

Supplementary Information for “Projections of Tropical Heat Stress Under Global Warming Constrained by Atmospheric Dynamics”

Yi Zhang ¹ Isaac Held ¹ S. Fueglistaler ^{1,2}

¹ Program in Atmospheric and Oceanic Sciences, Princeton University, Sayre Hall, Princeton NJ 08540,

USA.

² Dept. of Geosciences, Princeton University, Guyot Hall, Princeton NJ 08544, USA.

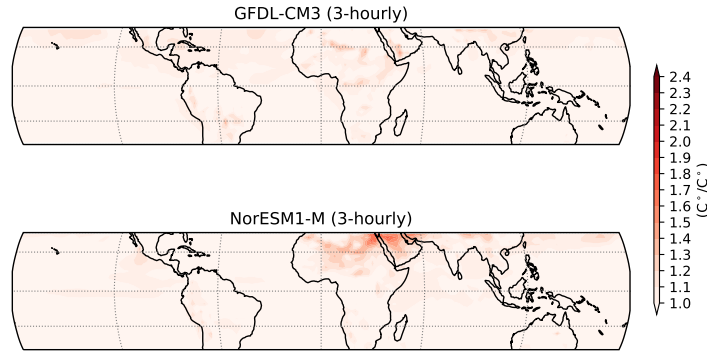


Figure S1. Location-specific T_{\max} (annual-maximum 3-hourly TW) trends normalized by tropical mean warming for GFDL-CM3 and NorESM1-M models.

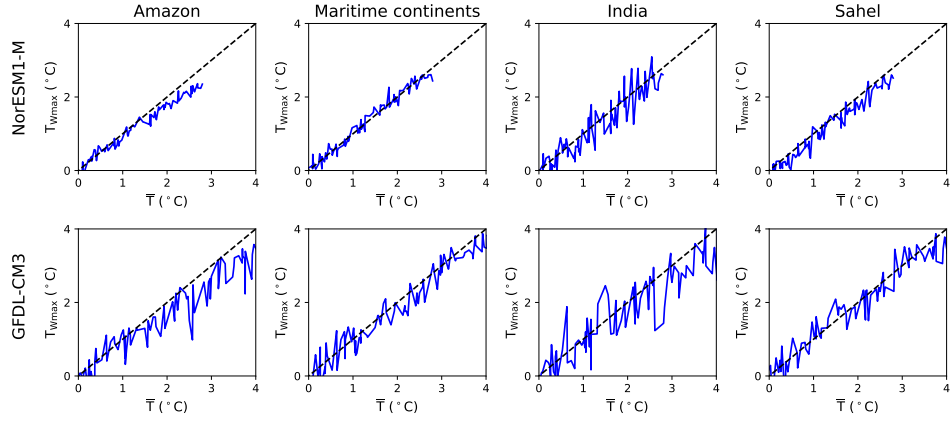


Figure S2. TW_{\max} (annual-maximum 3-hourly TW) increases vs. the tropical mean warming for the four regions in Fig. 2 for GFDL-CM3 and NorESM1-M models.

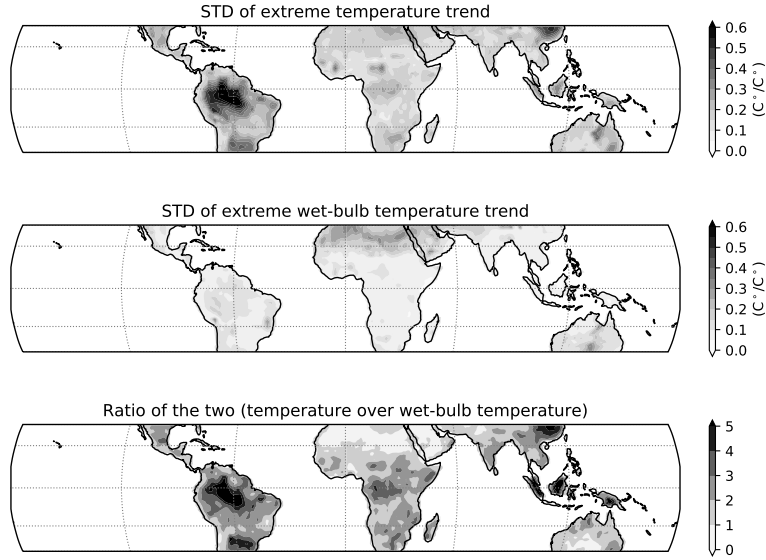


Figure S3. Standard deviations across models of projected normalized trends of T_{\max} (upper) and TW_{\max} (middle) and the ratios of the two (lower).

