

S U P P L E M E N T

STATE OF THE CLIMATE IN 2016

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NASA GISS

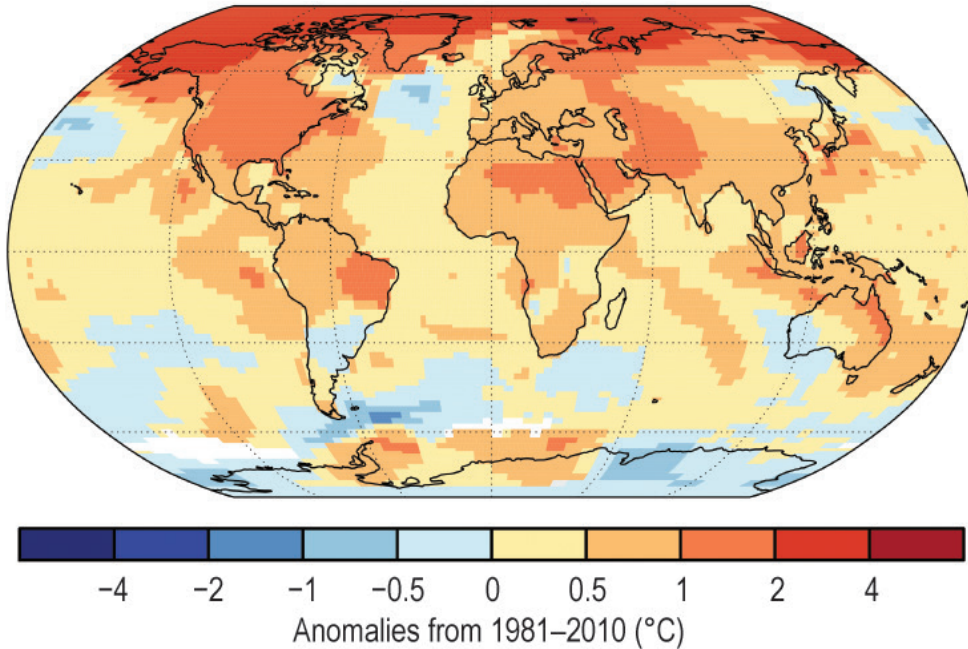


FIG. S2.1. NASA GISS surface temperature (~2-m air temperature over land, sea surface temperature over ocean; °C) annual anomaly for 2016 relative to the 1981–2010 base period.

HadCRUT 4.5

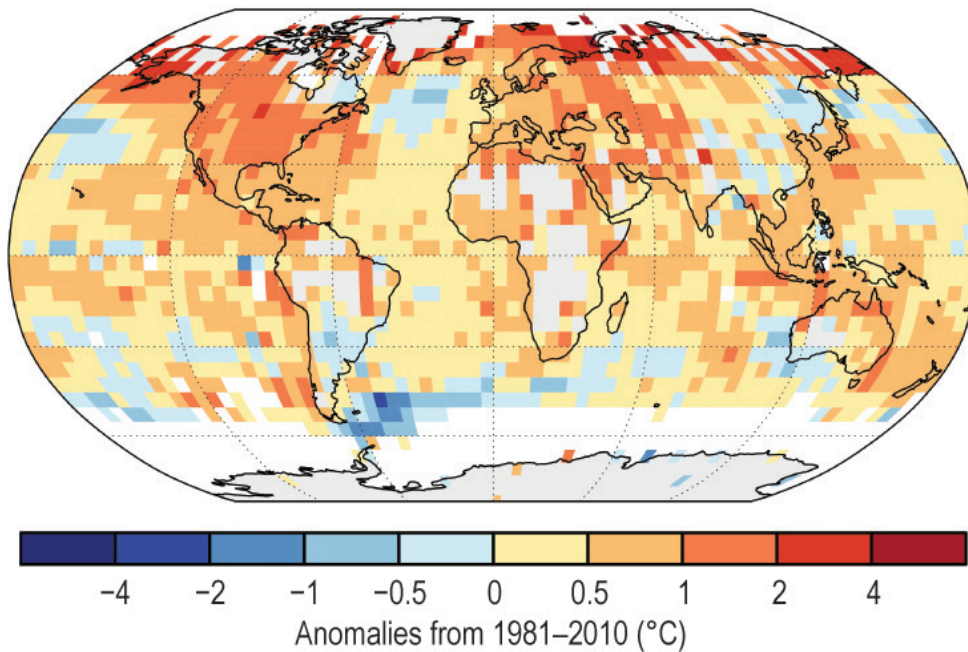


FIG. S2.2. HadCRUT4.5 surface temperature (~2-m air temperature over land, sea surface temperature over ocean; °C) annual anomaly for 2016 relative to the 1981–2010 base period.

ERA-Interim

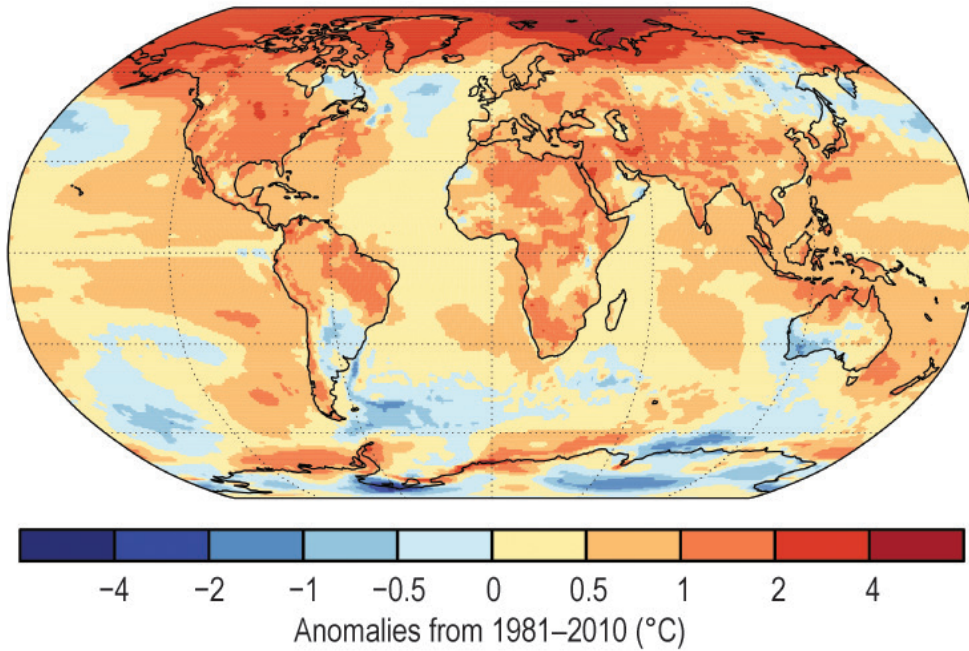
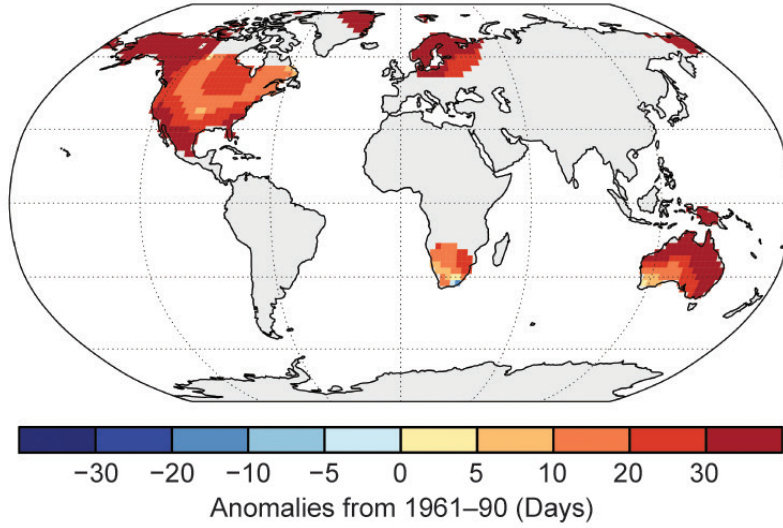


FIG. S2.3. ERA-Interim surface air temperature (2-m; °C) annual anomaly for 2016 relative to the 1981–2010 base period.

