SEVERE LOCAL STORMS, JULY 1941—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Hancock County, Iowa	17				2,000	Wind, hail, electrical.	Barn burned; some loss in crops.
Columbia, S. C., and vicinity.	17				20,000	Rain and flood	Streets, roads, and property damaged; 3.71 inches of rain recorded.
Mays County, Okla	18	4 p. m	[1] 3		2,000	Hail	Loss in crops, $1,900; property damage, $100; path, 6 miles long.
Crescent, Okla., northeast of.	18	4:10 p. m	[1] 2		40,000	Wind and hail	Crop loss, $35,000; property damage, $5,000; path, 12 miles long.
Posey and Vanderburgh Counties, Ind.	18	5 p. m	[1] 2		25,000	do	Crop damage, $10,000; property damage, $15,000.
Columbia County, Wash	18				75,000	Hail	Report made on combined damage from 2 storms.
Walla Walla, Franklin and eastern Benton Counties, Wash.	18				40,000	Electrical	Pasturage ruined; wheat burned.
Ithaca, N. Y., and vicinity	19					Thunderstorm	Lightning and falling trees caused much damage to telephone and power lines.
Virden, N. Mex	20	4:05–4:35 p. m	587		8,500	Heavy hail	$8,000, loss to crops; $500, damage to roofs.
Ainsworth, Nebr	20	6–7 p. m	[1] 3		25,000	Hail and wind	Chief damage to corn from hail; property damaged; path 9 miles long.
Progresso and Cedarvale, N. Mex., vicinity of.	21	4–5:30 p. m	[1] 1–3		10,000	Heavy hail	Loss to crops.
Raymond, Nebr	21	6 p. m	[1] 1		4,000	Wind and hail	Loss in small grain from hail; property damaged; man injured.
Weeping Water, Nebr., vicinity of.	21	7 p. m	[1] 1		4,000	do	All small buildings on a farm leveled; loss to corn and other crops on 2 farms.
Truchas, N. Mex	21		[1] 2		2,000	Heavy hail	Loss in crops.
Kenosha County, Wis., southeastern portion.	22				700	Thundersquall	Loss to crops, $500; property damage, $200.
Ada, Minn., and vicinity	23	11:30 p. m			20,000	Thundersquall and hail.	Loss to growing crops from hail, $5,000; property damages by wind, $15,000; path 5 miles long.
Molson, Wash	24	4:30 p. m	[1] 1		3,000	Hail	Property damaged.
Vanderburg County, Ind	24				8,500	Wind	Crop loss, $4,000; property damage, $4,500.
Prairie and Dawson Counties, Mont.	25	5 p. m			40,000	Heavy hail	Loss in wheat; path 20 miles long.
De Soto to Linwood, Kans., and vicinities.	26	2:30 p. m	[1] 2	0	4,000	Tornado	A vortex cloud observed; property damaged; path 8 miles long.
Madison, Fla., 4 miles north.	26	3 p. m	33	0	600	do	Crop loss, $100; property damaged, $500; path from 2 to 3 miles long.
Prairie and Dawson Counties, Mont.	27	2–5 p. m			30,000	Wind and hail	Loss chiefly in wheat; property damaged; path 50 miles long.
Fergus County, Mont	28	3–6 p. m			250,000	Heavy hail	Loss principally in wheat. Storm traveled a narrow strip north of Denton to the Missouri River northeast of Winifred; path 50 miles long.
New York State, western, central, and northern portions.	28			1		Severe thunderstorm.	In Jefferson County hundreds of trees were blown down, miles of telephone and power lines leveled and much damage to houses and barns. Many highways blocked by fallen trees. There was much damage in Syracuse, Cortland, and Ithaca. Numerous fires caused by lightning reported.
Marietta, Ohio	29	4 p. m			500	Heavy rain	Basements and streets flooded with damage to church basement of $500.
Elbing, Kans	29	6 p. m	1, 32	0 0	2,500	Tornado	Number of farm buildings wrecked and telephone lines down; path 3 miles long.
Osceola, Nebr., vicinity of	30	10:30 a. m			10,000	Hail	Much corn damaged; path 3 miles long.
Elida, N. Mex	30	Noon–12:10 p. m.			1,000	Heavy hail	Loss to crops; poultry killed.
Norfolk, Va	31				500	Electrical	Property damaged.

[1] Miles instead of yards.

