

Supplement of

GSDM-WBT: Global station-based daily maximum wet-bulb temperature data for 1981-2020

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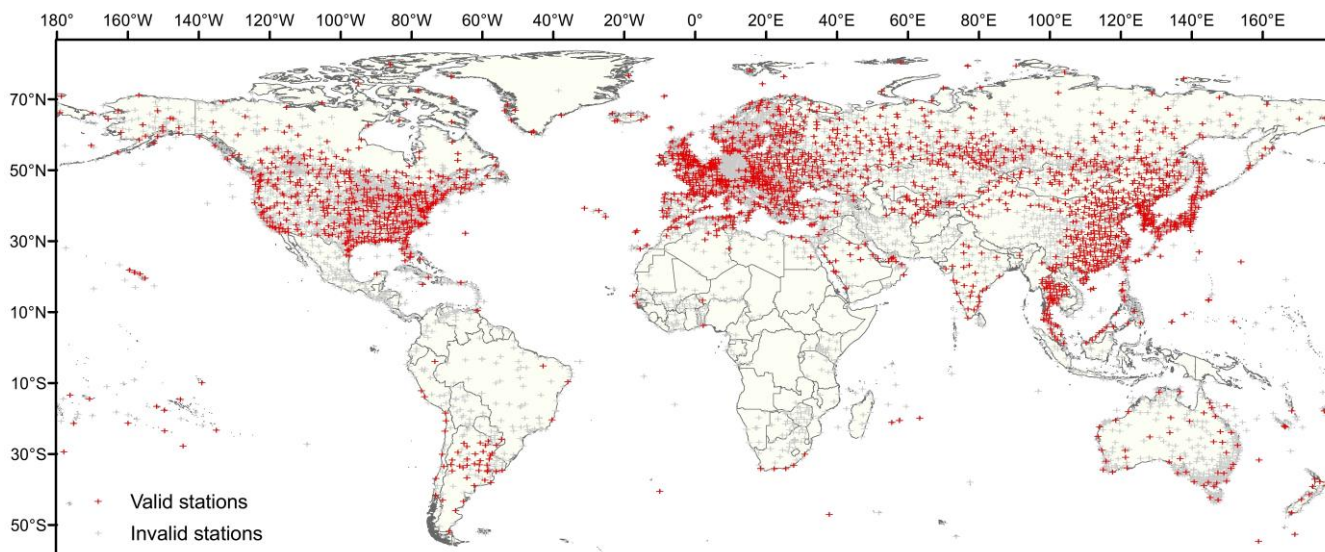
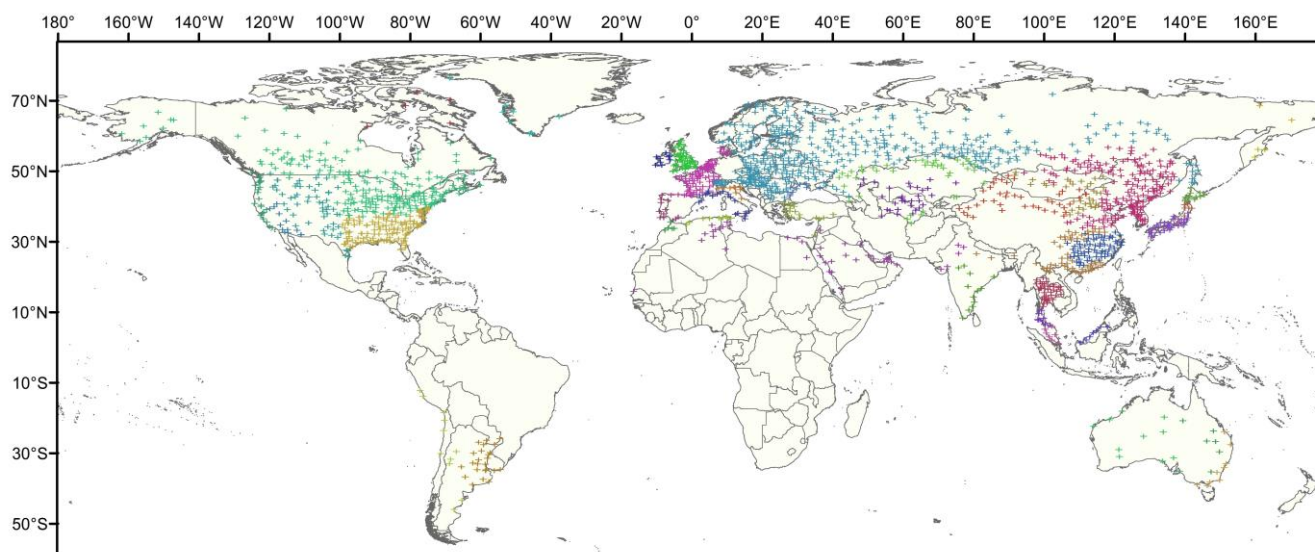


Figure S1. Spatial patterns of valid stations selected by data quality control.