(a) TN90p - Warm Nights



(b) TN10p - Cool Nights

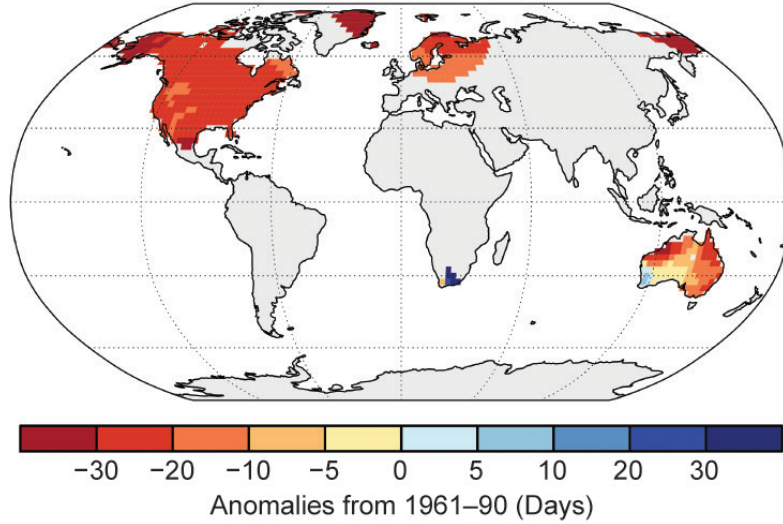


FIG. S2.4. TN90p and TN10p (warm and cool nights) annual anomalies in 2016 (GHCNDEX), in days.

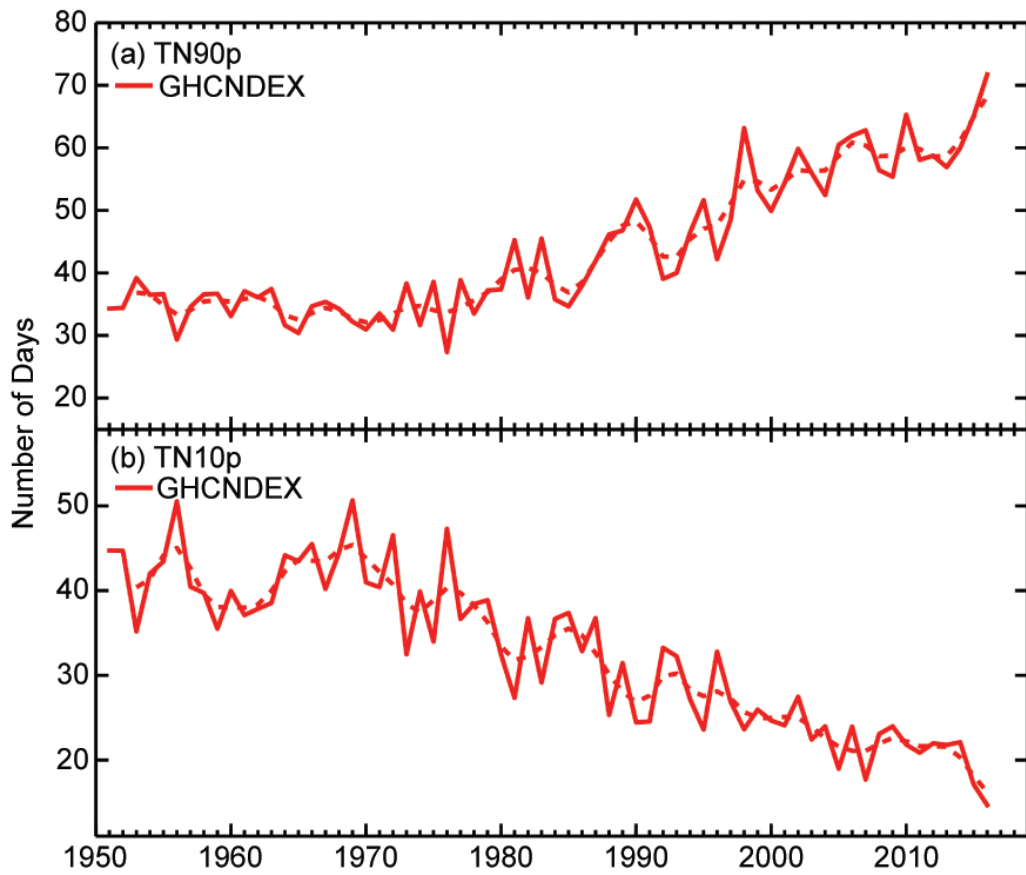
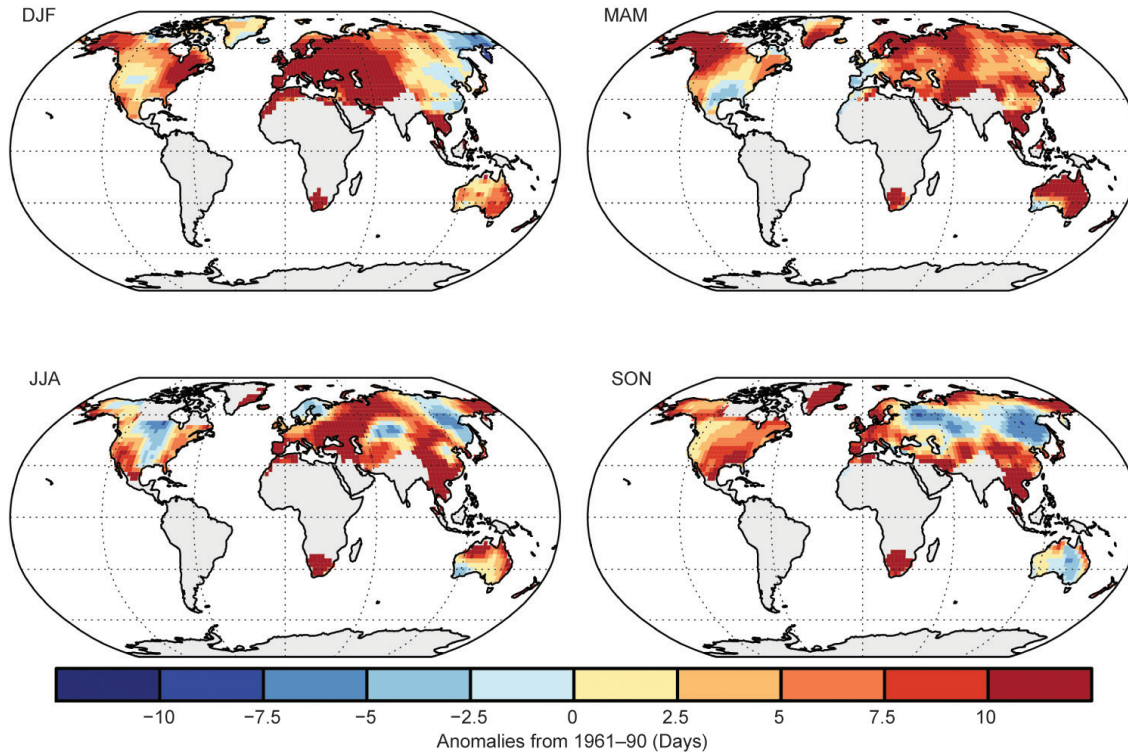


FIG. S2.5. Time series for TN90p and TN10p (warm and cool nights; in days).

