SOLAR RADIATION AND SUNSPOT DATA FOR SEPTEMBER 1942

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

SOLAR RADIATION OBSERVATIONS

Explanations of the tables and references to descriptions of instruments, stations and methods of observation, and to summaries of data, are given in the January 1942 REVIEW, p. 20.

Beginning with this issue, total solar and sky radiation data from Davis, Calif., will appear regularly in table 2 through the courtesy of Professor F. J. Veihmeyer of the University of California Agricultural Experiment Station. Dr. Veihmeyer's radiation equipment consists of a 10-junction Eppley thermoelectric pyrheliometer 659, having a resistance of 35 ohms and generating approximately 1.5 millivolts per gram-calories per square centimeter.

The records are made on a Leeds & Northrup Model S Micromax integrating potentiometer 463899. This instrument has been modified so that full scale deflection represents two gram-calories.

The coordinates of the new station are as follows:

Latitude 38°32′ N., longitude 121°45′ W., the elevation above sea level 32.4 feet.

TABLE 1.—*Solar radiation intensities during September 1942*

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

Albuquerque, N. M.

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	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Sept. 1	9.47				1.20	1.41	1.22	1.06		0.86	10.21
Sept. 2	11.38	0.88	0.98	1.10	1.26	1.38	1.21	1.01	0.87	.76	11.38
Sept. 3	10.21	.80	.88	1.00	1.12						10.97
Sept. 5	9.14	.94	1.03	1.12	1.27	1.47					7.87
Sept. 6	8.48			1.03		1.47					7.87
Sept. 7	7.04	.86	.96	1.06	1.22	1.42	1.21	1.06	.94	.82	7.57
Sept. 8	7.04	.81	.92	1.02	1.18	1.42	1.26	1.07	.96	.83	8.18
Sept. 9	6.50					1.50	1.30	1.14	1.02	.93	8.48
Sept. 10	7.04	.81	.90	.99	1.18	1.45	1.18	1.05			9.47
Sept. 12	11.81					1.45					12.68
Sept. 13	11.38					1.45			.96	.96	10.59
Sept. 14	10.97	.87	.97								11.38
Sept. 15	9.47		1.03		1.29	1.53	1.33	1.21	1.09	.98	7.04
Sept. 16	7.57		1.01	1.14	1.30	1.52	1.26	1.08	.96	.88	7.04
Sept. 17	7.57		.92	1.06	1.22	1.42	1.21	1.02	.89	.82	6.76
Sept. 19	6.50						1.20	1.04	.91	.81	8.18
Sept. 20	6.50		.92	1.05	1.24	1.44	1.22	1.07	.94	.82	7.29
Sept. 21	8.81					1.42	1.22	1.11	.95	.84	9.14
Sept. 22	6.02			1.04		1.43	1.27	1.12	1.00	.88	7.87
Sept. 23	7.87						1.30	1.15	1.05	1.00	4.95
Sept. 24 [1]	6.27	.77	.88	1.02	1.19	1.45	1.14	1.00	.85	.74	6.76
Sept. 25	7.87		.98	1.13	1.29	1.49					4.37
Sept. 26	5.16				1.24	1.50	1.30	1.12	1.01	.90	4.17
Sept. 27	4.75		.99	1.13	1.28	1.51	1.31	1.14	.99	.86	4.95

[1] Light amount of dust in air.

TABLE 1.—*Solar radiation intensities during September 1942*—Continued

Albuquerque, N. M.—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	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Sept. 28	3.63				1.25	1.53	1.33	1.21	1.12	1.01	4.57
Sept. 29	4.17		1.13	1.16	1.35	1.57	1.36	1.23	1.12	1.03	3.99
Sept. 30	3.81	.98	1.07	1.19	1.35	1.62	1.38	1.24	1.14	1.04	3.81
Means		.86	.97	1.08	1.25	1.47	1.26	1.06	.94	.89	
Departures		−.01	−.01	−.01	−.01	−.01	−.01	−.03	−.04	−.02	

Madison, Wis.

Sept. 4	7.06		0.83	0.86	1.11	1.35					8.87
Sept. 11	13.26				.91	1.32					16.94
Sept. 12	13.26				1.22	1.47					8.87
Sept. 21	6.55	.79	.86	1.10	1.22	1.44					6.81
Sept. 28	3.48		1.01	1.15	1.25	1.56	1.15				3.99
Sept. 30	4.78		.59	.68	.96	1.17	0.92				7.34
Means		.79	.82	.95	1.11	1.38	1.04				
Departures		+.03	−.06	−.06	−.04	−.01	−.01				

Lincoln, Nebr.

