SOLAR RADIATION AND SUNSPOT DATA FOR JULY 1946

SOLAR RADIATION OBSERVATIONS

[Solar Radiation Investigations Section, I. F. HAND in Charge]

Explanations of the tables and references to descriptions of instruments, stations, and methods of observations and to summaries of data are given in the MONTHLY WEATHER REVIEW, volume 72, page 43, January 1944. A list of the pyrheliometric stations is given on page 45 of the same REVIEW.

Through the courtesy of Mr. Loyal B. Aldrich, Director of the Astrophysical Observatory, Smithsonian Institution, and Mr. Alfred F. Moore, Senior Director of Smithsonian field stations, values of solar radiation obtained at normal incidence at Table Mountain, Calif., will be included in Table 1, beginning with this issue. The coordinates of Table Mountain are: Latitude 34°22′ N., longitude 117°41′ W., elevation 7,500 feet, or 2,286 meters. Very few values will be obtained at this station at air masses larger than 2.0; however, owing to the exceptionally clear skies at Table Mountain, and to the large number of observations made at this station, these values should prove to be a valuable addition to those presently available.

Early in July 1946, an Eppley normal-incidence pyrheliometer and a Leeds and Northrup micromax potentiometer were installed at the Harvard University Coronagraph Station at Climax, Colo. Through the courtesy and cooperation of Dr. Donald H. Menzel and Dr. Walter Orr Roberts, the above Weather Bureau equipment will be kept in continuous operation, and the records will be reduced by the Weather Bureau Solar Radiation Investigations Section. The elevation of the Climax station is 11,520 feet, which is higher than that of any other station in this country where continuous records of this nature have been obtained. The latitude of the station is 39°22′ N., and the longitude, 106°11′ W.

TABLE 1.—*Solar radiation intensities during July 1946*

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

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									75th mer. time
		A. M.				*1.0	P. M.				
	e.	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e.
MADISON, WIS.											
	mb.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*
July 1	13.2	0.71	0.84	0.99	1.14	1.35					12.7
July 2	14.2	.74	.79	.96	1.02	1.26					12.7
July 6	19.0	.42	.50	.64	.84	1.05					17.7
July 8	23.4	.32	.43	.55	.74	1.04					21.8
July 9	17.7	.32	.38	.42	.68	.97					25.2
July 10	24.2	.33	.44	.59							27.7
July 11	19.6	.73	.83	.95							17.0
July 12	16.5	.69	.80	.92	1.11	1.32					15.8
July 13	17.7	.66	.74	.83	1.03	1.20					15.8
July 20	17.0	.74	.81	.95	1.11	1.33					16.5
July 22	15.3	.59	.71	.83	.94	1.29					15.3
July 26	11.4	.76	.87	.98	1.15	1.29					10.6
July 27	12.7	.44	.52	.66	.81	1.13					12.7
July 29	18.3	.33	.45	.58	.77	1.06					19.6
July 31	15.8	.42	.54	.66	.83	1.10					18.3
Means		.55	.64	.77	.94	1.18					
Departures		−.08	−.10	−.10	−.10	−.10					

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	75th mer. time	Air mass									75th mer. time
		A. M.				*1.0	P. M.				
	e.	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e.
LINCOLN, NEBR.											
July 9	23.4						0.92	0.75	0.62		25.0
July 11	14.6					1.25	1.14	.99			12.3
July 17	29.6					1.20	.92	.75	.62	0.50	28.6
July 22	20.4					1.31	1.03	.84			21.1
Means						1.25	1.00	.83	(.62)	(.50)	
Departures						−.08	−.06	−.05	−.13	−.16	
TABLE MOUNTAIN, CALIF.											
July 1					1.34						
July 2					1.34						
July 3						1.47					
July 4					1.39						
July 5					1.42						
July 6					1.33						
July 7					1.44						
July 8		1.11	1.20	1.30	1.42	1.55					
July 9					1.42						
July 10					1.27						
July 14					1.37						
July 15					1.37						
July 16					1.37						
July 25					1.30						
July 27					1.40						
July 29					1.22						
July 30					1.35						
July 31		1.09	1.18	1.28	1.39	1.52					
Means		(1.10)	(1.19)	(1.29)	1.36	1.51					
BLUE HILL, MASS.											
July 3	12.2				0.96		1.08	0.88			10.8
July 4	12.4				1.12						13.0
July 5	14.0	0.73	0.76	0.96	1.12		1.03	.80	0.70		14.2
July 7	22.1				.85			.81			16.4
July 13	14.7	.66	.80	.97	1.21	1.36	1.13				10.6
July 14	17.6	.57	.70	.83	1.05						17.3
July 15	11.4								.80	0.71	10.2
July 16	11.4	.91	1.01	1.13	1.27	1.48	1.21	1.08			9.7
July 17	9.4	.89	1.00	1.10	1.21	1.48	1.16	.96	.84		9.6
July 18	12.4	.76	.87	.95	1.09	1.41	1.02	.85			13.8
July 19	15.9				1.08	1.36					15.2
July 24	19.9					1.19		.60	.50	.39	22.8
July 26	12.8					1.41	1.11	.90	.80	.69	11.0
July 27	10.7				1.11			.80	.70	.55	13.0
July 28	13.5			1.00	1.19		1.05	.83	.75	.65	11.9
July 29	14.1	.63	.73	.85	.99	1.21	.71		.37	.31	15.0
Means		.74	.84	.97	1.10	1.36	1.06	.85	.68	.55	
Departures		+.11	+.12	+.10	+.06	+.08	+.05	+.02	−.01	−.08	
CLIMAX, COLO.											
July 15				1.14	1.25	1.40					
July 16				1.13	1.28	1.45					
July 17					1.26						
July 18					1.23						
July 20					1.28						
July 21				1.24	1.37	1.48	1.30	1.14	1.00	0.86	
July 22				1.22	1.32		1.26	1.07	.95	.84	
July 23					1.26	1.43					
July 24				1.14	1.28						
July 25					1.25	1.17	1.16		.94	.84	
July 26						1.43	1.14				
July 27					1.20						
July 28						1.46					
July 29					1.28	1.46					
July 30					1.28						
Means				1.17	1.27	1.41	1.22	(1.10)	.96	.84	