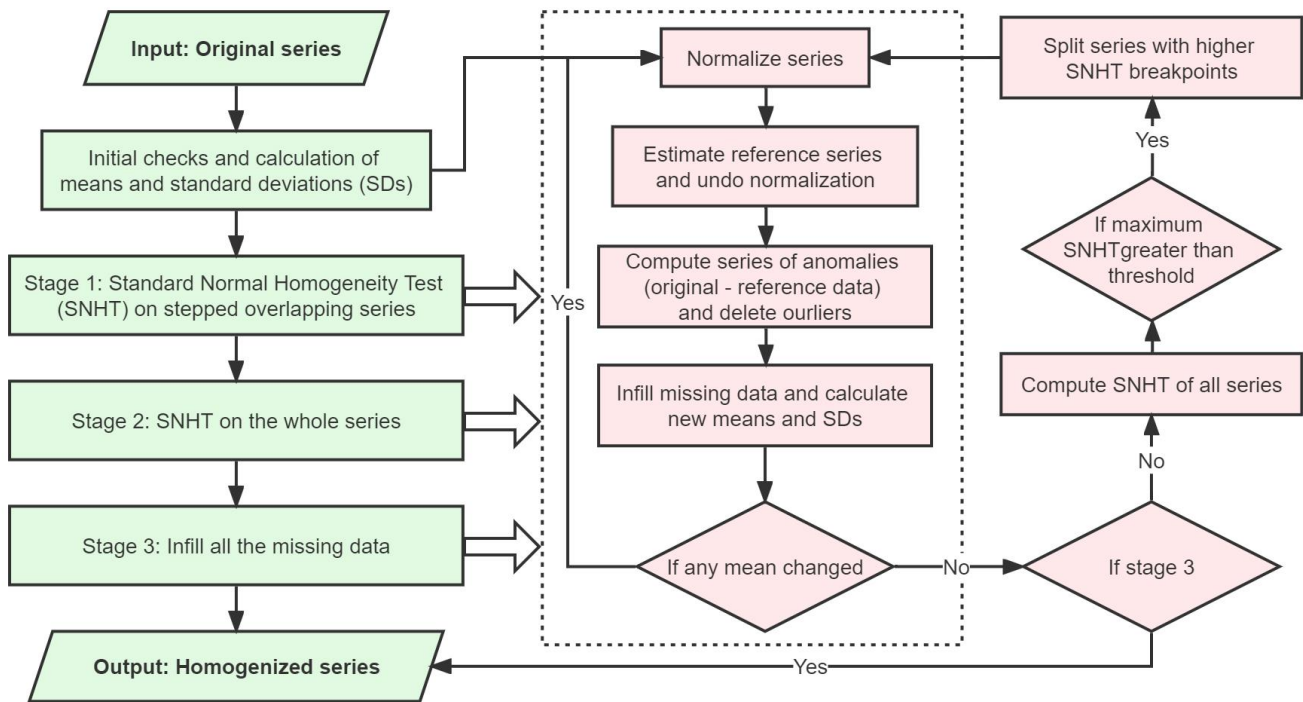


Station zones

+ Z1 + Z4 + Z7 + Z10 + Z13 + Z16 + Z19 + Z22 + Z25 + Z28 + Z31 + Z34 + Z37 + Z40
 + Z2 + Z5 + Z8 + Z11 + Z14 + Z17 + Z20 + Z23 + Z26 + Z29 + Z32 + Z35 + Z38 + Z41
 + Z3 + Z6 + Z9 + Z12 + Z15 + Z18 + Z21 + Z24 + Z27 + Z30 + Z33 + Z36 + Z39

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Figure S2. Spatial patterns of 41 station zones (total 1834 stations) based on Koppen-Geiger climate classifications. Each station zone contains at least 5 stations for better homogenization.