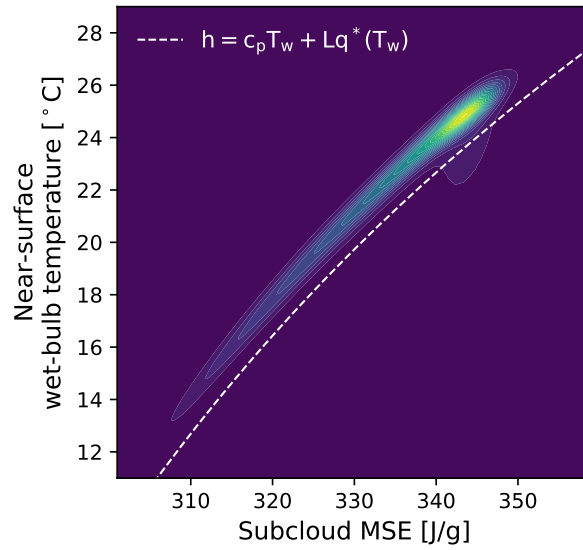


Figure S4. The histogram of 2-m wet-bulb temperature vs. subcloud MSE from ERA-Interim daily data averaged for 2001-2014. The dashed white line shows the theoretical relationship between MSE at sea level and the wet-bulb temperature.

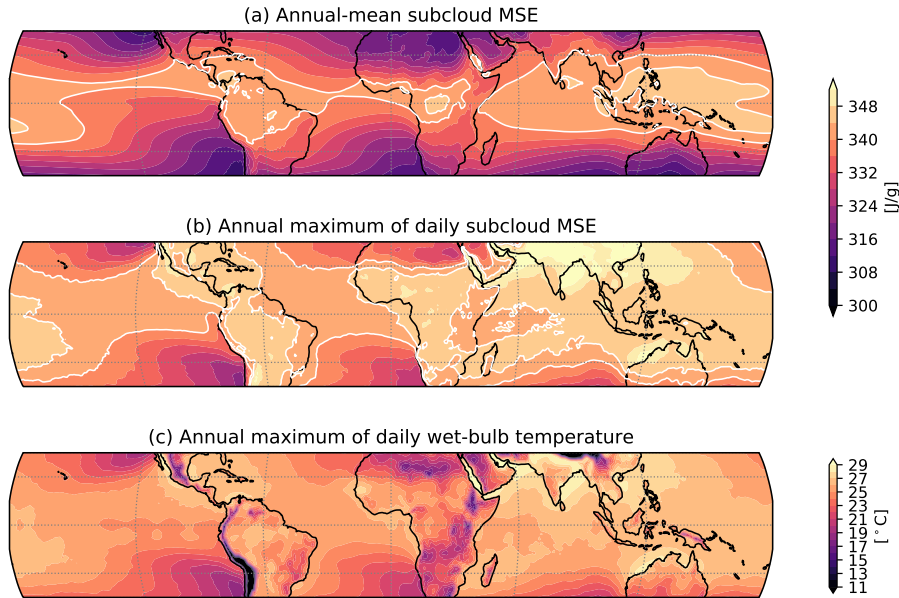


Figure S5. The annual-mean (a) and annual-maximum (b) daily-mean subcloud MSE and the annual-maximum daily 2-m wet-bulb temperature (c) from ERA-Interim averaged for 14 years within 2001-2014. White contours in (a) and (b) are to aid the comparison (The standard deviation is 8.8 J/g for panel (a) and 5.8 J/g for panel (b).)

