evg Nl F	27	15.0	19.3	5.8	30.7	6.8	14.2	-5.3	7.8	-0.90	1.35	20
SNOTEL	Hollandmeadows*	Subtrop	Mix F	61	43.3	19.6	4.7	39.0	9.0	20.9	-20	4.6	-0.01	0.98	20
SNOTEL	Hoosierpass*	Subtrop	Grassl	17	27.1	29.3	4.8	26.9	3.8	6.7	-1.2	7.0	-1.32	1.46	12
SNOTEL	Horsemeadow*	Subtrop	Evg Nl F	16	44.4	8.4	5.9	21.5	2.5	14.0	-5.1	5.7	-0.01	0.97	13
SNOTEL	Horseridge*	Subtrop	Grassl	11	9.5	16.6	7.7	18.0	3.0	9.7	-0.66	13.4	-2.22	1.75	20
SNOTEL	Hyndman*	Subtrop	Evg Nl F	37	95.9	9.2	8.4	32.3	3.8	24.4	-8.5	9.7	-0.49	1.15	9
SNOTEL	Ikalukrokreek*	Temp	O Shrubl	3	38.5	20.9	5.1	26.3	3.0	7.9	-1.7	7.1	-1.22	1.38	7
SNOTEL	Independencecreek*	Subtrop	Evg Nl F	36	10.9	11.6	7.8	33.5	6.3	24.1	-9.3	11.1	-1.20	1.43	14
SNOTEL	Independencelake*	Subtrop	Evg Nl F	39	80.3	11.0	7.5	35.5	9.0	27.9	-14	12.0	-1.72	1.59	15
SNOTEL	Indiancanyon*	Subtrop	Evg Nl F	27	51.1	23.5	6.9	28.1	4.2	9.2	-0.84	9.6	-1.03	1.38	18
SNOTEL	Indianrock*	Subtrop	Evg Nl F	56	42.0	12.3	7.8	36.3	8.0	27.8	-13	13.9	-2.46	1.79	13
SNOTEL	Jackcreekupper*	Subtrop	Grassl	6	31.1	15.0	9.7	19.4	2.4	11.0	-0.39	14.4	-1.42	1.48	11
SNOTEL	Jacksonpeak*	Subtrop	Evg Nl F	32	62.0	13.6	10.6	28.8	6.0	17.2	-2.0	9.0	0.16	0.86	8
SNOTEL	Jackspeak*	Subtrop	Grassl	14	57.5	19.4	12.1	20.8	3.1	12.8	-0.23	18.6	-1.59	1.54	12
SNOTEL	Jonescorral*	Subtrop	Evg Nl F	26	27.0	18.0	6.6	24.5	3.1	9.1	-1.0	7.8	-0.53	1.20	16
SNOTEL	Kenaimoosepens*	Temp	Mix F	50	2.6	12.6	2.4	52.6	28.8	48.2	-488	3.3	-1.26	1.39	7
SNOTEL	Kilfoilcreek*	Subtrop	Grassl	12	35.1	21.9	7.7	17.2	2.8	10.6	-1.00	13.6	-2.32	1.77	18
SNOTEL	Kimberlymine*	Subtrop	Evg Nl F	35	60.2	25.1	5.0	36.3	6.4	13.7	-6.8	7.0	-1.00	1.38	20
SNOTEL	Kingscabin*	Subtrop	Grassl	34	37.0	21.3	4.8	27.8	4.7	9.7	-3.3	7.3	-1.42	1.52	22
SNOTEL	Klondikenarrows*	Subtrop	Grassl	15	37.4	21.1	9.9	19.5	3.0	10.4	-0.16	14.1	-1.13	1.43	22
SNOTEL	Kolob*	Subtrop	Grassl	12	20.4	23.4	9.5	16.6	1.7	11.6	-0.58	13.0	-0.99	1.38	20
SNOTEL	Lakefork#1*	Subtrop	Grassl	28	24.8	31.6	10.6	28.4	5.6	14.7	-1.1	18.6	-2.42	1.75	10
SNOTEL	Lakefork#3*	Subtrop	CropNat	25	70.6	6.8	2.3	23.3	3.7	17.0	-56	3.1	-0.90	1.33	16
SNOTEL	Lakeforkbasin*	Subtrop	Grassl	25	15.3	39.0	4.6	24.5	3.6	15.6	-11	6.4	-1.08	1.38	13
SNOTEL	Lamancecreek*	Subtrop	Grassl	15	67.2	19.3	8.4	19.0	1.9	7.9	0.04	10.2	-0.58	1.22	15
SNOTEL	Lamoille#3*	Subtrop	Grassl	9	78.3	20.7	10.8	14.6	3.8	10.5	-0.01	8.9	0.27	0.82	14

