SOLAR RADIATION DATA FOR JULY 1949

Explanation of tables 1 and 2 and references to descriptions of instruments, stations, and methods of observation, and to summaries of data, are given in the MONTHLY WEATHER REVIEW, vol. 72, No. 1, January 1944, p. 43. A list of pyrheliometric stations is given on page 45 of that issue. An explanation of the formula used in computing the air mass values for each station listed in table 1 appears in vol. 75, No. 3, March 1947, p. 47.

Beginning with this issue, daily totals and weekly mean values of solar energy impinging upon a vertical surface of a pyrheliometer mounted vertically facing north at Blue Hill, Mass., will be published regularly in table 4. Data for 2 months, June and July 1949, are included in this issue. This type of measurement includes some direct energy from the sun near sunrise and sunset between March 21 and September 21. During the other 6 months, only energy from the sky and some reflected energy from the ground is measured.

TABLE 1.—*Solar radiation intensities during July 1949*

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

Date	Sun's zenith distance									Vapor pressure	
	A. M.				0.0°	P. M.					
	78.7°	75.7°	70.7°	60.0°		60.0°	70.7°	75.7°	78.7°	7:30 a. m.[1]	1:30 p. m.[1]
MADISON, WIS.											
	Air mass										
	4.81	3.84	2.88	1.92	*0.96	1.92	2.88	3.84	4.81		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2	------	------	------	------	1.19	0.73	0.50	------	------	27.7	21.5
11	0.83	0.92	1.04	1.16	------	------	------	------	------	15.3	13.2
13	.47	.54	.68	.81	------	------	------	------	------	19.6	18.3
15	.61	.71	.83	.96	1.25	------	------	------	------	17.7	17.0
16	.50	.62	.75	.92	1.18	------	------	------	------	20.4	18.3
19	.76	.87	.98	1.14	1.31	------	------	------	------	17.0	16.5
22	.77	.88	.99	1.14	1.35	------	------	------	------	16.5	15.8
23	.73	.77	.95	1.10	1.27	------	------	------	------	14.8	17.7
25	.52	.61	.73	.94	1.15	------	------	------	------	25.9	26.8
27	.44	.55	.68	.91	1.16	------	------	------	------	26.8	26.8
28	------	------	------	.90	1.14	------	------	------	------	26.8	26.8
29	------	------	------	------	1.27	------	------	------	------	24.2	17.7
30	.68	.75	------	------	------	------	------	------	------	16.5	14.8
Means	.63	.72	.85	1.00	1.23	.73	.50	------	------	------	------
Departures	.00	−.02	−.01	−.04	−.05	−.25	−.36	------	------	------	------

TABLE 1.—*Solar radiation intensities during July 1949*—Con.

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

Date	Sun's zenith distance									Vapor pressure	
	A. M.				0.0°	P. M.					
	78.7°	75.7°	70.7°	60.0°		60.0°	70.7°	75.7°	78.7°	7:30 a. m.[1]	1:30. p. m.[1]
BLUE HILL, MASS.											
	Air mass										
	4.86	3.89	2.92	1.94	*0.97	1.94	2.92	3.89	4.86		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
3	------	------	------	0.37	------	------	------	------	------	23.6	21.0
5	------	------	------	.80	------	1.14	1.01	0.86	0.78	21.7	15.4
8	0.79	0.89	1.04	1.20	------	1.12	.98	.83	.73	13.9	10.4
14	------	.47	.67	------	------	------	------	------	------	23.6	21.5
21	------	------	------	------	1.42	1.11	.94	.85	------	23.1	14.7
23	.78	.91	1.02	1.18	1.44	1.15	1.00	.85	.78	15.2	14.4
24	------	------	------	1.25	1.43	------	.93	.79	.68	12.3	12.2
27	.48	.57	.70	.89	------	------	------	------	------	19.3	23.2
28	------	------	.61	.82	------	------	.62	.48	.38	26.3	24.4
29	.50	.61	.76	.93	------	.99	------	.67	.61	22.7	18.4
30	.47	.54	.63	------	------	------	------	------	------	25.7	24.4
Means	.60	.66	.78	.93	1.43	1.10	.91	.76	.66	------	------
Departures	−.04	−.06	−.09	−.11	+.14	+.08	+.07	+.05	+.03	------	------
LINCOLN, NEBR.											
	Air mass										
	4.77	3.81	2.86	1.91	*0.95	1.91	2.86	3.81	4.77		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2	------	------	------	------	1.18	------	------	------	------	25.9	25.9
25	------	------	------	------	1.19	0.97	0.77	0.60	0.48	25.9	25.7
30	------	------	------	------	1.26	1.08	------	------	------	15.3	14.2
Means	------	------	------	------	1.21	1.02	.77	.60	.48	------	------
Departures	------	------	------	------	−.12	−.04	−.11	−.15	−.18	------	------
TABLE MOUNTAIN, CALIF.											
	Air mass										
	3.76	3.01	2.26	1.51	*0.75	1.51	2.26	3.01	3.76		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
5	------	------	------	1.45	------	------	------	------	------	------	------
6	------	------	------	1.47	------	------	------	------	------	------	------
8	1.04	1.14	1.24	1.35	------	------	------	------	------	------	------
9	------	------	------	1.38	------	------	------	------	------	------	------
10	------	------	------	1.32	------	------	------	------	------	------	------
Means	1.04	1.14	1.24	1.39	------	------	------	------	------	------	------
Departures	−.06	−.05	−.05	−.01	------	------	------	------	------	------	------