(a) TX90p - Warm Days



(b) TX10p - Cool Days

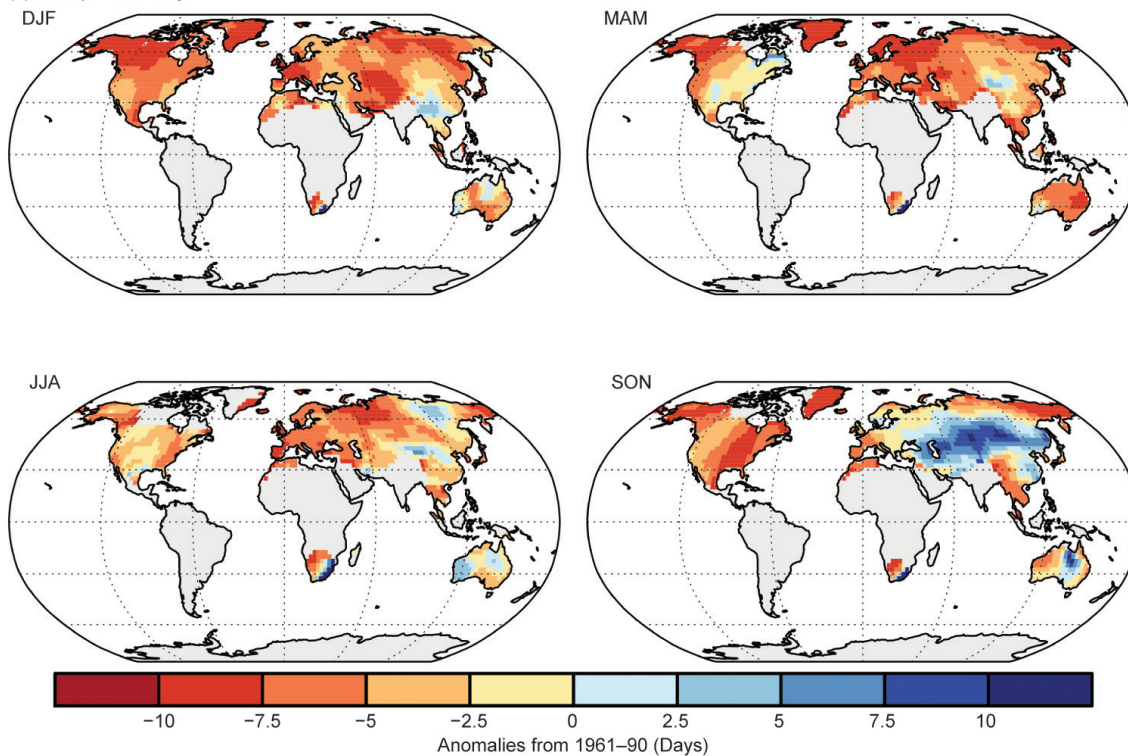
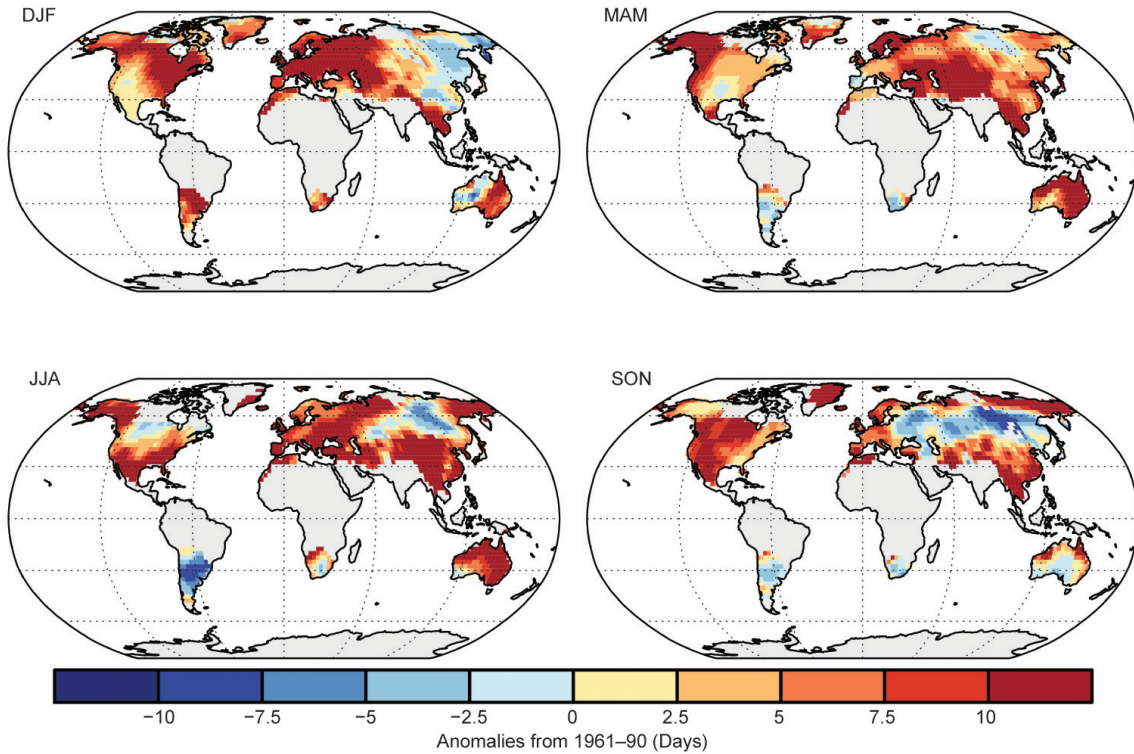
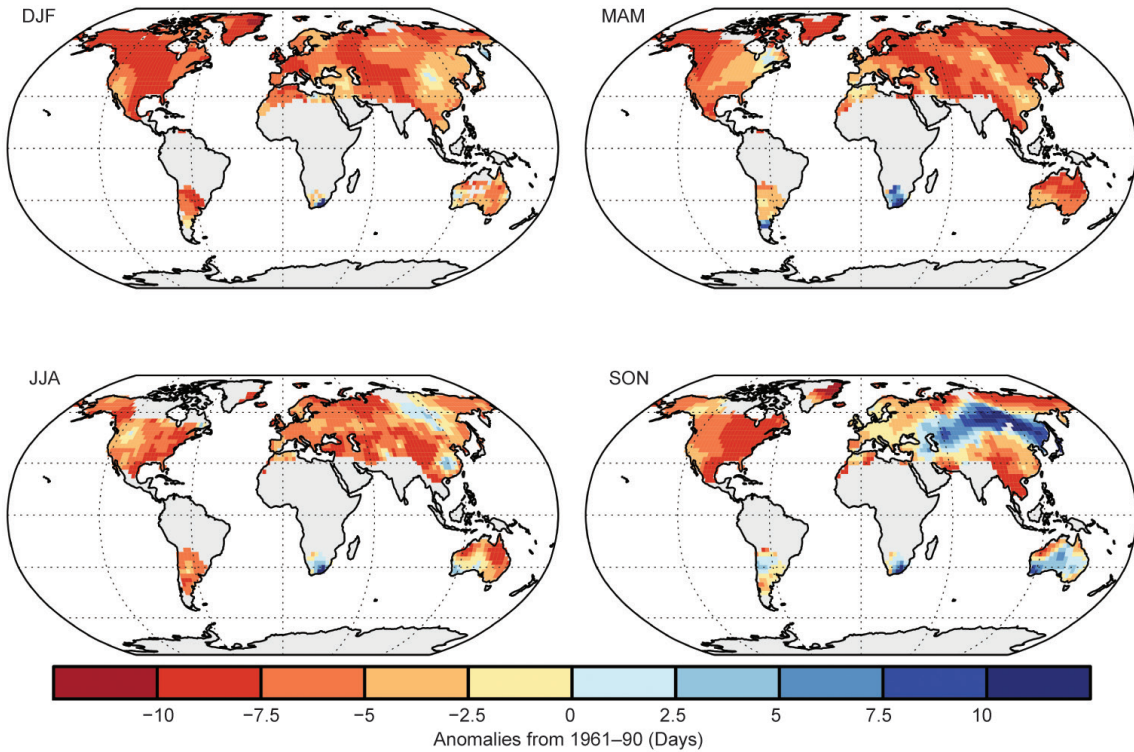


FIG. S2.6. Seasonal anomalies for (a) TX90p, (b) TX10p, and on the next page, (c) TN90p and (d) TN10p (GHCNDEX; in days).