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Laprelecreek*	Subtrop	Grassl	27	8.6	15.5	9.1	23.6	3.9	13.3	-1.2	14.2	-1.54	1.55	18
SNOTEL	Larsencreek*	Subtrop	Grassl	23	30.7	10.2	6.1	23.6	3.4	15.2	-5.8	8.6	-1.20	1.43	13
SNOTEL	Lasalmountain*	Subtrop	Mix F	29	50.7	17.1	3.6	35.4	4.5	19.3	-29	5.5	-1.47	1.53	20
SNOTEL	Laureldraw*	Subtrop	Grassl	12	19.2	25.5	8.5	17.6	2.7	12.3	-1.2	13.3	-1.61	1.57	17
SNOTEL	Leavittlake*	Subtrop	Grassl	23	58.5	7.9	6.8	33.1	6.6	27.3	-17	10.5	-1.74	1.55	8
SNOTEL	Leavittmeadows*	Subtrop	Grassl	20	39.4	12.6	3.9	25.1	4.7	13.8	-12	5.4	-0.97	1.37	21
SNOTEL	Leecanyon*	Subtrop	O Shrubl	16	45.4	16.2	7.8	23.2	4.4	9.6	-0.61	7.6	-0.00	0.97	15
SNOTEL	Lewislakdivide*	Subtrop	Grassl	19	26.4	28.2	9.1	24.3	6.0	12.6	-1.1	14.3	-1.72	1.58	12
SNOTEL	Lewispeak*	Subtrop	Grassl	8	57.5	17.6	7.7	19.2	2.2	8.0	-0.16	10.8	-1.11	1.41	18
SNOTEL	Lewispeak*	Subtrop	Grassl	12	27.4	19.1	6.4	20.4	3.1	8.5	-0.84	11.2	-2.17	1.74	21
SNOTEL	Lilylake*	Subtrop	Grassl	23	29.1	16.3	6.4	24.7	5.0	12.1	-2.8	9.8	-1.46	1.53	19
SNOTEL	Lilypond*	Subtrop	Grassl	27	31.4	32.3	4.8	27.3	4.4	9.0	-2.8	7.7	-1.78	1.62	16
SNOTEL	Lilypond*	Temp	Grassl	0	2.7	12.9	5.2	15.1	2.9	6.0	-0.46	6.9	-0.91	1.34	16
SNOTEL	Littlebear*	Subtrop	Grassl	10	26.5	25.9	9.6	19.6	2.1	11.0	-0.41	11.7	-0.58	1.22	16
SNOTEL	Littlegrassy*	Subtrop	Grassl	10	35.5	21.1	13.4	20.0	3.3	12.6	-0.03	16.8	-0.82	1.25	7
SNOTEL	Lizardheadpass*	Subtrop	Grassl	29	26.8	36.7	4.6	22.0	5.8	16.8	-13	7.1	-1.46	1.53	23
SNOTEL	Lobdelllake*	Subtrop	Grassl	16	21.7	11.9	6.2	20.3	1.9	11.0	-2.4	10.3	-2.00	1.66	12
SNOTEL	Lonecone*	Subtrop	Evg Nl F	28	21.8	28.4	8.2	27.6	5.0	10.6	-0.74	12.9	-1.58	1.57	23
SNOTEL	Longdrawresv*	Subtrop	Evg Nl F	24	31.3	23.9	3.1	34.5	7.1	12.5	-16	3.6	-0.45	1.16	14
SNOTEL	Longflat*	Subtrop	Grassl	20	17.5	11.5	6.4	22.2	3.5	12.2	-2.9	6.9	-0.24	1.09	24
SNOTEL	Longvalley*	Subtrop	Cropl	13	2.3	13.5	5.6	18.9	2.1	8.1	-1.2	8.1	-1.23	1.45	19
SNOTEL	Longvalleyjct*	Subtrop	Grassl	13	8.1	19.9	10.1	19.4	3.5	8.1	0.34	8.0	0.34	0.79	24
SNOTEL	Lookout*	Temp	Evg Nl F	45	94.6	8.9	6.0	55.8	11.9	47.3	-72	2.3	0.82	0.39	7
SNOTEL	Lookoutpeak*	Subtrop	Grassl	23	57.7	12.6	8.2	22.7	3.6	14.5	-2.3	13.9	-2.07	1.71	20
SNOTEL	Lostcreekresv*	Subtrop	Grassl	6	61.9	25.9	10.4	20.5	2.6	12.1	-0.46	15.7	-1.44	1.52	17
SNOTEL	Lostdog*	Subtrop	Grassl	8	34.6	18.6	8.0	16.7	2.1	7.2	0.13	7.7	0.00	0.97	16
SNOTEL	Losthorse*	Subtrop	Grassl	20	17.8	13.3	9.4	23.7	4.4	14.5	-1.5	13.0	-1.04	1.38	16
SNOTEL	Louismeadow*	Subtrop	W Savan	47	66.7	20.5	8.4	28.5	7.6	14.0	-1.9	12.0	-1.14	1.43	20
SNOTEL	Magicmountain*	Subtrop	Grassl	29	27.1	18.3	7.4	25.7	4.3	11.2	-1.4	10.3	-1.07	1.39	14
SNOTEL	Mammoth-Cottonwood*	Subtrop	CropNat	14	18.7	21.0	4.7	18.7	2.0	6.3	-0.90	8.1	-2.13	1.72	18
SNOTEL	Marlettelake*	Subtrop	Evg Nl F	37	52.5	12.6	7.2	28.6	4.0	18.9	-6.3	12.7	-2.31	1.76	15
SNOTEL	Medanopass*	Subtrop	Evg Nl F	33	36.3	15.6	6.7	30.2	3.3	15.6	-4.7	6.0	0.16	0.89	18
SNOTEL	Merchantvalley*	Subtrop	Grassl	21	44.4	31.1	1.7	22.6	3.4	8.9	-29	1.6	0.05	0.94	16
SNOTEL	Micacreek*	Temp	Evg Nl F	65	43.9	22.8	10.8	49.2	10.3	30.9	-7.9	16.4	-1.51	1.52	13

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Michigancreek*	Subtrop	Grassl	23	34.3	10.4	5.2	28.5	3.2	19.4	-14	8.4	-1.79	1.62	16
SNOTEL	Middleforkcamp*	Subtrop	Grassl	18	12.6	15.4	3.9	28.9	2.9	13.9	-13	3.9	-0.12	1.01	11
SNOTEL	Midwayvalley*	Subtrop	Grassl	15	34.3	18.4	7.9	21.2	3.1	8.7	-0.25	10.7	-0.93	1.35	20
SNOTEL	Mill-Dnorth*	Subtrop	Grassl	14	61.2	16.2	8.7	20.8	3.3	11.4	-0.86	14.6	-2.06	1.68	13
SNOTEL	Millerwoods*	Subtrop	Mix F	53	30.3	33.8	8.8	37.0	8.6	8.7	-0.02	8.2	0.10	0.93	22
SNOTEL	Miningfork*	Subtrop	Grassl	12	94.8	16.0	6.9	18.4	2.3	6.8	-0.07	8.1	-0.49	1.18	14
SNOTEL	Monahanflat*	Temp	O Shrubl	17	13.5	20.6	6.2	32.6	4.0	13.4	-4.4	6.6	-0.33	1.08	8
SNOTEL	Monitorpass*	Subtrop	Grassl	17	23.4	19.2	7.9	21.4	3.2	9.6	-0.53	12.7	-1.71	1.60	18
SNOTEL	Montecristo*	Subtrop	Grassl	14	21.7	18.7	11.2	20.1	3.3	12.3	-0.29	17.6	-1.64	1.57	15
SNOTEL	Montecristo*	Subtrop	Evg Nl F	43	47.2	26.8	10.1	33.7	7.2	13.4	-0.91	13.2	-0.85	1.31	13
SNOTEL	Moscowmountain*	Temp	Evg Nl F	60	28.5	23.9	12.6	39.4	7.8	21.5	-2.1	18.0	-1.19	1.43	16
SNOTEL	Mosesmtn*	Temp	Evg Nl F	49	32.1	12.7	9.3	32.9	3.3	23.0	-5.7	15.6	-2.07	1.67	11
SNOTEL	Mosquitridge*	Temp	Evg Nl F	54	36.5	15.0	7.9	35.7	6.5	24.0	-8.8	13.2	-1.95	1.66	15
SNOTEL	Mosssprings*	Subtrop	Evg Nl F	51	14.5	18.2	11.3	46.5	8.2	32.5	-7.8	18.2	-1.76	1.61	15
SNOTEL	Mtroseskiarea*	Subtrop	W Savan	20	76.8	2.8	3.3	27.0	7.7	26.0	-71	5.6	-2.33	1.69	7
SNOTEL	Mudflat*	Subtrop	Grassl	7	10.2	21.0	9.1	18.1	3.1	8.2	0.12	8.7	0.01	0.96	15
SNOTEL	Myrtlecreek*	Temp	Grassl	16	35.4	17.1	2.7	19.5	2.3	5.1	-2.7	4.9	-2.55	1.81	13
SNOTEL	Navajowhiskeyck*	Subtrop	Grassl	17	4.5	34.2	3.6	19.9	4.1	14.8	-16	3.7	-0.05	1.01	26
SNOTEL	Nukaglacier*	Temp	Grassl	17	68.3	14.7	7.1	22.2	2.6	9.9	-1.4	8.3	-0.66	1.17	6
SNOTEL	Orchardrangesite*	Subtrop	Grassl	1	1.2	15.9	10.7	16.4	2.4	8.6	0.32	6.2	0.65	0.58	20
SNOTEL	Palo*	Subtrop	Evg Nl F	47	30.0	7.9	6.8	38.5	8.8	32.8	-23	10.1	-1.27	1.48	25
SNOTEL	Paradise*	Temp	Evg Nl F	55	69.9	27.2	8.2	45.9	8.6	22.2	-7.4	11.7	-1.31	1.42	8
SNOTEL	Parkcone*	Subtrop	Evg Nl F	39	31.7	24.0	5.7	38.9	7.6	17.0	-8.7	6.9	-0.59	1.22	14
SNOTEL	Parkcreekridge*	Temp	Mix F	50	70.8	10.6	3.3	28.0	4.4	18.1	-31	4.2	-0.68	1.25	16
SNOTEL	Parkreservoir*	Subtrop	Grassl	29	19.9	40.4	0.4	28.5	11.8	16.4	-1555	0.6	-0.80	1.29	12
SNOTEL	Parleyssummit*	Subtrop	CropNat	18	33.4	28.1	9.3	20.6	2.8	13.3	-1.1	16.0	-2.11	1.72	19
SNOTEL	Parrishcreek*	Subtrop	Grassl	24	64.5	26.1	8.8	17.8	1.7	12.3	-1.1	13.2	-1.44	1.51	14
SNOTEL	Phantomvalley*	Subtrop	Evg Nl F	28	44.3	3.2	0.7	31.5	5.1	28.7	-1673	0.8	-0.27	1.09	14
SNOTEL	Picklekeg*	Subtrop	Grassl	12	34.4	27.7	4.1	17.4	1.8	11.4	-7.2	6.7	-1.82	1.63	18
SNOTEL	Pinecreek*	Subtrop	Grassl	12	26.6	12.0	6.0	22.9	4.0	12.3	-3.4	6.7	-0.32	1.12	20
SNOTEL	Pocketcreek*	Subtrop	Evg Nl F	35	30.7	29.3	8.4	33.2	3.0	10.4	-0.77	13.7	-2.08	1.64	8
SNOTEL	Pointmackenzie*	Temp	Mix F	45	5.5	6.5	8.5	64.3	21.5	64.0	-64	15.4	-2.80	1.82	8
SNOTEL	Poisonflat*	Subtrop	Evg Nl F	29	20.2	41.3	0.8	25.7	3.8	16.0	-395	1.3	-1.46	1.53	23
SNOTEL	Porphyrycreek*	Subtrop	Evg Nl F	38	31.8	32.1	5.8	32.4	4.4	8.6	-1.6	9.8	-2.30	1.68	7