SOLAR RADIATION AND SUNSPOT DATA FOR JULY 1941

SOLAR RADIATION OBSERVATIONS

By HELEN CULLINANE

Measurements of solar radiant energy received at the surface of the earth are made at 9 stations maintained by the Weather Bureau and at 12 cooperating stations maintained by other institutions. The intensity of the total radiation from sun and sky on a horizontal surface is continuously recorded (from sunrise to sunset) at all these stations by self-registering instruments; pyrheliometric measurements of the intensity of direct solar radiation at normal incidence are made at frequent intervals on clear days at three Weather Bureau stations (Madison, Wis.; Lincoln, Nebr.; and Albuquerque, N. Mex.) and at the Blue Hill Observatory at Harvard University. Occasional observations of sky polarization are taken at the Weather Bureau station at Madison and at Blue Hill Observatory.

The geographic coordinates of the stations, descriptions of the instrumental equipment, station exposures, and methods of observation, together with summaries of the data obtained, up to the end of 1939, are given in the MONTHLY WEATHER REVIEW for December 1937 and April 1941.

Table 1 contains the measurements of the intensity of direct solar radiation at normal incidence, with means and their departures from normal (means based on less than 3 values are in parentheses). At Lincoln, Madison, Albuquerque, and Blue Hill the observations are obtained with a recording thermopile, checked by observations with a Smithsonian silver-disk pyrheliometer at Blue Hill. The table also gives vapor pressures at 7:30 a. m. and at 1:30 p. m. (75th meridian time).

Table 2 contains the average amounts of radiation received daily on a horizontal surface from both sun and sky during each week, their departures from normal and the accumulated departures since the beginning of the year. The values at most of the stations are obtained from the records of the Eppley pyrheliometer recording on either a microammeter or a potentiometer.

In compliance with numerous requests received, the Solar Radiation Investigations Section will from now on publish daily totals for table 2 for all stations except Fairbanks, Alaska, as well as the weekly means previously published. If the daily figures for total solar and sky radiation at Fairbanks should be desired, they may be obtained approximately 2 months after the date of the observation by writing to the Solar Radiation Investigations Supervisory Station, Blue Hill Observatory, Milton, Mass.

Radiation at normal incidence was below normal at Madison, Wis.

Total solar and sky radiation during July was below normal at Washington, New York, Cambridge, Fairbanks, La Jolla, and Newport, and excessive at all other stations, with the exception of Albuquerque, where it was approximately normal. Attention is called to the fact that radiation data for State College, Pa., appear in table 2 for the first time.

Polarization measurements during July at Madison gave a mean for 6 measurements of 50 percent, 8 percent below the normal for that month, while the maximum (61) was 5 percent below normal.

TABLE 1.—*Solar radiation intensities during July 1941*

[Gram-calories per minute per square centimeter of normal surface]

ALBUQUERQUE, N. MEX.

Date	Sun's zenith distance										
	7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e.	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
July 2	8.18	0.86	0.94			1.42	1.25	1.08	0.97	0.91	8.48
July 3	9.83	.87	.94	1.06	1.19	1.39	1.20	1.06	.91	.83	10.59
July 4	8.81	.79	.88	.99	1.11						8.48
July 7	9.83	.84	.96	1.06	1.17	1.35					8.81
July 8	8.81	.80	.89	1.01	1.08	1.42	1.20	.98	.89		8.81
July 10	9.83	.80	.89	1.01	1.14	1.37					8.48
July 12	10.59			.94	1.13	1.35					10.59
July 13	10.97		.95	1.06	1.21	1.41					9.83
July 14	10.97	.79	.86	1.00	1.16	1.35					11.38
July 15	10.21	.81	.89	1.01	1.16	1.43	1.13				10.21
July 16	11.38	.85	.94	1.07	1.22	1.43	1.18		.88		11.38
July 17	10.59		.87	.99	1.15						10.97
July 19	12.24	.81	.88	1.01		1.38					10.97
July 20	14.10					1.42					13.13
July 21	12.67	.78	.88		1.19	1.43					14.10
July 22	10.97	.84	.94	1.07	1.22	1.40	1.13			.80	10.97
July 24	10.97						1.19				10.97