(c) TN90p - Warm Nights



(d) TN10p - Cool Nights



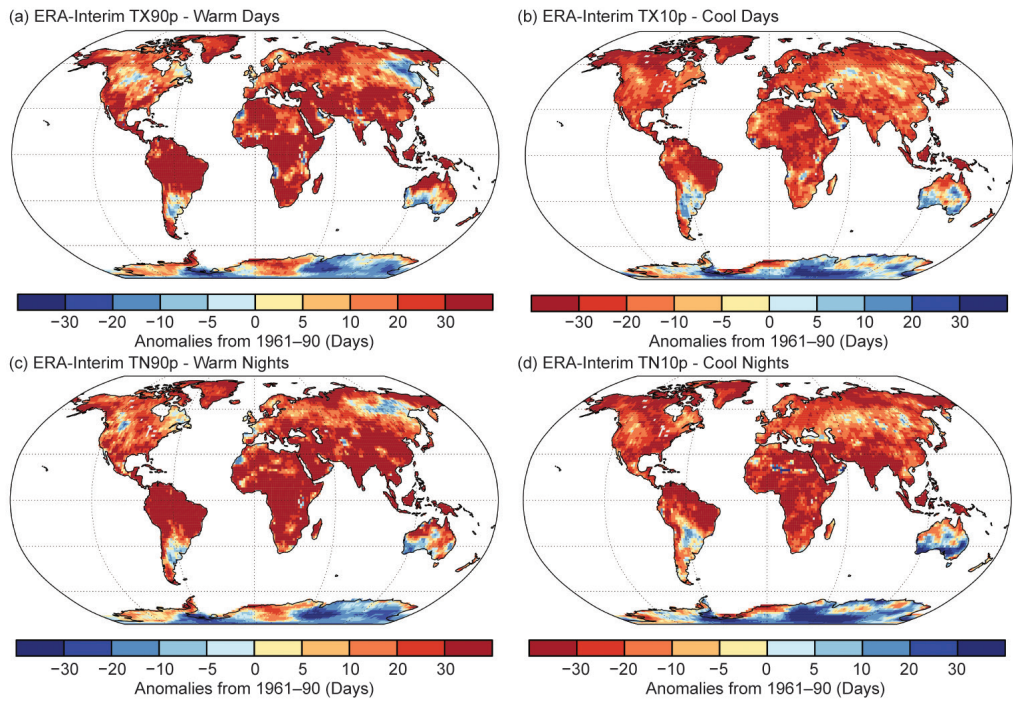
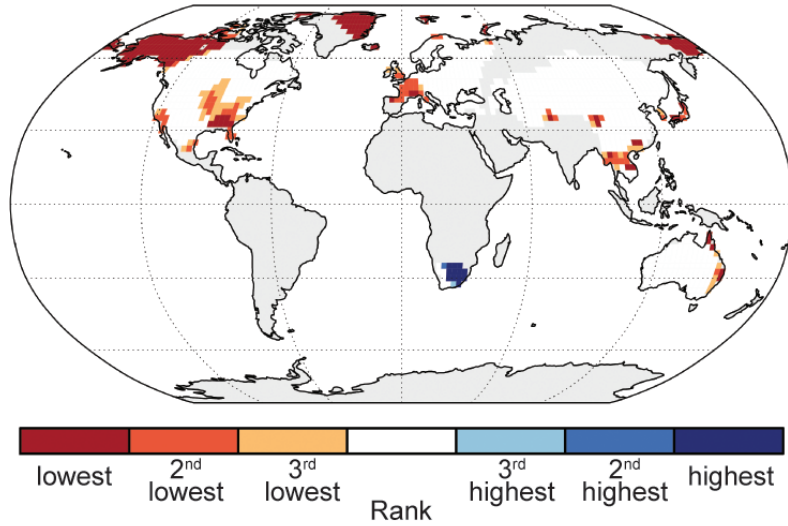


FIG. S2.7. Annual anomalies from ERA-Interim for TX90p, TX10p, TN90p, and TNI0p (in days).

(a) TX10p



(b) TN10p

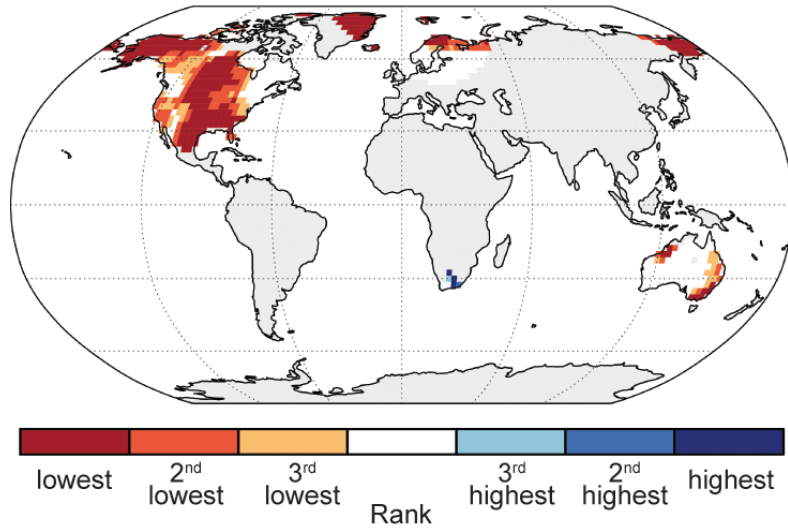


FIG. S2.8. Rank plot over the period 1951–2016 of TX10p and TN10p.

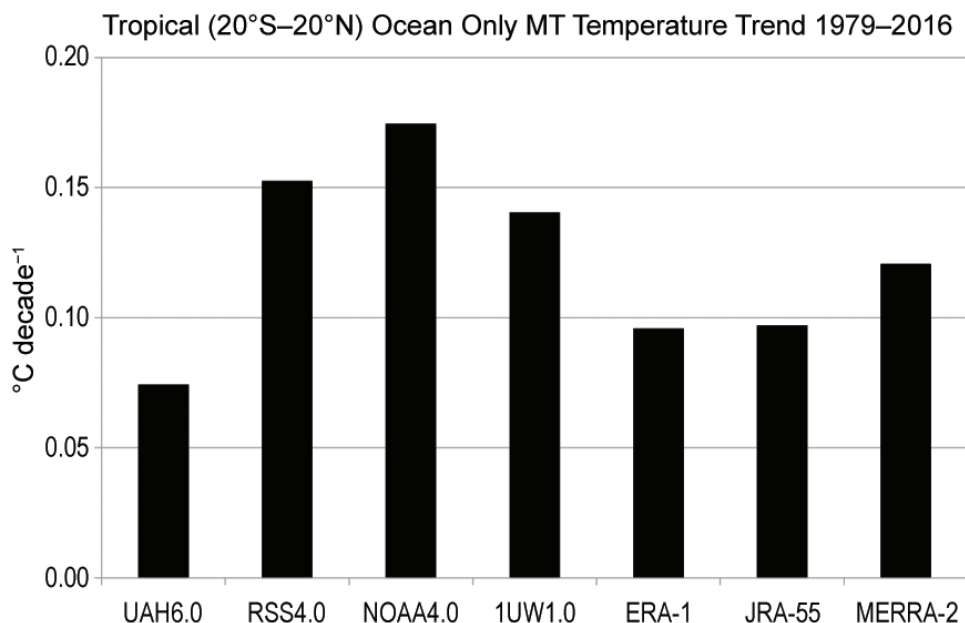


FIG. S2.9. 1979–2015 trend of midtropospheric temperature ($^{\circ}\text{C decade}^{-1}$) over oceans 30°N – 30°S from four satellite datasets and the ERA-1 reanalyses.