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Portgraham*	Temp	Evg Nl F	70	23.5	23.1	3.4	59.0	12.4	37.2	-135	2.2	0.53	0.65	9
SNOTEL	Quartzmountain*	Subtrop	Evg Nl F	30	23.0	11.7	6.4	29.1	6.4	20.1	-9.5	10.1	-1.64	1.58	17
SNOTEL	Quartzpeak*	Temp	Evg Nl F	63	77.1	14.5	6.7	39.5	5.6	26.8	-16	10.8	-1.82	1.61	13
SNOTEL	Raggedmountain*	Temp	Mix F	56	57.1	14.5	8.4	39.7	11.5	29.5	-12	12.8	-1.52	1.53	13
SNOTEL	Rainbowcanyon*	Subtrop	Evg Nl F	40	62.6	16.3	7.6	39.0	12.3	26.1	-11	9.3	-0.58	1.23	24
SNOTEL	Rainypass*	Temp	Evg Nl F	58	71.1	25.0	6.2	42.0	10.4	22.1	-12	10.5	-2.03	1.69	17
SNOTEL	Redpineridge*	Subtrop	Grassl	17	17.3	31.8	6.4	23.0	3.0	11.9	-2.6	10.7	-1.92	1.67	21
SNOTEL	Redriverpass#2*	Subtrop	Grassl	22	23.8	1.6	2.3	24.9	6.1	24.2	-120	3.1	-0.93	1.36	23
SNOTEL	Reynoldscreek*	Subtrop	Grassl	15	20.0	14.8	6.2	23.1	2.8	10.3	-2.0	7.6	-0.65	1.22	11
SNOTEL	Rockcreek*	Subtrop	Evg Nl F	27	16.4	21.2	5.0	29.0	3.9	10.7	-3.9	8.2	-1.85	1.64	18
SNOTEL	Rocksprings*	Subtrop	Evg Nl F	32	29.6	19.8	11.7	32.7	5.8	19.6	-2.0	19.4	-1.92	1.66	18
SNOTEL	Rockybasin-Settleme*	Subtrop	Grassl	19	53.9	10.9	11.1	23.4	3.5	16.3	-1.5	13.9	-0.83	1.25	7
SNOTEL	Roughandtumble*	Subtrop	Grassl	29	17.4	19.2	9.0	26.4	4.8	10.8	-0.56	9.5	-0.20	1.06	14
SNOTEL	Rubicon#2*	Subtrop	Evg Nl F	52	44.7	21.0	9.5	43.6	11.3	28.7	-8.5	16.3	-2.06	1.71	20
SNOTEL	Sagecreekbasin*	Subtrop	Grassl	5	22.7	22.3	3.6	15.4	1.2	7.4	-3.8	2.5	0.44	0.69	7
SNOTEL	Salmonmeadows*	Temp	Evg Nl F	48	26.1	16.6	8.7	36.7	3.9	22.6	-6.7	13.7	-1.85	1.58	8
SNOTEL	Saltcreekfalls*	Subtrop	Evg Nl F	70	34.5	6.2	5.2	52.1	11.1	48.3	-98	9.5	-2.79	1.80	7
SNOTEL	Saltriversummit*	Subtrop	Grassl	26	24.5	23.5	1.7	29.4	6.2	8.4	-26	2.1	-0.78	1.28	12
SNOTEL	Sasseridge*	Temp	Evg Nl F	44	97.7	20.1	6.9	34.8	6.8	17.7	-5.9	9.9	-1.18	1.43	18
SNOTEL	Savagepass*	Subtrop	Evg Nl F	62	54.4	25.8	2.3	49.5	7.7	25.3	-132	3.8	-2.00	1.67	15
SNOTEL	Schneidermeadows*	Subtrop	Evg Nl F	44	25.3	18.1	8.1	34.1	6.2	19.6	-5.2	12.8	-1.66	1.59	18
SNOTEL	Schofieldpass*	Subtrop	W Savan	55	54.4	10.4	7.5	33.6	7.1	24.5	-12	8.2	-0.43	1.09	6
SNOTEL	Seeleycreek*	Subtrop	Grassl	11	18.2	17.2	9.2	16.8	1.7	8.2	0.15	9.0	-0.03	0.97	13
SNOTEL	Sentinelbutte*	Temp	Evg Nl F	72	65.6	14.1	10.2	48.5	5.5	37.3	-14	18.2	-2.53	1.79	11
SNOTEL	Seventysixcreek*	Subtrop	Grassl	5	20.3	23.4	12.1	16.4	1.7	13.1	-0.28	13.1	-0.26	1.08	14
SNOTEL	Shanghisummit*	Subtrop	Mix F	59	19.0	10.6	8.0	35.1	7.3	26.7	-12	11.2	-1.22	1.39	8
SNOTEL	Sharkstooth*	Subtrop	Evg Nl F	35	41.7	34.3	6.4	39.2	6.0	11.2	-2.3	10.4	-1.83	1.64	21
SNOTEL	Sharkstooth*	Subtrop	Grassl	2	11.7	21.0	12.3	22.4	4.0	10.7	0.20	12.0	-0.01	0.98	19
SNOTEL	Shuree*	Subtrop	Grassl	27	30.1	11.0	4.8	26.6	4.5	16.9	-12	6.5	-0.92	1.35	21
SNOTEL	Sierrablanca*	Subtrop	CropNat	44	42.8	5.1	5.0	28.1	3.1	23.7	-23	6.5	-0.84	1.29	11
SNOTEL	Silvercreek*	Subtrop	Evg Nl F	26	10.6	23.1	14.2	25.6	5.2	16.6	-0.43	22.9	-1.74	1.61	20
SNOTEL	Silvies*	Subtrop	Grassl	10	16.3	24.1	9.1	20.0	2.4	11.0	-0.57	15.5	-2.10	1.70	15
SNOTEL	Slumgullion*	Subtrop	Evg Nl F	36	30.1	21.0	7.2	40.8	7.3	23.2	-11	12.0	-2.11	1.66	9
SNOTEL	Smileymountain*	Subtrop	Grassl	44	35.9	15.5	8.8	32.2	6.3	18.4	-4.1	8.8	-0.15	1.00	8