TABLE 1.—*Solar radiation intensities during July 1941*—Continued

ALBUQUERQUE, N. MEX.—Continued

Date	Sun's zenith distance										
	7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e.	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
July 25	11.81			1.01	1.16	1.41		1.08	.95	.84	12.24
July 26	11.81					1.42					9.83
July 28	10.21	.81	.92	1.05	1.22	1.45	1.36	1.27			9.83
July 31	10.21	.83	.92	1.01	1.19				.91		10.21
Means		.82	.91	1.02	1.17	1.40	1.20	1.09	.92	.84	
MADISON, WIS.											
July 9	9.14	0.47	0.60	0.62							13.13
July 16	11.81	.73	.83								11.38
July 17	12.68	.49	.59								11.38
July 18	15.11		.74								13.13
July 19	12.24	.79	.84		1.19	1.46					9.47
July 21	11.38	.57	.59	.69	.84	1.06					10.59
July 24	17.37	.48	.58	.64	.81	.93					17.96
July 25	17.96	.35	.35	.60	.79	1.20					19.23
July 26	17.96		.38	.49	.64	.89					19.23
July 29	19.89	.47	.53	.66	.91	1.23					17.96
Means		.54	.60	.62	.86	1.13					
Departures		−.12	−.16	−.28	−.20	−.17					

[1] Extrapolated.

TABLE 2.—*Daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

	Washington	Madison	Lincoln	New York	Fresno	Albuquerque	Fairbanks	Newport	Ithaca	Cambridge	Friday Harbor	Riverside	New Orleans	La Jolla	State College
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
July 2	567	607	260	554	662	741		609	495	619	721	655	641	433	505
July 3	380	641	594	128	718	746		597	536	610	531	684	338	662	81
July 4	90	679	715	116	722	542		135	511	202	693	667	453	659	66
July 5	396	692	615	410	710	594		506	713		597	668		585	690
July 6	190	505	596	353	692	626		491	454		448	649	648	444	162
July 7	221	534	648	226	648	695		382	297		743	658	663	499	272
July 8	482	677	403	348	698			136	442	359	773	656	668	389	602
Mean	332	619	547	305	693	657	425	408	492	448	644	662	569	524	340
Departure	−179	+74	−40	−160	−3	−7	−40	−167	−33	−32	+56	+69	+149	−45	
July 9	731	590	693	693	672	552		563	706	533	773	582	549	564	809
July 10	584	374	452	634	689	620		713	708	682	748	569	336	648	742
July 11	314	372	746	429	695	588		647	361	632	733	599	520	674	434
July 12	573	606	405	236	715	665		170	415	186	754	652	323	686	463
July 13	110	652	398	449	734	666		385	670	532	720	666	591	703	560
July 14	346	642	478	590	729	724		531	680	668	688	661	676	664	725
July 15	646	331	729	634	734	709		588	595	602	676	672	582	582	649
Mean	472	510	557	524	710	646	516	514	591	548	727	629	511	646	626
Departure	−26	−35	−28	+67	+25	+6	+36	−13	+107	+42	+132	+55	+102	+28	
July 16	465	533	582	556	730			498	604	375	684	649	433	579	534
July 17	375	410	703	142	678	609		165	544	129	447	606	399	450	575
July 18	480	324	743	403	714			252	686	449	657	624	481	541	640
July 19	478	688	708	328	716			224	655	275	557	666	423	563	638
July 20	561	664	690	647	711			668	699	665	194	660	265	667	699
July 21	532	651	609	587	699			709	661	637	384	636	354	381	774
July 22	529	351	669	519	685			609	544	557	542	627	468	510	712
Mean	488	517	672	454	705	(609)	356	446	628	441	495	638	403	513	653
Departure	+6	−12	+100	+26	+25	−13	−70	−39	+118	−36	−129	+77	−16	−68	
July 23	282	595	690	481	678			583	513	462	716	471	591	474	475
July 24	477	623	627	359	717			440	641	405	538	382	625	180	622
July 25	603	615	653	472	681			587	636	573	636	491	587	144	640
July 26	567	563	530	613	659			581	667	580	694	581	320	392	699
July 27	618	491	226	629	660			602	653	540	674	562		605	651
July 28	534	550	660	186	698			250	317	186	605	648		668	501
July 29	416	604	386	446	647			578	581	602	679	648	651	661	399
Mean	499	577	539	455	677		243	517	572	478	649	540	555	446	570
Departure	+9	+63	−9	+36	+25		−172	+26	+128	+1	+47	+11	+145	−60	
ACCUMULATED DEPARTURE ON JULY 29, 1941															
	+1,806	+2,023	−6,314	+11,193	−2,128		−3,192	−1,729		−63	+3,934	−1,520	+7,112	−3,388	