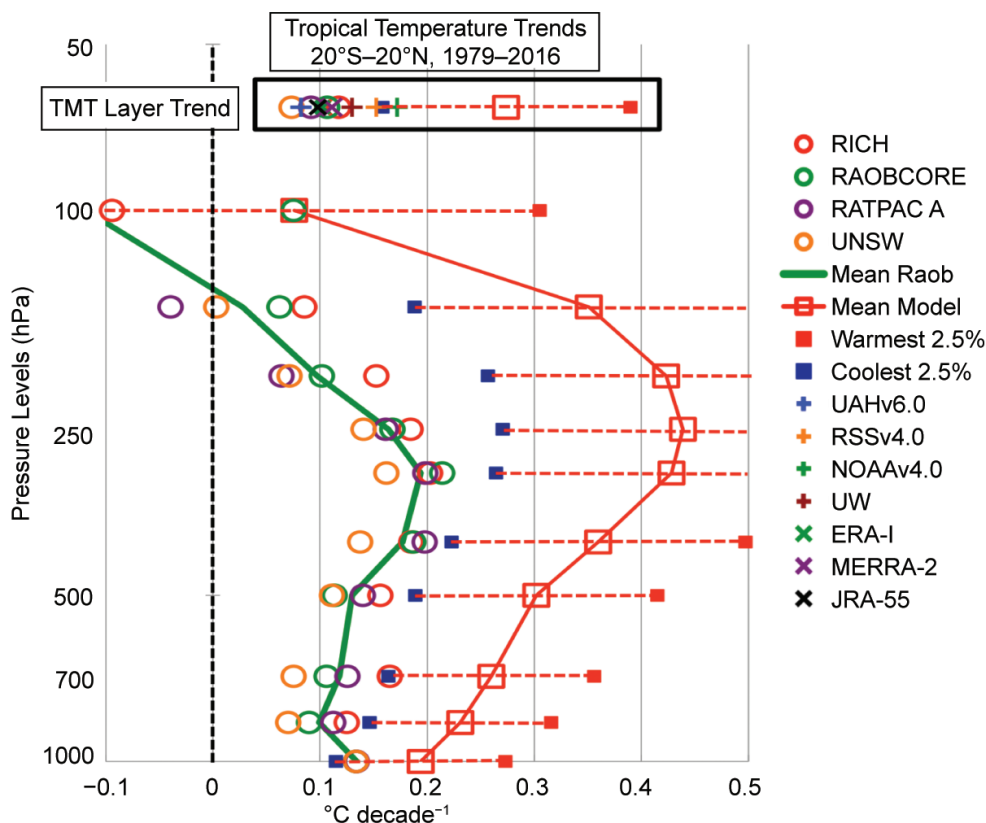


FIG. S2.10. Temperature trends ($^{\circ}\text{C decade}^{-1}$) for the tropics at various tropospheric levels for 1979–2016. The top box indicates trends for the tropical atmospheric layer known as the midtroposphere (TMT) and includes satellite observations. The CMIP-5 (rcp4.5) model output of 102 runs was used for the mean and range of model trends. The horizontal dashed lines represent the range within which 95% of the model trends occurred.

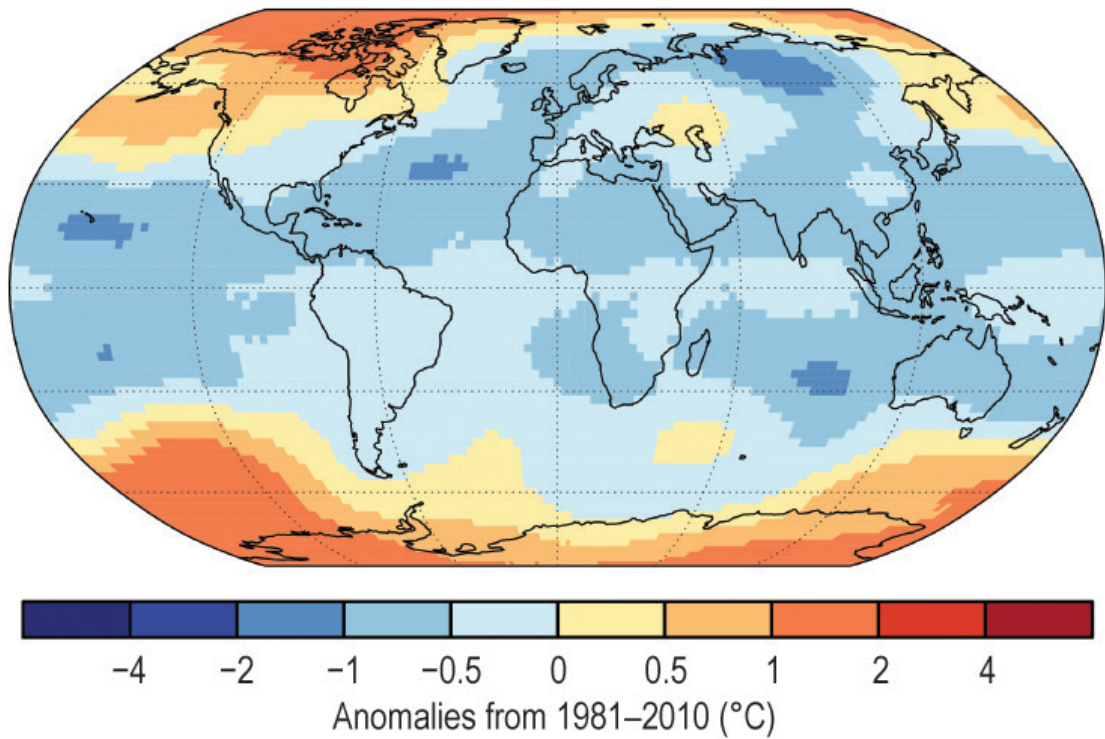


FIG. S2.11. Annual gridded TLS anomalies (°C) in 2016 from MERRA-2.

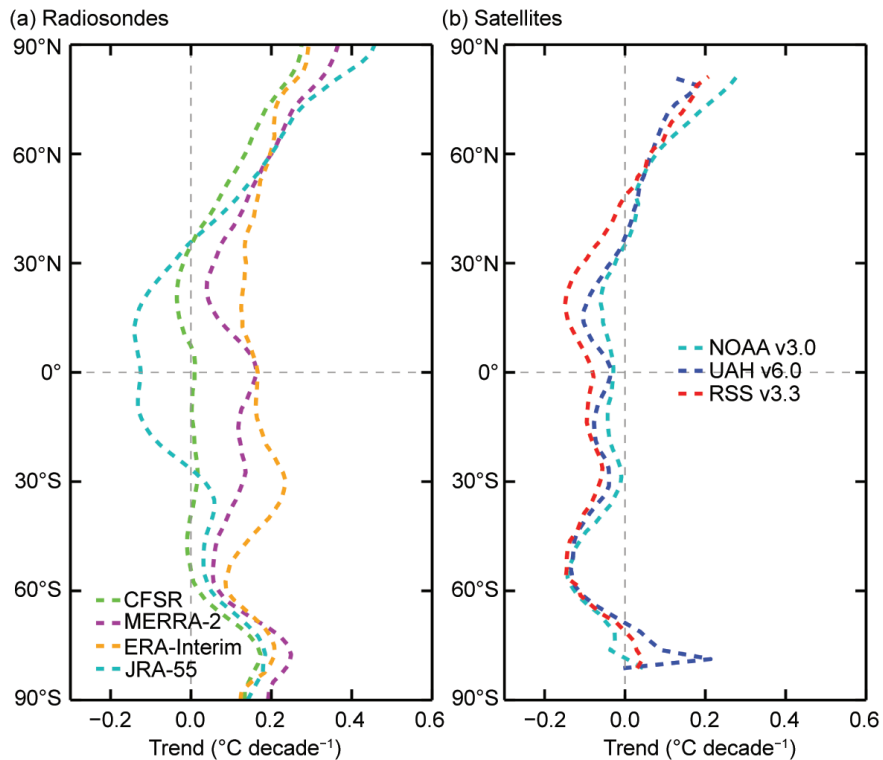


FIG. S2.12. (a) Annual trends (°C decade⁻¹) from 1994–2016 at all latitudes for the CFSR, MERRA-2, ERA-I, and JRA-55 reanalyses and (b), annual trends (°C decade⁻¹) from 1994–2016 at all latitudes for the UAH, RSS, and NOAA TLS CDRs.