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Smithandmorehouse*	Subtrop	Grassl	14	19.7	13.1	4.8	19.6	2.6	7.2	-1.4	3.2	0.53	0.66	18
SNOTEL	Snakeriverstation*	Subtrop	Evg Nl F	41	9.1	6.1	4.2	38.1	7.0	32.6	-65	4.8	-0.42	1.12	9
SNOTEL	Snowbird*	Subtrop	Grassl	23	59.0	10.1	6.2	29.0	3.6	20.2	-10	8.5	-1.00	1.37	15
SNOTEL	Snowmountain*	Subtrop	Evg Nl F	46	13.0	20.7	12.1	34.4	6.2	20.0	-1.9	18.7	-1.55	1.54	16
SNOTEL	Somsenranch*	Subtrop	Grassl	28	31.0	21.9	9.4	26.1	4.2	12.6	-0.92	16.1	-2.14	1.71	14
SNOTEL	Sonorapass*	Subtrop	Evg Nl F	37	32.9	21.9	7.7	30.7	6.8	15.1	-3.0	13.1	-2.00	1.69	20
SNOTEL	Sourdoughgulch*	Subtrop	Grassl	13	30.3	24.3	10.6	23.3	5.6	10.3	0.01	12.4	-0.44	1.17	21
SNOTEL	Spiritlk*	Subtrop	Evg Nl F	30	13.7	37.8	2.1	29.0	4.9	9.6	-22	1.9	0.14	0.91	22
SNOTEL	Sprattcreek*	Subtrop	Evg Nl F	37	47.0	6.4	2.8	30.9	4.7	25.4	-85	4.9	-2.26	1.75	17
SNOTEL	Squawsprings*	Subtrop	Grassl	14	33.3	13.0	8.4	17.2	2.4	10.8	-0.83	15.4	-2.71	1.83	10
SNOTEL	Steelcreekpark*	Subtrop	Evg Nl F	40	15.6	34.3	4.7	31.5	5.6	4.1	0.15	2.7	0.65	0.57	13
SNOTEL	Strawberrydivide*	Subtrop	CropNat	15	37.8	15.8	8.4	19.4	3.6	11.2	-0.87	14.6	-2.17	1.73	19
SNOTEL	Summitcreek*	Temp	W Savan	23	92.7	30.0	2.8	44.8	29.6	30.4	-133	2.1	0.33	0.78	11
SNOTEL	Summitmeadow*	Subtrop	Grassl	17	90.9	14.2	12.3	21.4	2.4	14.3	-0.50	18.2	-1.42	1.48	10
SNOTEL	Summitranch*	Subtrop	Grassl	23	27.3	12.7	3.6	27.2	3.9	15.4	-19	5.0	-1.14	1.41	14
SNOTEL	Susitnavalleyhigh*	Temp	W Savan	37	3.3	11.8	5.1	19.8	2.9	9.8	-3.1	7.1	-1.15	1.38	9
SNOTEL	Swedepeak*	Subtrop	Evg Nl F	32	31.7	13.5	9.7	31.5	6.0	20.3	-3.9	11.1	-0.46	1.15	10
SNOTEL	Tablemountain*	Subtrop	Grassl	0	4.5	14.5	9.3	12.5	2.7	8.2	0.17	8.8	0.05	0.94	14
SNOTEL	Tahoecitycross*	Subtrop	Mix F	34	48.1	26.8	11.2	35.7	6.7	18.2	-1.8	19.8	-2.25	1.76	24
SNOTEL	Taospowderhorn*	Subtrop	Evg Nl F	34	68.1	18.8	9.3	36.9	7.7	20.1	-4.0	9.3	-0.08	1.01	16
SNOTEL	Taylorbutte*	Subtrop	Evg Nl F	26	4.4	9.3	5.6	35.4	7.1	28.1	-26	9.0	-1.80	1.60	12
SNOTEL	Taylorcanyon*	Subtrop	Grassl	1	7.7	24.3	7.5	15.4	2.0	10.5	-1.2	3.8	0.71	0.50	9
SNOTEL	Templefork*	Subtrop	CropNat	16	37.5	17.8	9.9	19.7	3.5	11.5	-0.42	15.9	-1.71	1.61	22
SNOTEL	Thaynecanyon*	Subtrop	Grassl	24	51.6	17.4	10.3	25.7	4.4	15.0	-1.3	17.0	-1.91	1.65	15
SNOTEL	Timberline*	Subtrop	CropNat	24	31.5	32.8	4.3	23.4	3.2	11.5	-6.5	7.5	-2.20	1.74	20
SNOTEL	Timpanogosdivide*	Subtrop	Mix F	46	40.0	12.8	8.0	31.0	4.9	21.6	-6.7	14.2	-2.36	1.78	18
SNOTEL	Tipton*	Subtrop	Evg Nl F	42	22.6	15.8	12.3	39.3	7.3	28.9	-5.0	21.0	-2.18	1.71	12
SNOTEL	Toejam*	Subtrop	Grassl	13	21.4	20.4	9.5	20.4	2.2	10.2	-0.28	15.6	-2.01	1.64	9
SNOTEL	Togwoteepass*	Subtrop	Evg Nl F	32	15.8	19.2	7.1	34.2	4.6	17.3	-5.5	10.1	-1.24	1.42	10
SNOTEL	Tokositnavalley*	Temp	Water	46	41.7	18.0	2.1	32.1	7.8	16.0	-64	2.6	-0.79	1.27	10
SNOTEL	Tonygrovelake*	Subtrop	Grassl	21	26.7	16.5	7.2	24.0	4.5	12.3	-2.1	11.8	-1.87	1.65	20
SNOTEL	Tonygrovers*	Subtrop	Grassl	14	38.4	16.1	7.4	20.2	3.2	9.9	-0.87	12.2	-1.84	1.65	22
SNOTEL	Touchet*	Subtrop	W Savan	41	73.7	16.1	7.4	29.9	9.0	18.9	-6.0	11.5	-1.61	1.56	14
SNOTEL	Triallake*	Subtrop	W Savan	29	18.0	21.4	6.2	29.7	8.7	13.8	-4.2	9.2	-1.28	1.47	20