Sept. 9	13.26						0.99	0.79	0.64	0.54	15.27
Sept. 10	16.94		0.77	0.92	1.10	1.40	1.14	.94	1.82	.71	17.53
Sept. 11	18.77						1.12	.90	.73	.58	18.77
Sept. 12	11.48					1.31	1.10	.92			7.92
Sept. 15	13.72				1.03						16.94
Sept. 16	15.27		.79	.92	1.12		1.08	.88	.75	.67	16.94
Sept. 21	6.55	0.77	.88	1.01							6.81
Sept. 27	4.37							1.14	1.03		4.78
Sept. 28	3.48			1.05	1.24		1.12	.96	.83	.70	4.57
Sept. 30	8.23	.60	.73	.88	1.08		1.14	.92	.77	.67	9.91
Means		(.68)	.79	.96	1.11	(1.36)	1.10	.93	.80	.64	
Departures		−.06	−.05	−.01	−.03	−.06	−.06	−.05	−.03	−.08	

Blue Hill, Mass.

Sept. 1	15.7	0.73	0.81	0.92	1.06		0.88	0.66	0.54	0.39	17.5
Sept. 2	16.9	.79	.88	.97	1.10			.63	.42	.33	18.8
Sept. 3	17.5		.51	.62	0.78						19.5
Sept. 5	12.6								.51	.37	13.1
Sept. 6	9.0	.99	1.06	1.16	1.28	1.36	1.19	.98			7.4
Sept. 7	12.2				1.17		1.18				13.1
Sept. 13	18.8							.81	.61	.49	15.2
Sept. 14	12.2								.60	.48	13.1
Sept. 15	16.9							.52	.40	.28	24.0
Sept. 16	22.3					.98	.83				21.6
Sept. 17	22.4	.59	.66	.73	.89		.83	.62	.47		21.6
Sept. 18	21.7								.50	.35	22.4
Sept. 22	9.7							.86	.74	.61	12.2
Sept. 23	9.7	.66	.74	.84	.99						12.2
Sept. 24	14.6	.62	.70	.83	1.01						12.2
Sept. 25	9.4			1.08			1.08	.83	.64	.48	7.4
Sept. 28	9.0				1.27			1.01	.82	.69	5.8
Sept. 29	5.6	1.08	1.13	1.18					.77	.61	5.7
Sept. 30	6.3	1.01	1.06	1.16	1.27	1.22	1.09	.82	.66	.44	6.3
Means		.81	.84	.95	1.08	1.19	1.01	.77	.59	.46	
Departures		+.01	−.06	−.06	−.05	−.17	−.11	−.14	−.16	−.17	

* Extrapolated

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

[Gram-calories per square centimeter]