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Figure S3. Procedures of Climatol (Modified based on the manual of Climatol package from <https://www.climatol.eu/>)

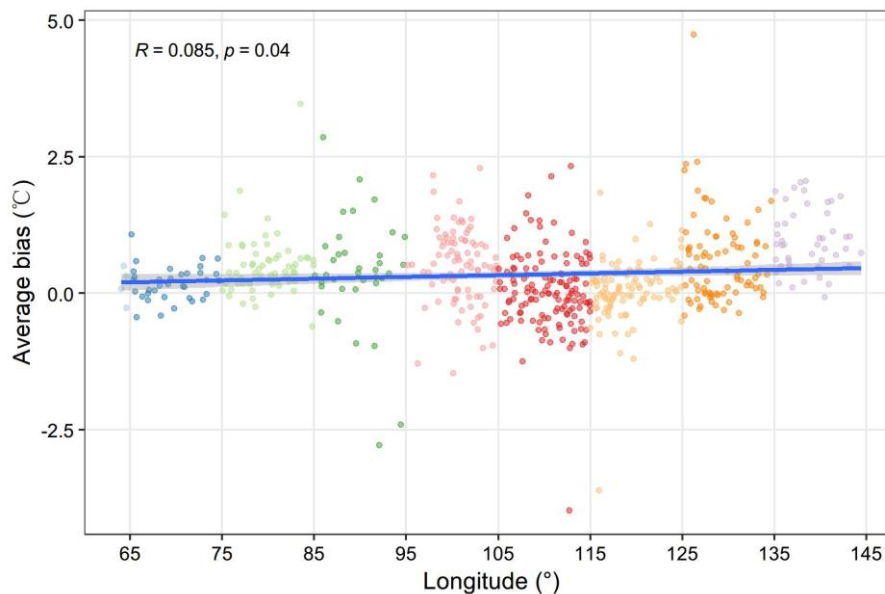


Figure S4. Correlation between longitude and average bias derived from daily maximum wet-bulb temperature of GSDM-20 WBT and that of the nearest grids in HiTiSEA.

Table S1. Detailed parameters for Climatol in different station zones

Station zone	Maximum number of referenced data in SNHT test	Distance (in km) where referenced data weighs half in stage 3	Threshold of SNHT for stage 1	Threshold of SNHT for stage 2	Threshold of outlier for monthly series, in standard deviations	Threshold of outlier for daily series, in standard deviations
Z1	8	426.15	10	20	5	9
Z2	8	301.12	23	40	6	8
Z3	8	87.05	22	45	5	10
Z4	8	235.4	17	20	4	8
Z5	8	41.96	50	110	8	18
Z6	8	132.94	25	30	5	9
Z7	8	61.16	65	100	8	15
Z8	8	74.44	30	80	4.5	7
Z9	8	85.89	30	40	4.5	10
Z10	8	95.6	75	130	10	16
Z11	8	86.38	50	100	6	8
Z12	8	102.01	30	45	4.5	9
Z13	8	119.9	60	110	9	20
Z14	8	152.53	40	50	7	10
Z15	8	113.26	36	100	7	11
Z16	8	94.72	30	35	4.5	8
Z17	8	90.34	70	100	6	9
Z18	8	137.93	50	70	5.5	11
Z19	8	81.89	60	90	6	11
Z20	8	75.51	35	45	3.5	8
Z21	8	127.08	45	60	5	8
Z22	8	69.41	55	120	4.5	16
Z23	8	90.18	65	110	7	11
Z24	8	137.22	35	60	7	11
Z25	8	63.71	75	120	9	18
Z26	8	118.39	32	55	6	13
Z27	8	103.46	70	120	7	14
Z28	8	161.96	20	50	6	8
Z29	8	136.36	60	90	7	13
Z30	8	124	70	100	6	11
Z31	8	79.89	60	80	8	13
Z32	5	185.09	38	40	6	10
Z33	5	99.27	42	80	6	9
Z34	8	260.02	50	90	6	10
Z35	6	145.44	42	60	5	8
Z36	6	146.9	54	90	6	9
Z37	8	347.93	20	45	4.5	14
Z38	8	639.65	22	40	5	14
Z39	8	162.99	32	75	5	9
Z40	8	224.57	40	45	4.5	12
Z41	5	229.13	70	80	7	9