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
SNOTEL	Trough*	Temp	Evg Nl F	35	34.4	23.0	10.4	31.7	5.2	15.4	-1.3	16.5	-1.67	1.60	22
SNOTEL	Troutcreek*	Subtrop	Grassl	27	12.2	17.4	4.3	27.8	4.7	12.7	-8.2	6.9	-1.70	1.60	20
SNOTEL	Truckee#2*	Subtrop	Evg Nl F	42	21.7	13.0	6.8	35.9	8.3	26.1	-15	11.3	-1.93	1.67	19
SNOTEL	Upperrriogrande*	Subtrop	Evg Nl F	26	51.3	19.7	5.6	35.1	7.7	18.2	-10	8.0	-1.19	1.42	13
SNOTEL	Uppersanjuan*	Subtrop	Grassl	24	87.6	25.6	6.8	25.0	4.1	7.4	-0.25	8.9	-0.81	1.31	18
SNOTEL	Uppertaylor*	Subtrop	Evg Nl F	32	72.5	19.5	5.6	33.5	6.4	17.2	-9.2	9.1	-1.87	1.64	16
SNOTEL	Uppertsainariver*	Temp	O Shrubl	13	8.2	12.6	7.9	28.7	5.5	18.0	-4.8	9.2	-0.52	1.17	10
SNOTEL	Usudocdaniel*	Subtrop	Grassl	22	32.2	19.0	9.5	22.1	3.3	10.9	-0.42	14.4	-1.50	1.52	14
SNOTEL	Vacarrospring*	Subtrop	Grassl	13	48.1	9.0	1.8	18.6	5.5	11.0	-38	2.3	-0.69	1.22	9
SNOTEL	Vanwyck*	Subtrop	Grassl	8	47.5	20.0	10.2	20.2	3.2	9.6	0.06	12.2	-0.50	1.20	21
SNOTEL	Vernoncreek*	Subtrop	Grassl	8	14.1	17.5	8.9	19.0	2.4	9.1	-0.12	12.4	-1.05	1.39	18
SNOTEL	Virginialakesridge*	Subtrop	Grassl	18	37.6	12.9	9.0	18.1	2.4	10.5	-0.53	13.0	-1.34	1.45	10
SNOTEL	Wardcreek#3*	Subtrop	Evg Nl F	46	34.5	30.4	6.8	39.9	8.0	16.1	-4.9	11.9	-2.21	1.75	23
SNOTEL	Wardmountain*	Subtrop	Grassl	22	66.6	16.3	9.4	21.1	2.5	9.6	-0.15	9.8	-0.20	1.04	10
SNOTEL	Waterhole*	Temp	Evg Nl F	52	82.4	32.6	4.7	36.4	7.6	9.4	-3.4	6.4	-1.00	1.37	17
SNOTEL	Websterflat*	Subtrop	Grassl	15	18.8	25.3	6.3	19.5	1.9	8.9	-1.2	9.6	-1.46	1.53	18
SNOTEL	Wheelerpeak*	Subtrop	Grassl	33	44.8	13.6	6.3	27.0	3.4	15.6	-5.6	10.4	-1.89	1.65	18
SNOTEL	Whiteriver#1*	Subtrop	Grassl	17	43.7	17.5	7.5	19.6	3.0	8.9	-0.54	11.9	-1.71	1.59	15
SNOTEL	Widtsoe#3*	Subtrop	Evg Nl F	29	53.7	30.7	6.0	28.4	5.0	7.0	-0.43	7.1	-0.48	1.18	19
SNOTEL	Wildbasin*	Subtrop	Evg Nl F	37	33.9	26.2	4.5	34.9	5.2	11.4	-5.9	6.8	-1.42	1.51	16
SNOTEL	Wilsoncreek*	Subtrop	Grassl	7	12.2	9.6	6.6	19.3	0.9	11.3	-2.3	5.4	0.24	0.82	9
SNOTEL	Windypeak*	Subtrop	Evg Nl F	38	28.1	8.9	7.5	29.1	3.7	22.0	-8.5	11.3	-1.51	1.52	12
SNOTEL	Wolfcreeksummit*	Subtrop	Grassl	28	28.8	29.2	2.3	25.5	2.8	4.5	-3.0	2.2	-0.00	0.98	20
SNOTEL	Zirkel*	Subtrop	Evg Nl F	39	52.5	25.2	7.6	34.5	6.6	14.3	-2.8	11.7	-1.52	1.53	15
SWEX															
_POLAND	MarshBubnow,Pl*	Temp	Mix F	36	1.9	30.0	10.3	28.7	4.0	10.2	-0.06	13.0	-0.73	1.27	14
UDC_SMOS	Engersdorf*	Temp	CropNat	5	5.6	30.1	9.1	23.8	8.2	8.4	-0.03	5.8	0.50	0.64	6
UDC_SMOS	Erlbach*	Temp	CropNat	21	11.7	30.2	6.8	23.7	2.0	8.7	-0.77	6.2	0.10	0.92	14
UDC_SMOS	Frieding*	Temp	CropNat	10	5.5	31.4	5.4	23.5	4.1	8.5	-1.7	3.5	0.55	0.65	17
UDC_SMOS	Harbach*	Temp	Cropl	6	6.8	29.1	5.0	20.3	3.1	9.7	-3.0	4.5	0.15	0.89	12
UDC_SMOS	Lochheim*	Temp	Cropl	3	0.8	34.3	6.6	22.4	4.0	13.0	-3.1	5.7	0.21	0.86	17
UDC_SMOS	Neusling*	Temp	Cropl	3	1.3	27.1	3.5	20.9	5.8	7.7	-4.1	3.3	0.09	0.93	17
UDC_SMOS	Steinbeissen*	Temp	Cropl	4	6.1	32.1	6.2	23.4	6.8	10.3	-2.0	5.3	0.23	0.85	17
USCRN	Aberdeen-35-WNW*	Subtrop	Cropl	6	5.2	20.4	8.7	15.6	2.7	9.4	-0.24	10.0	-0.43	1.16	16
USCRN	Asheville-13-S*	Subtrop	CropNat	10	8.9	18.8	6.5	17.2	2.3	6.2	0.05	7.3	-0.32	1.12	22