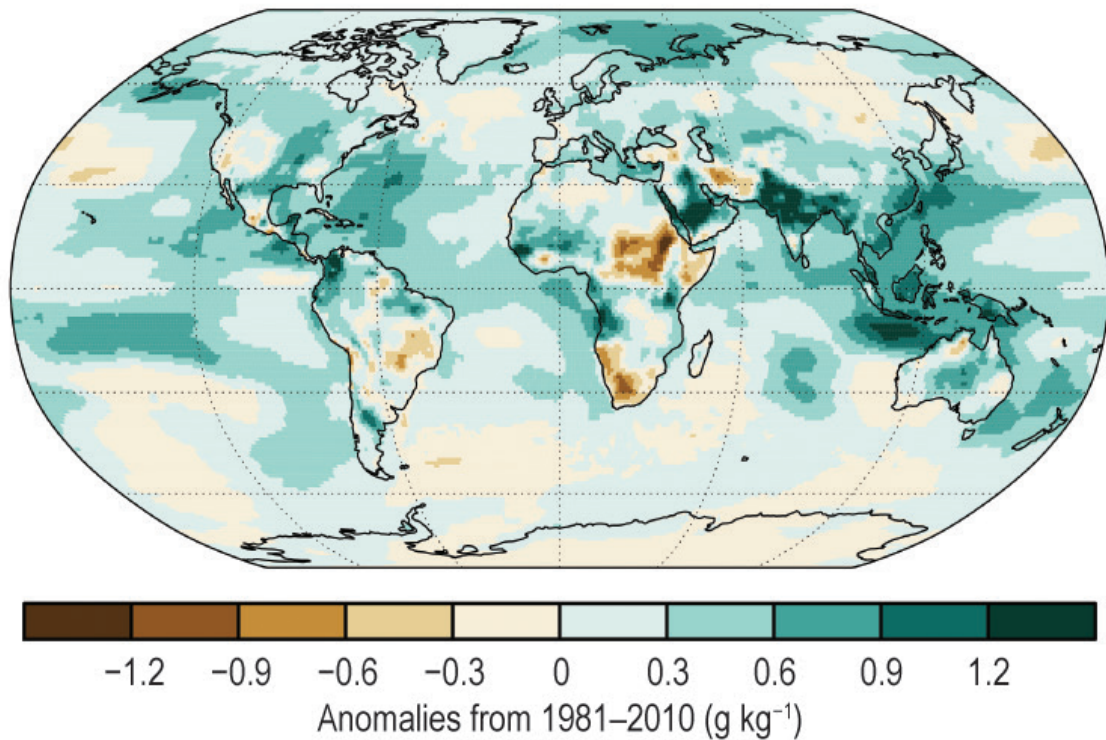


FIG. S2.13. Annual average anomaly for 2016 surface specific humidity (g kg^{-1}) from ERA-Interim (1981–2010 base period).

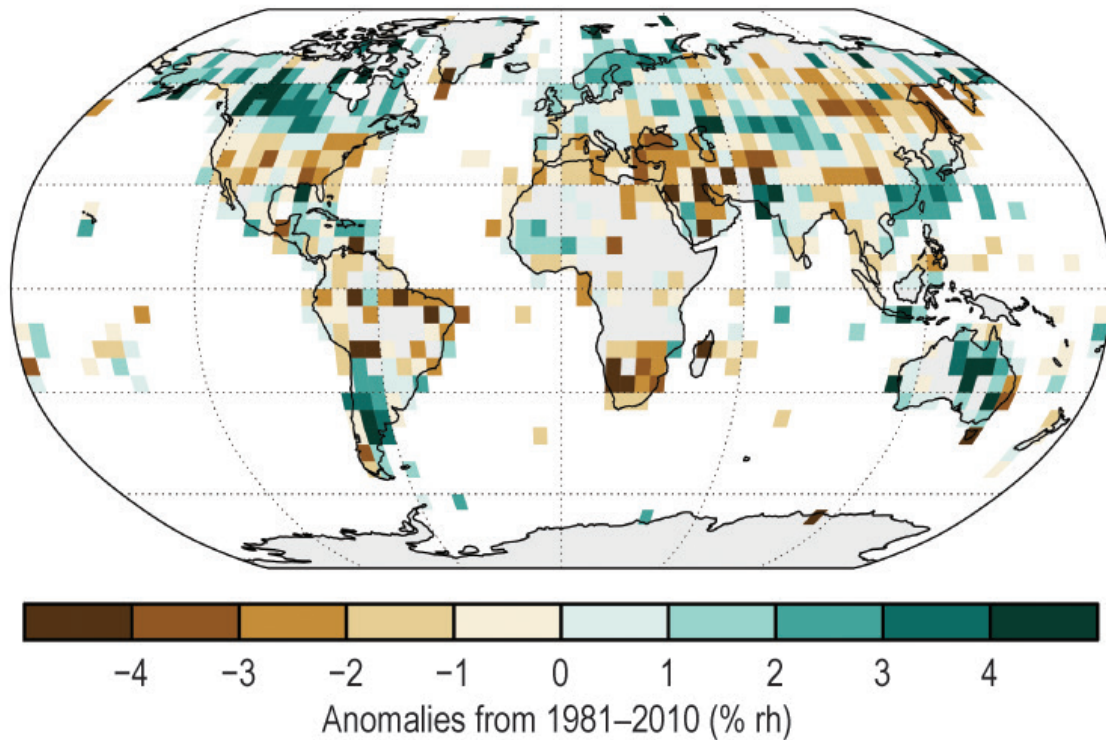


FIG. S2.14. Annual average anomaly for 2016 surface relative humidity (%) over land from HadISDH (1981–2010 base period).