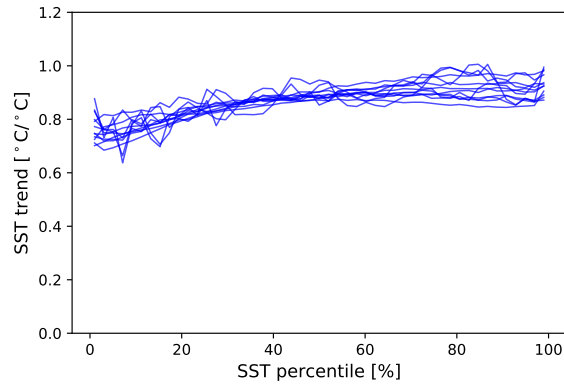


Figure S6. Trend of SST percentiles for each model normalized by tropical mean warming under RCP 8.5. Each line represents one CMIP5 model.

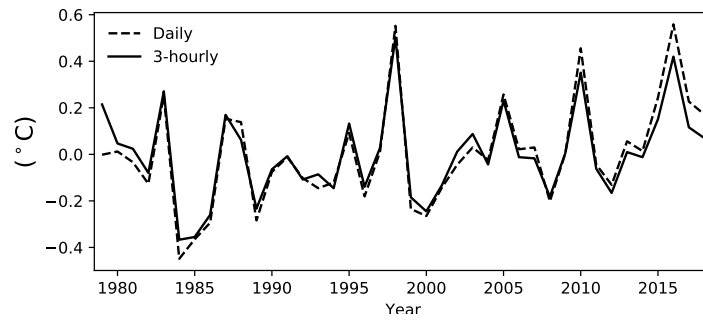


Figure S7. The tropical land-mean TW_{\max} anomalies for TW_{\max} defined as the annual-maximum daily-mean TW (dashed) and the annual-maximum 3-hourly TW (solid) for 1979-2018 from ERA-Interim.

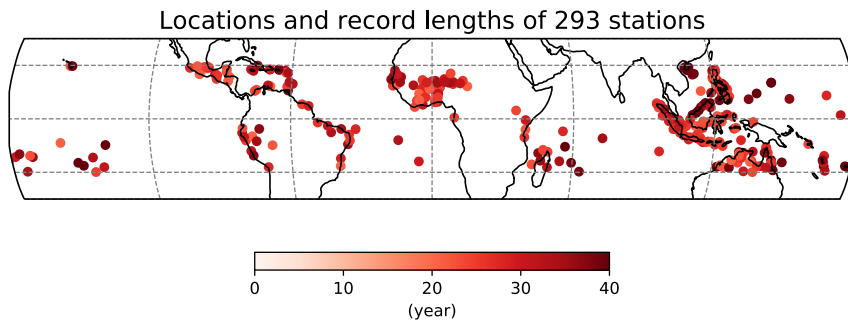


Figure S8. Locations and record lengths (color) of 293 stations from HadISD that contain enough measurements required by this study.

Table S1. Table of CMIP5 models used in this study.

#	Model Name	Institute ID
1	ACCESS1-0	ACCESS
2	ACCESS1-3	ACCESS
3	CESM1-CAM5	NSF-DOE-NCAR
4	CNRM-CM5	CNRM-CERFACS
5	CSIRO-Mk3-6-0	CSIRO-QCCCE
6	CanESM2	CCCMA
7	GFDL-CM3	NOAA GFDL
8	GFDL-ESM2G	NOAA GFDL
9	GFDL-ESM2M	NOAA GFDL
10	HadGEM2-AO	NIMR/KMA
11	HadGEM2-CC	MOHC
12	HadGEM2-ES	MOHC
13	INMCM4	INM
14	IPSL-CM5A-LR	IPSL
15	IPSL-CM5A-MR	IPSL
16	IPSL-CM5B-LR	IPSL
17	MIROC5	MIROC
18	MIROC-ESM	MIROC
19	MIROC-ESM-CHEM	MIROC
20	MRI-CGCM3	MRI
21	MRI-ESM1	MRI
22	NorESM1-M	NCC