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
USCRN	Asheville-8-SSW*	Subtrop	Mix F	57	8.7	24.3	8.5	28.5	4.8	9.0	-0.17	9.4	-0.29	1.11	22
USCRN	Austin-33-NW*	Subtrop	Savan	21	18.8	22.0	9.3	18.2	4.8	7.6	0.30	6.8	0.44	0.73	22
USCRN	Batesville-8-WNW*	Subtrop	Grassl	5	2.2	25.7	7.4	14.6	1.8	12.8	-2.1	6.1	0.30	0.82	24
USCRN	Bedford-5-WNW*	Subtrop	CropNat	21	10.4	32.6	5.8	20.0	3.8	13.5	-4.8	5.8	-0.07	1.00	19
USCRN	Blackville-3-W*	Subtrop	Cropl	3	2.3	14.3	3.3	15.4	2.4	3.5	-0.17	3.8	-0.35	1.14	24
USCRN	Bodega-6-WSW*	Subtrop	Grassl	12	3.5	5.3	2.0	40.5	5.3	35.5	-346	2.0	-0.09	0.98	8
USCRN	Bowling-Green-21*	Subtrop	Dec Bl F	50	13.9	27.1	6.6	25.6	3.7	8.0	-0.52	9.7	-1.28	1.47	21
USCRN	Bronte-11-NNE*	Subtrop	Grassl	4	3.0	6.7	3.9	11.5	3.3	5.3	-0.89	2.3	0.65	0.58	24
USCRN	Brunswick-23-S*	Subtrop	Mix F	32	2.9	5.6	2.1	27.6	3.9	22.2	-121	1.7	0.25	0.85	25
USCRN	Buffalo-13-ESE*	Subtrop	Grassl	5	5.8	25.1	6.3	16.6	1.1	10.3	-1.9	7.0	-0.35	1.12	15
USCRN	Champaign-9-SW*	Subtrop	Cropl	1	0.6	29.4	10.0	17.4	4.4	15.8	-1.6	13.0	-0.78	1.30	18
USCRN	Chillicothe-22-ENE*	Subtrop	Cropl	6	3.0	28.5	12.3	16.0	1.9	16.6	-0.92	10.7	0.20	0.87	21
USCRN	Cortez-8-SE*	Subtrop	Grassl	10	44.5	17.3	7.3	22.0	4.3	6.9	0.05	5.4	0.42	0.74	18
USCRN	Corvallis-10-SSW*	Subtrop	CropNat	17	12.5	33.6	10.5	27.9	7.6	9.4	0.17	8.1	0.38	0.77	21
USCRN	Coshocton-8-NNE*	Subtrop	CropNat	13	7.2	34.6	8.0	20.5	5.6	16.4	-3.4	9.6	-0.52	1.20	20
USCRN	Crossville-7-NW*	Subtrop	CropNat	22	3.5	29.8	8.8	18.7	1.9	13.6	-1.5	8.5	0.01	0.97	19
USCRN	Des-Moines-17-E*	Subtrop	CropNat	7	4.1	26.3	6.9	17.6	2.2	11.7	-2.1	11.5	-1.94	1.66	18
USCRN	Dinosaur-2-E*	Subtrop	Grassl	0	10.4	18.5	4.7	13.2	2.5	6.1	-0.86	3.2	0.50	0.67	11
USCRN	Durham-11-W*	Subtrop	W Savan	42	3.6	21.4	7.7	26.2	4.2	8.3	-0.22	7.9	-0.11	1.03	26
USCRN	Durham-2-N*	Subtrop	Mix F	43	6.8	23.5	7.4	25.0	3.9	4.9	0.52	4.5	0.61	0.61	19
USCRN	Durham-2-SSW*	Subtrop	Mix F	54	4.2	18.2	5.1	26.2	5.3	8.9	-2.2	3.9	0.40	0.75	18
USCRN	Edinburg-17-NNE*	Subtrop	Grassl	6	3.2	9.5	2.9	13.9	3.0	5.2	-2.4	2.6	0.13	0.91	21
USCRN	Elgin-5-S*	Subtrop	Grassl	9	8.0	6.0	3.5	16.2	3.4	10.9	-9.1	4.0	-0.39	1.15	26
USCRN	Everglades-C-5-NE*	Subtrop	Cropl	23	0.6	8.4	3.6	29.0	9.5	21.8	-36	2.9	0.34	0.79	24
USCRN	Fairhope-3-NE*	Subtrop	CropNat	26	2.0	12.0	4.3	18.6	2.9	7.6	-2.2	4.3	-0.03	1.00	25
USCRN	Fallbrook-5-NE*	Subtrop	O Shrubl	14	42.3	17.9	5.5	29.0	4.8	11.7	-3.7	3.5	0.57	0.64	26
USCRN	Gadsden-19-N*	Subtrop	Grassl	5	2.2	23.1	6.6	16.0	1.3	9.3	-1.1	6.9	-0.16	1.06	25
USCRN	Goodridge-12-NNW*	Temp	CropNat	20	2.1	28.6	9.8	21.3	1.5	12.6	-0.84	17.1	-2.39	1.75	10
USCRN	Goodwell-2-E*	Subtrop	Grassl	0	3.0	11.9	5.3	8.5	3.1	5.8	-0.25	5.4	-0.11	1.03	24
USCRN	Harrison-20-SSE*	Subtrop	Grassl	2	8.8	11.3	5.0	18.7	1.3	9.2	-2.6	8.1	-1.77	1.61	17
USCRN	Holly-Springs-4-N*	Subtrop	CropNat	20	2.3	27.0	9.4	20.7	2.3	10.2	-0.22	7.9	0.28	0.83	26
USCRN	Jamestown-38-WSW*	Temp	Cropl	4	4.2	12.0	4.3	17.1	1.9	6.7	-1.6	5.4	-0.73	1.27	14
USCRN	Joplin-24-N*	Subtrop	Grassl	11	1.1	26.7	12.2	17.6	2.0	14.7	-0.53	14.4	-0.47	1.18	21
USCRN	Kingston-1-NW*	Subtrop	CropNat	19	2.7	27.3	4.1	20.6	3.4	7.4	-2.6	3.5	0.22	0.86	19