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

[Gram calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	East Lansing, Mich.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Newport, R. I.	State College, Pa.	Put-in-Bay, Ohio	Boulder, Colo.	Davis, Calif.	Tooele, Utah	New Orleans, La.	Toronto, Canada
1946	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
July 2	285	698	634	684	493	712	305	663	452	420	335	655	359	230	812	775	633	724	800	537	732
July 3	686	655	341	661	591	720	311	786	706	424	525	666	736	389	796	784	484	727	672	524	687
July 4	689	718	405	680	527	705	257	783	681	112	584	625	737	621	670	758	590	697	674	418	697
July 5	484	681	419	591	513	687	277	711	678	223	680	531	662	724	642	678	445	718	538	395	640
July 6	454	580	350	593	339	691	526	689	518	549	582	598	478	407	454	636	636	740	660	358	584
July 7	459	419	639	564	634	701	520	598	625	586	620	704	669	609	693	641	553	663	768	618	703
July 8	590	631	631	518	494	683	613	605	721	414	665	707	710	710	515	459	531	698	785	375	428
Means	521	626	488	613	513	700	401	691	626	390	570	641	621	527	654	676	553	709	700	461	639
Departures	+7	+75	−99	+104	+6	+5	−76	+77	+123	−109	+12	+31	+63	−29	+128	+84	−2	+4	−13	+33	------
July 9	210	495	739	458	283	696	645	560	172	474	643	696	184	221	496	654	785	725	810	279	700
July 10	607	564	454	471	318	665	611	710	265	572	647	614	335	318	415	603	743	710	806	603	653
July 11	514	505	785	445	48	670	593	656	299	524	548	616	408	475	570	473	526	738	284	296	455
July 12	259	723	729	621	114	673	602	786	502	585	578	625	538	330	475	741	430	736	680	505	617
July 13	728	697	740	647	636	692	574	761	645	621	677	637	721	752	732	706	324	762	710	416	666
July 14	636	153	734	357	559	712	517	604	632	530	660	692	657	706	600	586	522	622	732	262	422
July 15	361	609	146	670	184	697	523	615	515	480	676	670	506	246	610	676	554	706	792	------	718
Means	474	535	618	524	306	686	581	670	433	541	633	650	478	435	557	634	555	714	688	394	604
Departures	−26	−15	+29	+33	−178	−2	+89	+54	−47	+42	+33	+60	−33	−82	−9	+69	+20	+28	−4	−29	------
July 16	686	397	189	643	656	678	325	234	722	553	656	611	761	711	736	761	570	716	784	655	668
July 17	732	237	706	606	607	674	603	538	673	420	427	580	746	741	713	740	361	709	569	483	636
July 18	694	462	696	430	560	633	455	709	593	403	326	374	705	705	620	417	405	684	783	544	617
July 19	620	533	306	537	437	430	106	666	570	586	345	394	650	620	517	515	390	600	783	526	461
July 20	480	713	745	520	349	542	344	539	425	526	321	547	502	532	281	308	691	700	760	468	463
July 21	565	704	743	456	491	591	520	703	54	291	421	661	122	257	322	471	731	625	756	552	373
July 22	226	661	736	549	157	614	547	725	129	487	470	440	198	170	231	518	519	658	738	252	353
Means	572	530	589	534	465	595	414	588	452	467	424	515	526	533	488	533	524	670	739	497	510
Departures	+86	−4	+15	+41	−3	−82	−15	−5	+15	−38	−128	−57	+31	+41	−19	−19	+8	+1	+55	+71	------
July 23	350	406	586	579	45	576	581	717	297	638	387	402	321	431	462	670	490	659	557	473	567
July 24	653	202	389	348	280	532	479	683	552	611	231	229	598	514	545	500	453	635	489	568	242
July 25	368	647	588	420	247	499	323	563	371	466	377	610	348	132	524	318	544	156	740	618	549
July 26	736	686	560	632	630	715	455	556	528	596	633	660	568	593	715	699	516	621	620	556	671
July 27	692	533	657	619	643	722	500	298	477	515	636	659	515	599	597	670	368	662	750	571	628
July 28	618	622	619	559	576	722	213	377	580	509	485	440	682	690	649	641	612	649	749	566	602
July 29	700	571	654	497	515	744	394	663	540	385	585	618	618	644	571	639	610	661	553	460	450
Means	588	524	579	522	419	644	421	551	478	531	476	517	521	515	581	591	513	578	637	544	530
Departures	+98	+8	+29	+43	−24	−15	+10	−5	+48	+55	−30	−29	+65	+35	+103	+48	+7	−75	−10	+120	------
ACCUMULATED DEPARTURES ON JULY 29, 1946																					
	+1,113	+2,422	−1,197	+2,450	−6,895	+2,730	------	------	+1,785	−245	------	−1,631	+665	+385	+1,295	------	+3,045	+9,254	−2,408	------	------