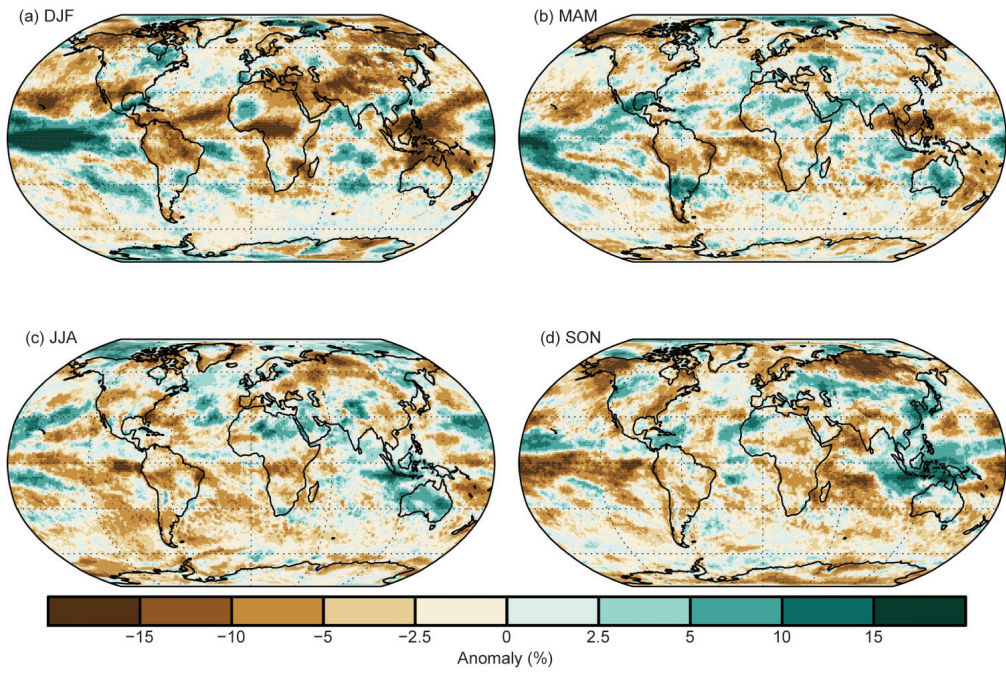


FIG. S2.15. Global seasonal cloudiness anomaly map (%) for 2016 generated from the 30-year PATMOS-x/AVHRR cloud climatology (1981–2010 base period).

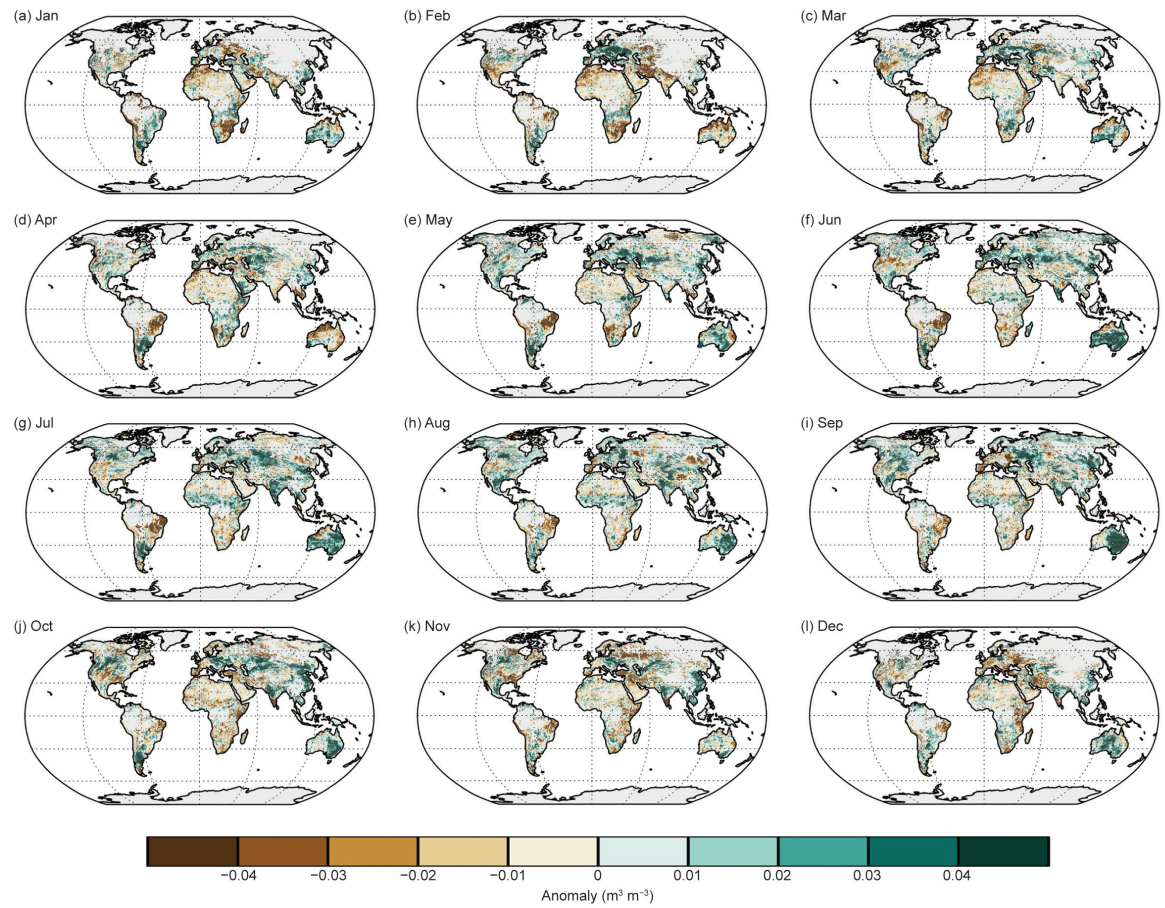


FIG. S2.16. Monthly soil moisture anomalies ($m^3 m^{-3}$) for 2016 (base period: 1991–2015). Data were masked as missing where retrievals are either not possible or of very low quality (dense forests, frozen soil, snow, ice, etc.). (Source: ESA CCI Soil Moisture.)

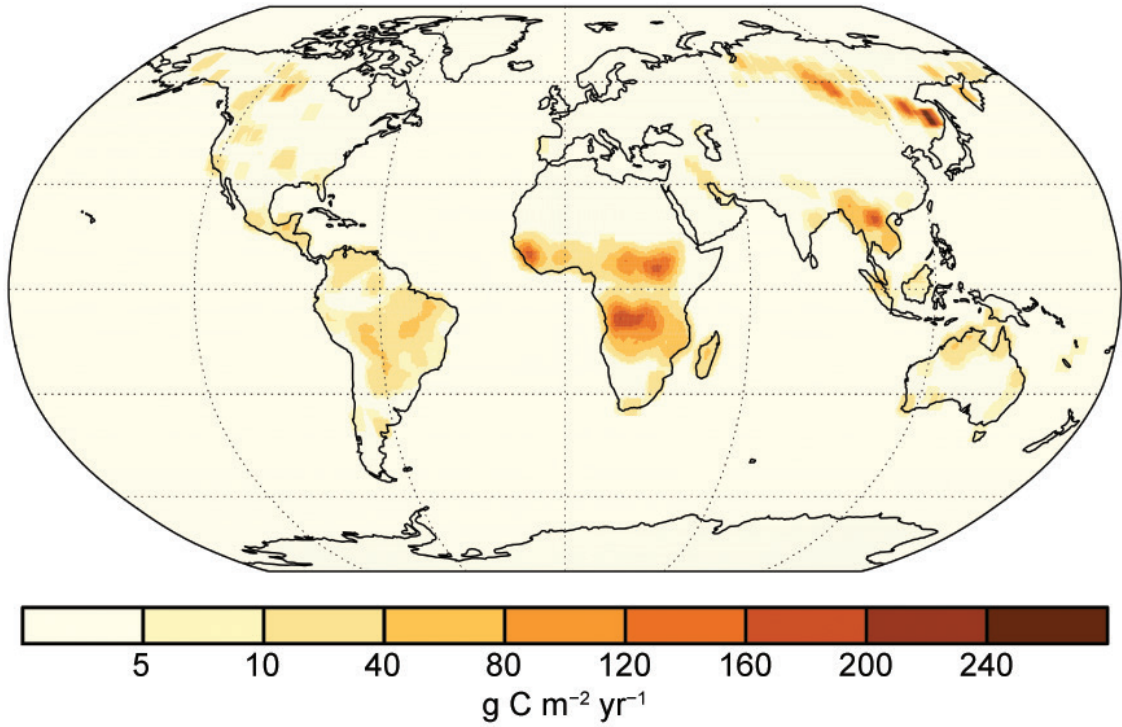


FIG. S2.17. Global map of fire activity in 2016 in terms of carbon consumption. (Source: GFASv1.3.)