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
USCRN	Kingston-1-W*	Subtrop	CropNat	31	4.1	19.6	4.4	24.0	3.3	5.9	-0.87	4.2	0.03	0.96	19
USCRN	La-Junta-17-WSW*	Subtrop	Grassl	1	1.4	16.7	4.8	11.8	2.7	7.4	-1.5	7.0	-1.21	1.45	20
USCRN	Lafayette-13-SE*	Subtrop	CropNat	16	2.4	25.7	10.0	17.0	1.5	12.7	-0.68	10.0	-0.05	1.00	24
USCRN	Las-Cruces-20-N*	Subtrop	O Shrubl	0	1.6	5.2	2.8	6.2	2.2	2.7	0.07	2.8	0.01	0.97	24
USCRN	Limestone-4-NNW*	Temp	CropNat	39	3.4	21.4	5.5	25.0	3.5	8.0	-1.2	8.6	-1.60	1.55	14
USCRN	Lincoln-11-SW*	Subtrop	Cropl	4	7.3	24.6	3.1	18.0	2.1	7.9	-5.8	5.1	-1.90	1.66	19
USCRN	Lincoln-8-ENE*	Subtrop	Cropl	3	3.2	31.3	4.6	17.1	2.9	14.8	-9.9	4.7	-0.09	1.01	18
USCRN	Los-Alamos-13-W*	Subtrop	CropNat	22	28.4	21.6	8.3	21.3	5.8	8.0	0.02	9.1	-0.27	1.09	17
USCRN	Manhattan-6-SSW*	Subtrop	Grassl	4	5.6	28.3	10.5	18.3	2.3	14.8	-1.1	15.9	-1.39	1.51	22
USCRN	McClellanville-7-NE*	Subtrop	Mix F	48	3.6	7.1	3.2	35.7	4.7	28.8	-85	2.2	0.52	0.68	26
USCRN	Medora-7-E*	Temp	Grassl	10	16.5	20.6	8.5	20.4	1.5	9.5	-0.33	15.8	-2.68	1.85	15
USCRN	Merced-23-WSW*	Subtrop	Savan	4	0.5	2.8	1.8	18.3	2.3	15.6	-86	1.5	0.18	0.84	8
USCRN	Mercury-3-SSW*	Subtrop	Urban	0	2.6	2.4	1.5	13.5	2.2	11.3	-62	1.5	-0.14	1.05	24
USCRN	Monahans-6-ENE*	Subtrop	O Shrubl	1	1.6	0.9	1.2	4.9	2.0	4.5	-13	1.6	-0.69	1.27	23
USCRN	Monroe-26-N*	Subtrop	Mix F	50	3.7	24.1	9.1	31.9	5.2	9.9	-0.23	6.4	0.48	0.70	25
USCRN	Montrose-11-ENE*	Subtrop	Grassl	10	10.3	15.7	8.4	21.1	2.7	8.9	-0.20	7.9	0.06	0.93	13
USCRN	Muleshoe-19-S*	Subtrop	Grassl	2	2.4	13.4	4.8	9.2	2.5	6.0	-0.65	5.1	-0.16	1.05	24
USCRN	Necedah-5-WNW*	Subtrop	Wetl	26	1.8	10.2	3.6	33.8	3.7	24.1	-48	4.5	-0.69	1.26	15
USCRN	Newton-11-SW*	Subtrop	CropNat	23	3.6	9.6	3.7	21.3	3.1	12.0	-9.6	2.9	0.37	0.77	25
USCRN	Newton-5-ENE*	Subtrop	CropNat	14	4.5	21.3	7.1	19.6	2.6	5.9	0.30	5.6	0.36	0.78	25
USCRN	Newton-8-W*	Subtrop	W Savan	43	2.5	7.8	2.8	24.8	4.6	17.2	-40	1.8	0.58	0.64	25
USCRN	Northgate-5-ESE*	Temp	Cropl	7	0.6	22.0	5.5	20.6	2.2	5.0	0.10	5.8	-0.18	1.05	14
USCRN	Nunn-7-NNE*	Subtrop	Grassl	0	3.4	6.6	3.3	13.3	1.4	7.1	-4.0	2.0	0.59	0.61	12
USCRN	Oakley-19-SSW*	Subtrop	Grassl	0	6.3	28.0	6.7	10.9	2.3	18.3	-6.8	8.1	-0.52	1.20	20
USCRN	Old-Town-2-W*	Subtrop	Mix F	39	3.8	40.3	6.8	26.9	3.6	14.2	-3.7	5.3	0.33	0.79	15
USCRN	Palestine-6-WNW*	Subtrop	Cropl	16	3.1	11.1	9.4	17.2	3.1	9.1	0.03	4.9	0.72	0.52	25
USCRN	Panther-Junction-2*	Subtrop	O Shrubl	2	4.2	3.5	1.7	15.6	4.2	13.0	-61	2.4	-1.19	1.45	24
USCRN	Pierre-24-S*	Subtrop	Grassl	5	3.9	29.0	7.1	15.5	2.5	14.7	-3.6	6.5	0.10	0.92	16
USCRN	Redding-12-WNW*	Subtrop	Evg Nl F	41	34.1	12.3	4.2	36.0	1.9	23.8	-36	2.5	0.58	0.60	8
USCRN	Riley-10-WSW*	Subtrop	Grassl	1	1.7	10.6	7.3	18.3	4.2	9.2	-0.69	5.5	0.40	0.75	17
USCRN	Salem-10-W*	Subtrop	CropNat	17	4.6	26.7	7.6	19.2	2.8	11.1	-1.2	11.2	-1.27	1.47	23
USCRN	Santa-Barbara-11-W*	Subtrop	W Savan	12	5.0	13.7	6.9	27.1	4.3	14.0	-3.3	4.1	0.64	0.58	17
USCRN	Sebring-23-SSE*	Subtrop	Grassl	9	0.5	3.2	1.3	16.5	2.6	13.5	-105	1.4	-0.22	1.08	23
USCRN	Selma-13-WNW*	Subtrop	CropNat	9	1.8	38.0	8.7	17.3	2.4	21.8	-5.6	5.5	0.58	0.63	20

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Table S1 – continued from previous page