[1] 75th Meridian Time.
*Extrapolated.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface during July 1949*

[Gram-calories per square centimeter]

Date	Honolulu, T. H.	Pearl Harbor, T. H.	La Jolla, Calif.	Riverside, Calif.	Nashville, Tenn.	Fresno, Calif.	Davis, Calif.	Washington, D. C.	Columbia, Mo.	Soda Springs, Calif.	Seabrook, N. J.	Grand Lake, Colo.	New York, N. Y.	Salt Lake City, Utah	State College, Pa.	Lincoln, Nebr.	Newport, R. I.	Put-in-Bay, Ohio	East Wareham, Mass.	Blue Hill, Mass.	Boston, Mass.	Lynn, Mass.	Twin Falls, Idaho	East Lansing, Mich.	Madison, Wis.	Toronto, Canada	Summit, Mont.	Fairbanks, Alaska
1949																												
July 2	587	674	386	593	668	659	713	497	687	812	555	615	499	282	633	710	692	640	682	707	670	667	456	498	694	489	782	479
July 3	719	584	557	632	591	783	725	632	549	(821)	672	580	614	221	740	689	594	666	568	606	558	601	689	494	666	662	746	449
July 4	653	562	599	671	610	782	755	689	605	840	705	553	534	314	597	635	642	687	591	597	510	500	417	464	617	240	657	91
July 5	626	559	592	589	687	793	722	569	332	842	575	630	655	431	481	668	672	625	560	745	681	696	615	451	374	376	480	427
July 6	690	652	589	607	652	810	703	594	------	837	------	616	343	460	336	541	530	364	580	617	561	515	719	236	377	211	650	541
July 7	616	599	459	665	447	795	731	121	538	804	------	336	579	432	197	637	652	522	623	775	739	713	726	164	190	705	524	698
July 8	570	466	292	643	656	765	661	486	418	(714)	------	661	572	486	674	526	776	565	723	765	705	723	727	381	290	706	774	724
Means	637	585	496	629	616	770	716	513	521	810	------	570	542	375	523	630	637	581	618	687	632	631	621	384	458	484	659	487
Departures	−1	−3	−69	+5	+100	+62	−2	−4	−92	+8	------	−42	+29	−123	+13	+37	+66	−10	+62	+114	+76	------	+11	−114	−94	−1	+19	+22
July 9	739	689	329	645	507	761	704	645	458	795	------	678	679	362	511	552	749	504	690	730	650	661	460	227	562	139	771	685
July 10	778	636	412	623	375	769	708	281	744	(788)	------	396	147	659	466	761	364	733	325	248	201	215	597	628	798	730	628	578
July 11	688	649	332	581	538	761	689	434	514	(799)	------	578	492	712	659	438	617	665	622	662	498	519	630	542	577	618	672	537
July 12	687	692	616	571	303	737	688	196	237	799	77	501	218	630	143	598	372	639	505	580	490	445	667	240	663	378	607	678
July 13	654	448	534	632	237	745	671	244	629	669	209	566	259	629	548	340	421	695	266	230	205	266	688	524	482	599	642	291
July 14	579	654	610	607	527	752	679	316	653	746	582	574	594	694	681	433	517	357	410	655	531	594	695	162	460	258	753	540
July 15	578	458	617	611	513	747	699	386	218	790	500	592	216	688	521	666	410	687	388	243	264	278	485	586	725	672	631	601
Means	672	604	493	610	428	753	691	357	493	770	------	555	372	625	504	542	493	611	458	478	406	425	603	415	610	485	672	559
Departures	+2	−10	−89	+6	−61	+53	−3	−138	−93	−17	------	−25	−105	+57	−36	−46	−27	+79	−46	−35	−52	------	−13	−23	+61	+12	+42	+58
July 16	644	616	479	588	306	751	632	378	427	795	337	653	220	635	502	714	402	581	428	424	489	481	709	542	540	620	436	372
July 17	774	715	550	589	272	743	700	268	445	793	283	728	122	686	111	639	189	284	150	232	210	198	730	494	684	225	598	581
July 18	699	640	527	600	546	747	691	550	590	808	555	590	445	473	414	703	574	615	448	498	371	364	357	427	481	233	589	------
July 19	662	628	572	599	512	771	693	485	655	814	421	534	485	611	580	719	471	626	480	526	536	513	706	533	729	440	569	------
July 20	749	711	603	614	527	762	677	560	368	796	569	583	547	701	581	523	573	476	536	466	482	515	723	346	318	403	259	236
July 21	621	618	631	622	569	740	667	459	712	791	472	697	414	716	452	631	507	373	486	684	698	651	690	192	134	638	628	453
July 22	738	712	630	623	720	732	672	639	604	782	578	698	492	696	383	539	362	520	302	398	394	347	698	546	740	510	535	437
Means	698	663	570	605	493	750	676	477	543	797	459	640	389	645	432	638	440	496	404	461	454	438	659	440	518	438	516	416
Departures	+16	+38	+27	+21	−24	+63	−11	−9	−45	+14	------	+29	−68	+8	−46	+62	−42	−35	−68	−29	+24	------	+40	−13	−18	−36	−21	−13
July 23	606	417	576	585	719	745	653	583	714	780	587	589	692	709	668	429	723	735	663	733	754	710	706	556	695	689	631	342
July 24	654	436	586	583	579	744	684	689	728	792	687	532	708	510	741	693	718	571	661	741	767	698	688	355	572	605	303	282
July 25	594	535	593	595	692	753	664	560	569	775	486	419	408	676	622	669	165	618	150	138	91	96	671	437	627	631	359	342
July 26	648	649	422	503	648	734	660	569	629	781	529	562	605	669	584	473	680	572	615	671	700	617	675	432	465	530	243	444
July 27	725	665	520	489	705	726	671	647	628	779	540	770	343	641	673	489	620	638	580	656	703	576	668	464	565	427	222	410
July 28	747	689	344	527	572	729	647	579	730	745	569	753	519	617	537	691	613	664	497	474	599	496	673	417	628	429	646	309
July 29	652	597	347	520	588	673	596	590	608	730	568	631	650	602	593	320	658	601	581	639	771	639	654	258	625	432	707	426
Means	661	570	484	543	643	731	654	602	658	769	566	608	561	632	631	538	597	629	535	579	626	547	676	417	597	535	444	365
Departures	+9	−8	−32	−15	+144	+60	−4	+104	+84	+12	------	+24	+108	+4	+124	−14	+98	+71	+63	+109	+169	------	+93	−52	+76	+60	−69	−38
ACCUMULATED DEPARTURES ON JULY 29, 1949																												
	+476	+371	−8,106	------	+3,738	+8,330	+1,204	−2,016	------	+917	------	------	------	−770	+6,202	−4,634	+5,740	+7,693	+3,280	+6,587	+7,707	------	+3,710	−1,722	+5,530	+742	+154	------