Online tables 7.1 and 7.2 supplement main report section 7c: Central America and the Caribbean

ONLINE TABLE 7.1. Summary of events and impacts, including number of fatalities (f), missing people (m), affected people (a), injured people (i), number of affected families (h), and damaged houses (d), by country and specific region. [Data sources, Guatemala: www.redhum.org; Belize: www.cdema.org; Central America: National Weather Services and National Emergency Committees communications and regional newspapers].

Country	Specific Region	Dates (2016)	Hydrometeorological Conditions	Impacts
Panamá	Parque Lefvre and Río Abajo	10 May	Heavy rainfall and floods	168a
	Paso Canoas and San Isidro, Chiriqui province	05 Sep	Heavy rainfall and floods	93d
	Los Santos and Herrera provinces	19 Oct	Rainfall and floods associated with a low pressure system	614a, 117d
	Province of Panama, Colón, Bocas del Toro and Chiriqui	22 Nov	Rainfall and floods associated with Hurricane Otto	8f, 2431a
Costa Rica	Tárcoles, Puntarenas	18 Jul	Heavy rainfall associated with a tropical wave	2f, 2i
	Curubandé Liberia, Guanacaste	05 Aug	Rainfall and floods associated with Hurricane Earl	3f
	Quepos	25 Aug	Heavy rainfall	18h
	Corredores, Osa, Golfito, and Pérez Zeledón	12 Sep	Rainfall, floods, and landslides associated with a low pressure system	135d
	Cartago province	06 Oct	Heavy rainfall associated with Hurricane Matthew	153a, 21d
	Golfito, Corredores, and Osa	17 Nov	Rainfall and floods associated with a cold front and low pressure system systems	70h
	Alajuela, Cartago, Guanacaste, Heredia, and Limón provinces	24 Nov	Heavy rainfall and floods associated with Hurricane Otto	10f, 10831a, 1610d
	Upala, El Carmen	17 Dec	Heavy rainfall and floods	25a
Nicaragua	Managua	29 May	Rainfall and floods associated with a low pressure system	509a, 98d
	Caribbean Coast	09 Jul	Heavy rainfall and floods	8905a, 1699d
	Nueva Segovia	04 Aug	Rainfall and floods associated with Hurricane Earl	20d
	Madriz, Nueva Segovia, Estelí, Boaco, Jinotega, León, and Managua	18 Oct	Rainfall and floods associated with a low pressure system	2f, 709d
	Regions of Caribe Sur, Rio San Juan, Rivas, and Zelaya Central	24 Nov	Rainfall and floods associated with Hurricane Otto	11 678a, 857d
El Salvador	Western, Central, and Eastern region	08 Jul	Heavy rainfall associated with a tropical wave	5i, 11d
	Municipality Ciudad Arce, Department La Libertad	20 Jul	Rainfall and floods associated with a tropical wave	1f
	La Paz, Morazán, La Unión, and San Miguel Departments	18 Oct	Rainfall and floods associated with a low pressure system	60h, 163d

ONLINE TABLE 7.1. (CONT.) Summary of events and impacts, including number of fatalities (f), missing people (m), affected people (a), injured people (i), number of affected families (h), and damaged houses (d), by country and specific region. [Data sources, Guatemala: www.redhum.org; Belize: www.cdema.org; Central America: National Weather Services and National Emergency Committees communications and regional newspapers].

Country	Specific Region	Dates (2016)	Hydrometeorological Conditions	Impacts
Honduras	Departments of Cortes, Yoró, and Atlántida	22 Mar	Rainfall and floods associated with a cold front	10341a, 173d
	Soledad, El Paraiso Department	27 May	Heavy rainfall, landslides	5f, 2i
	Departments of Colon, Gracias a Dios, Cortes and Islas de la Bahía	05 Aug	Rainfall and floods associated with Hurricane Earl	1m, 63a, 1i
	Tegucigalpa	29 Aug	Rainfall and landslides	1f, 39h
	Distrito Central	20 Oct	Rainfall and floods associated with a low pressure system	1f, 1653a, 3i
Guatemala	San Juan Comalapa, and Chimaltenango	19 Apr	Heavy Rainfall	962a
	El Armeño, Municipality Las Cruces, Petén	24 Apr	Heavy rain and strong winds	2f, 2i
	Villa Canales, Guatemala	19 May	Rainfall and floods	335a, 67d
	Villa Nueva, Guatemala	03 Jun	Rainfall and floods	1f, 148d
	Departments of Suchitepéquez, Alta Verapaz, Esquintla, and Izabal	09 Jul	Heavy rainfall, floods, and strong winds	960a, 160d
	Petén and Quiché	05 Aug	Rainfall and floods associated with Hurricane Earl	1046a, 1i, 162d
	Guatemala, Izabal, Zacapa, Alta Verapaz, and Suchitepéquez	15 Aug	Rainfall, floods and landslides	4093a, 102d
	Villa Nueva, Guatemala Department	06 Sep	Rainfall and landslides	10f
	Departments of Guatemala, Suchitepéquez, and Santa Rosa	11 Sep	Rainfall, floods, and landslides	5307a, 32d
	Departments of Chiquimula, Guatemala, Quiché, Retalhuleu, Suchitepéquez, and Zacapa	22 Sep	Rainfall, floods, and landslides associated with a Easterly wave	52 125a, 76d
	Poptún and Petén	16 Oct	Rainfall and floods	942a, 190d
	Department of Guatemala	05 Dec	Cold front	508a
Belize	Belize City, Belize Rural, Orange Walk, Cavo, and Stann Creek	05 Aug	Rainfall and floods associated with Hurricane Earl	8000a

ONLINE TABLE 7.2. Record seasonal temperatures (°C) for some Caribbean locations.

Country	Stations/ Locations	Record Start Date	Tmin				Tmean				Tmax			
			JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND
Barbados	CIMH	1971	-	24.7		24.4		27.9	-	-	-	-	-	-
Barbados	GAIA	1979	-	-	-	-	28	-	-	-	-	-	-	-
Cayman	METEO	1957	-	25.7		25.2	-	-	-	-	-	-	-	-
Dominica	Canefield	1983	-	-	-	-	-	-	-	-	-	-	-	32.2
Jamaica	Sangster	1973	-	25.1	25.6		-	-	-	-	-	-	-	-
Jamaica	Worthy Park	1973	-	-	-	-	23.5	-	-	-	30.3	-	-	-
Grenada	MBIA	1986	-	-	-	23.3	-	-	-	-	-	-	-	-
Martinique	Lamentin	1971	-	24.8	-	24	-	-	-	-	-	-	-	-
Puerto Rico	Guayama	1971	-	26.1	-	-	-	-	29.4		-	-	-	-
Puerto Rico	Lajas	1971	-	21.8	-	20.6		27.1	-	-	-	-	-	-
Puerto Rico	San Juan	1898	-	-	-	24.8	-	-	-	-	-	-	-	-
St. Kitts	Golden Rock	1998	-	-	-	-	26.5	28.2	29	28.1	-	-	-	-
St. Kitts	RLB		-	-	-	-	-	-	-	-	-	31	-	-
St. Lucia	Hewanorra	1973	-	26.1	26.2	25.5	-	-	-	-	-	-	-	-
St. Vincent	ET Joshua	1979	-	-	25.9		-	-	-	-	-	-	-	-
Tobago	Crown Point	1969	-	-	26.7		-	-	28.4	28.2	-	-	31.8	31.4
Trinidad	Piarco	1946				24.1	-	-	-	28.1	-	33	33.6	32.9
USVI	St. Thomas	1953	-	26.2		25.2	-	-	-	-	-	-	-	-

REFERENCES

Dee, D. P., and Coauthors, 2011: The ERA-Interim reanalysis: Configuration and performance of the data assimilation system. *Quart. J. Roy. Meteor. Soc.*, **137**, 553–597, doi:10.1002/qj.828.