Network	Station	Region	Land Cov	T%	TRI	In situ		Θ_{TWI}		Global		Unbiased		z-score	
						$\bar{x}$	σ	$\bar{x}$	σ	RMSE	E	RMSE	E	RMSE	n
USCRN	Shabbona-5-NNE*	Subtrop	Cropl	1	1.0	31.5	5.4	17.8	3.2	15.2	-7.5	7.9	-1.34	1.48	17
USCRN	Sioux-Falls-14-NNE*	Subtrop	Cropl	4	3.2	29.6	13.0	16.8	1.9	18.3	-1.1	19.6	-1.42	1.51	17
USCRN	Socorro-20-N*	Subtrop	O Shrubl	0	10.4	5.2	3.2	9.2	2.5	4.7	-1.3	2.8	0.20	0.87	24
USCRN	Stillwater-2-W*	Subtrop	Grassl	1	1.3	22.6	7.0	13.8	2.6	10.2	-1.2	4.5	0.58	0.63	25
USCRN	Stillwater-5-WNW*	Subtrop	Grassl	3	3.6	16.4	6.1	15.6	2.9	4.8	0.34	5.2	0.22	0.87	24
USCRN	Stovepipe-Wells-1*	Subtrop	Barren	0	9.3	1.8	0.9	19.0	2.9	17.4	-404	1.0	-0.25	1.09	26
USCRN	Titusville-7-E*	Subtrop	CropNat	14	1.4	17.1	8.1	21.6	3.2	7.3	0.13	5.4	0.52	0.67	19
USCRN	Tucson-11-W*	Subtrop	O Shrubl	1	12.1	5.2	2.6	15.7	3.2	10.9	-17	2.2	0.23	0.86	26
USCRN	Versailles-3-NNW*	Subtrop	Cropl	4	4.7	34.6	4.3	16.4	1.5	18.6	-19	4.9	-0.35	1.14	22
USCRN	Watkinsville-5-SSE*	Subtrop	CropNat	10	2.4	10.8	5.3	18.5	2.3	9.2	-2.1	6.2	-0.40	1.16	25
USCRN	Whitman-5-ENE*	Subtrop	Grassl	1	11.0	7.4	1.5	16.3	2.8	9.6	-43	2.6	-2.14	1.73	19
USCRN	Williams-35-NNW*	Subtrop	O Shrubl	0	3.3	12.8	3.8	10.7	2.8	3.4	0.17	2.9	0.40	0.76	25
USCRN	Wolf-Point-34-NE*	Temp	Grassl	1	8.8	22.6	5.4	17.3	1.3	7.0	-0.83	5.1	0.02	0.95	13
USCRN	Yosemite-Village-12*	Subtrop	Evg Nl F	42	37.1	4.7	2.6	41.4	2.1	36.8	-234	3.4	-0.98	1.32	8
USCRN	Yuma-27-ENE*	Subtrop	O Shrubl	0	2.3	11.4	6.0	9.5	2.9	4.6	0.37	4.3	0.45	0.72	17
VAS	MelbexI*	Subtrop	O Shrubl	1	15.5	12.3	5.4	12.8	4.5	3.9	0.44	4.2	0.38	0.77	22
VAS	MelbexII*	Subtrop	Cropl	1	6.0	17.3	5.7	12.3	4.0	6.3	-0.28	4.0	0.48	0.70	21

Stations marked with an asterisk () represent more than one probe, and the average observed soil moisture was used.

Table S2. Statistics of fit between regionalized soil moisture estimates derived from MODIS TWI at the original (o) MODIS spatial resolution (500 m) and resampled (r) to 13 km, AMSR-E, and SMOS (both at 25 km spatial resolution), compared to global in situ probes for the period 2010-12-02 to 2012-02-01. All soil moisture estimates expressed as percentage volumetric content. Global results represent data without rescaling. Unbiased results have means ($\bar{x}$) and standard deviations (σ) locally fitted to the in situ data. The difference between the global and unbiased results equals the model bias. Statistical significances for differences in $\bar{x}$ and RMSE are calculated using the two-tailed Student t-test. The significance of differences in variance are calculated using Levene's test. r^2 is the correlation coefficient and E model efficiency (see main article).

Sensor	Tropical							Subtropical							Temperate						
	$\bar{x}$	σ	rmse	r^2	E	stn	n	$\bar{x}$	σ	rmse	r^2	E	stn	n	$\bar{x}$	σ	rmse	r^2	E	stn	n
<i>Global</i>	a	b	c					a	b	f					a	b	i				
MODIS (o)	19.1	11.3	13.4	0.26	0.15	19	338	19.0	7.7	12.1	0.05	-0.16	461	6118	22.5	9.6	11.7	0.08	-0.34	36	430
MODIS (r)	22.5	15.7	14.3	0.31	0.03	17	322	19.1	6.6	11.1	0.10	0.03	415	5791	23.1	9.5	13.3	0.01	-0.64	36	447
AMSR-E	9.6	2.7	18.8	0.02	-0.89	10	1249	12.6	3.0	11.7	0.17	-0.07	441	49619	15.0	4.1	12.6	0.12	-0.47	46	5285
SMOS	19.6	10.4	12.5	0.26	0.19	13	1663	11.9	9.1	12.2	0.25	-0.17	453	46023	11.8	6.7	14.6	0.11	-1.13	51	4771
<i>Unbiased</i>			d							g							k				
MODIS (o) ^P	21.8	14.5	6.1	–	–	19	338	18.4	11.2	7.0	–	–	461	6118	22.8	10.1	9.1	–	–	36	430
MODIS (r) ^r	20.7	14.6	6.8	–	–	17	322	18.6	11.3	6.7	–	–	415	5791	22.3	10.4	8.5	–	–	36	447
AMSR-E ^s	21.8	13.7	6.3	–	–	10	1249	17.9	11.3	6.3	–	–	441	49619	23.0	10.4	6.0	–	–	46	5285
SMOS ^P	21.5	13.9	5.4	–	–	13	1663	18.4	11.2	5.6	–	–	453	46023	22.4	10.0	5.6	–	–	51	4771

^a Except for MODIS(o+r) temperate and MODIS(r) tropical region, all biases are significant ($p < 0.05$)

^b Except for MODIS(o+r) temperate and MODIS(r) tropical region, all variances (σ) are different compared to the in situ data (Levene's test < 0.05)

^c Global tropical RMSE ($p = 0.05$): SMOS = MODIS(o), SMOS < MODIS(r), MODIS(o) = MODIS(r), (MODIS(r) < AMSR-E

^d Unbiased tropical RMSE ($p = 0.05$): SMOS = MODIS(o), SMOS < (AMSR-E and MODIS(r)), MODIS(o) = AMSRE = MODIS(r)

^e Global sub-tropical RMSE ($p = 0.05$): MODIS(r) < all others, AMSR-E < (SMOS and MODIS(o)), MODIS(o) = SMOS

^f Unbiased sub-tropical RMSE ($p = 0.05$): SMOS < all others, AMSRE < both MODIS, MODIS(r) < MODIS(o)

^g Global temperate RMSE ($p = 0.05$): MODIS(o) = MODIS(r), MODIS(o) < (AMSR-E and SMOS), AMSRE = MODIS(r), AMSRE < SMOS, MODIS(r) = SMOS

^h Unbiased temperate RMSE ($p = 0.05$): SMOS < all other, AMSRE < both MODIS, MODIS(r) = MODIS(o)

ⁱ Unbiased regional RMSE for MODIS(o) ($p = 0.05$): tropical < subtropical < temperate

^j Unbiased regional RMSE for MODIS(r) ($p = 0.05$): (tropical = subtropical) < temperate

^k Unbiased regional RMSE for AMSRE ($p = 0.05$): temperate < subtropical, tropical = subtropical, tropical = temperate

^l Unbiased regional RMSE for SMOS ($p = 0.05$): tropical = subtropical = temperate

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