Table S2. Detailed information of the typical station in each station zone

Station zone	Station code	Station name	Longitude (+ East, - West)	Latitude (+ North, - South)	Selected criteria (value)		
					The most break points	Higher SNHT values	More missing data
Z1	710810-99999	HALL BEACH	-81.244	68.776	√ (4)	—	—
Z2	042310-99999	SONDRE STROMFJORD	-50.689	67.017	—	√ (35.9)	—
Z3	039760-99999	BELMULLET	-10	54.233	√ (2)	√ (78.1)	—
Z4	324080-99999	UST'-KAMCHATSK	162.717	56.217	—	—	√ (1893)
Z5	034620-99999	WITTERING	-0.476	52.613	√ (2)	—	—
Z6	154800-99999	CONSTANTA	28.65	44.217	√ (2)	—	—
Z7	064000-99999	KOKSIJDE	2.653	51.09	√ (2)	—	—
Z8	161490-99999	RIMINI	12.612	44.02	√ (3)	√ (47.4)	—
Z9	474280-99999	ESASHI	140.117	41.867	√ (3)	—	—
Z10	154500-99999	CRAIOVA	23.889	44.318	—	√ (168.8)	—
Z11	164200-99999	MESSINA	15.55	38.2	√ (2)	—	—
Z12	085620-99999	BEJA	-7.932	38.079	√ (3)	√ (79.1)	—
Z13	727575-94925	GRAND FORKS AFB AIRPORT	-97.4	47.967	√ (2)	—	—
Z14	382620-99999	CHIMBAJ	59.817	42.95	√ (2)	√ (110)	—
Z15	442980-99999	CHOIR	108.217	46.45	√ (2)	√ (53.2)	—
Z16	475740-99999	FUKAURA	139.933	40.65	√ (3)	—	—
Z17	607140-99999	SIDI AHMED AIR BASE	9.791	37.245	√ (2)	—	—
Z18	443470-99999	TSOGT-OVOO	105.317	44.417	√ (3)	—	—
Z19	742060-24207	MCCHORD AFB AIRPORT	-122.483	47.15	—	√ (162.9)	—
Z20	601350-99999	SALE	-6.752	34.051	√ (3)	—	—
Z21	171500-99999	BALIKESIR	27.926	39.619	√ (4)	—	—
Z22	477550-99999	HAMADA	132.067	34.9	√ (2)	√ (170.9)	—
Z23	539750-99999	YANGCHENG	112.4	35.483	√ (2)	√ (129.9)	—
Z24	389110-99999	KERKI	65.2	37.833	√ (3)	—	—
Z25	724243-03849	LDON-CRBN APT- MGEE FLD APT	-84.077	37.087	√ (2)	—	—
Z26	699604-03145	YUMA MCAS	-114.617	32.65	√ (2)	√ (36.1)	—
Z27	579930-99999	GANZHOU	114.95	25.85	√ (2)	√ (196.2)	—
Z28	421820-99999	SAFDARJUNG	77.206	28.585	√ (3)	√ (41.2)	—
Z29	724645-23070	PERRY STOKES AIRPORT	-104.338	37.262	—	√ (195.4)	—

Z30	573280-99999	DA XIAN	107.5	31.2	√ (2)	√ (139)	—
Z31	484750-99999	HUA HIN	99.952	12.636	√ (2)	√ (92.6)	—
Z32	433440-99999	TIRUCHIRAPPALLI	78.71	10.765	√ (2)	—	—
Z33	485520-99999	CHA IAN	99.956	8.471	√ (3)	—	—
Z34	403750-99999	TABUK	36.619	28.365	√ (2)	√ (85.2)	—
Z35	963150-99999	BRUNEI INTL	114.928	4.944	√ (4)	—	—
Z36	486980-99999	SINGAPORE CHANGI INTL	103.994	1.35	√ (2)	√ (82.7)	—
Z37	944480-99999	LEONORA	121.333	-28.883	√ (2)	√ (62)	—
Z38	945150-99999	ROMA AIRPORT	148.783	-26.55	—	√ (46.9)	—
Z39	865800-99999	CARRASCO INTL	-56.031	-34.838	√ (4)	—	—
Z40	943800-99999	GLADSTONE RADAR	151.267	-23.85	√ (2)	—	—
Z41	878600-99999	COMODORO RIVADAVIA	-67.466	-45.785	—	√ (177.3)	—