NOTE.—Values in parentheses are interpolated.

LATE SOLAR RADIATION DATA FOR JUNE 1949

TABLE 2.—*Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface during June 1949*

[Gram-calories per square centimeter]

EAST LANSING, MICH.

June 4	584	June 11	518	June 18	422	June 25	239
June 5	616	June 12	474	June 19	463	June 26	439
June 6	501	June 13	346	June 20	479	June 27	421
June 7	633	June 14	280	June 21	270	June 28	485
June 8	598	June 15	29	June 22	570	June 29	294
June 9	547	June 16	89	June 23	498	June 30	546
June 10	500	June 17	217	June 24	498	July 1	502
Means	569		279		457		418
Departures	+111		−131		−38		−65
Accumulated Departure on July 1, 1949							−308

TABLE 3.—*Daily totals and weekly means of solar and sky radiation plus the radiation reflected from the ground, as received on a vertical surface facing south at Blue Hill, Mass., during July 1949*

Date	2	3	4	5	6	7	8	*Mean*	9	10	11	12	13	14	15	*Mean*	16	17	18	19	20	21	22	*Mean*
Gm cal/cm²	238	236	225	244	230	257	238	*238*	238	95	251	241	99	264	105	*185*	191	106	222	227	196	251	170	*195*
Date	23	24	25	26	27	28	29	*Mean*																
Gm cal/cm²	255	260	52	279	265	201	266	*226*																

TABLE 4.—*Daily totals and weekly means of solar and sky radiation, plus the radiation reflected from the ground, as received on a vertical surface facing north at Blue Hill, Mass., during June 1949*

Date	4	5	6	7	8	9	10	*Mean*	11	12	13	14	15	16	17	*Mean*	18	19	20	21	22	23	24	*Mean*
Gm cal/cm²	155	145	172	157	193	162	168	*165*	163	150	162	179	167	159	176	*165*	158			162	133	174	174	*160*
Date	25	26	27	28	29	30	1	*Mean*																
Gm cal/cm²	134	147	116	150	164	169	146	*147*																

TABLE 4.—*Daily totals and weekly means of solar and sky radiation, plus the radiation reflected from the ground, as received on a vertical surface facing north at Blue Hill, Mass., during July 1949*

Date	2	3	4	5	6	7	8	*Mean*	9	10	11	12	13	14	15	*Mean*	16	17	18	19	20	21	22	*Mean*
Gm cal/cm²	164	160	134	142	134	158	159	*150*	148	86	145	149	94	144	103	*124*	141	95	132	146	102	127	136	*126*
Date	23	24	25	26	27	28	29	*Mean*																
Gm cal/cm²	134	133	51	144	122	125	126	*119*																

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