Date	Washington	Madison	Lincoln	Chicago	New York	Fresno	Cambridge	Nashville	Twin Falls	New Orleans	Riverside	Blue Hill	Friday Harbor	Newport	State College	Put-in-Bay	San Juan u. v. below 3132 Å	Davis, Calif.	East Wareham
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*milli-cal.*		
September 3	491	282	316	210	480	563	298	260	577	609	463	353	469	453	381	66	------	------	445
September 3	441	540	219	490	165	565	84	368	560	584	577	93	293	254	173	572	272	------	177
September 5	440	499	300	362	515	561	474	335	566	388	536	466	280	525	569	515	344	------	520
September 6	367	337	188	228	559	556	570	385	543	455	561	571	446	575	513	415	272	598	561
September 7	81	59	224	128	400	551	519	362	432	452	547	474	443	540	89	350	358	596	504
September 8	287	88	139	113	160	559	134	347	541	463	552	114	483	162	119	221	428	559	223
September 9	455	124	478	151	44	535	66	345	453	433	546	73	138	45	322	388	17	359	87
Mean	366	276	266	240	332	556	307	343	524	484	540	306	365	365	309	361	308	422	359
Departure	−12	−96	−171	−117	−37	−6	+60	------	+18	+57	+62	−78	−43	−83	−107	------	------	------	------
September 10	285	477	520	402	214	558	200	368	540	249	460	212	357	284	365	307	262	596	248
September 11	407	473	495	446	211	544	56	379	391	339	518	70	460	101	197	318	155	596	79
September 12	262	517	468	345	191	536	204	361	471	613	521	108	311	125	345	301	273	593	175
September 13	354	311	149	400	535	536	496	374	480	380	533	499	312	496	580	489	477	575	447
September 14	487	488	450	475	509	538	452	350	502	377	507	458	104	505	480	460	292	569	486
September 15	450	306	434	412	384	526	370	110	519	96	511	375	391	374	289	282	363	564	375
September 16	439	397	492	405	405	508	418	141	528	25	528	375	127	266	466	458	170	546	223
Mean	383	424	430	412	350	535	314	298	490	297	511	299	295	307	389	374	301	577	290
Departure	+5	+78	+11	+16	−9	+8	−57	------	+15	−56	+62	−71	−72	−82	−27	------	------	------	------
September 17	230	413	200	258	399	505	409	24	424	380	427	397	477	392	288	424	64	546	363
September 18	308	114	65	408	81	492	473	295	519	442	468	369	408	341	186	341	299	568	360
September 19	415	84	486	57	205	484	243	399	514	423	492	217	------	239	356	236	------	566	294
September 20	321	511	515	527	119	503	56	120	506	474	517	33	------	63	316	489	------	541	92
September 21	501	456	407	494	454	476	85	436	500	516	519	72	420	112	560	460	469	519	103
September 22	490	364	313	384	467	460	431	372	491	604	497	440	414	416	445	282	417	517	280
September 23	375	145	247	136	365	459	391	415	486	574	489	400	359	422	300	458	153	499	429
Mean	377	298	318	323	299	483	284	295	491	488	487	276	416	283	363	345	278	537	274
Departure	+2	−51	−91	−26	−41	−4	−87	------	+56	+136	+16	−90	+81	−94	−46	------	------	------	------
September 24	434	121	209	340	287	455	394	334	484	------	477	398	349	398	324	330	------	462	414
September 25	467	285	22	116	475	461	445	362	425	------	445	455	335	462	437	320	441	477	447
September 26	110	93	189	68	152	463	372	18	456	48	469	369	271	344	221	136	413	483	364
September 27	94	377	468	260	56	466	172	300	462	495	446	148	79	239	66	231	244	499	315
September 28	477	465	449	342	501	387	362	413	292	575	479	402	75	452	410	488	421	500	406
September 29	486	309	424	355	457	459	407	388	313	496	427	451	99	470	441	460	409	328	480
September 30	415	393	423	381	252	457	351	390	440	486	458	444	130	463	455	380	301	487	465
Mean	355	292	312	266	312	450	358	315	410	420	457	381	191	404	336	336	371	461	413
Departure	+4	−6	−50	−19	−1	+1	+33	------	−31	+35	+5	+36	−97	+51	+30	------	------	------	------

ACCUMULATED DEPARTURES ON SEPTEMBER 30

	+1,638	−4,256	−7,651	+3,661	−2,723	+1,197	−5,390	------	+2,415	+9,576	+10,318	−10,402	−2,842	−4,760	−5,803	------	------	------	------

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR SEPTEMBER 1942

[Communicated by Capt. J. F. Hellweg, U. S. N. (Ret)., Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count, are included assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1942	*h m*									
Sept. 1	11 35	7479	0	273	+3	4	97	4	F	U. S. Naval.
		7479	+5	278	+7	5	24	2		
				(273)	(+7)	------	121	6		
Sept. 2	10 25	7482	−17	244	−7	22	97	7	G	Do.
		7481	+12	273	+12	13	24	6		
		7479	+15	276	+7	15	6	3		
				(261)	(+7)	------	127	16		
Sept. 3	10 53	7482	−4	243	−7	14	48	5	G	Do.
		7481	+28	275	+12	29	48	3		
		7479	+28	275	+7	28	6	2		
				(247)	(+7)	------	102	10		
Sept. 4	10 52	7482	+10	244	−7	17	48	9	VG	Do.
		7479	+38	272	+6	38	6	2		
		7481	+41	275	+12	41	48	8		
				(234)	(+7)	------	102	19		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR SEPTEMBER 1942—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1942	*h m*									
Sept. 5	11 12	7482	+23	244	−7	27	48	7	F	U. S. Naval.
		7481	+55	276	+13	55	24	2		
				(221)	(+7)	------	72	9		
Sept. 6	11 6	7483	−39	169	−5	41	12	1	G	Do.
		7482	+37	245	−7	40	194	15		
		7481	+68	276	+13	68	6	1		
				(208)	(+7)	------	212	17		
Sept. 7	9 56	7483	−25	170	−5	28	24	10	G	Mt. Wilson.
		7482	+50	245	−7	53	242	30		
				(195)	(+7)	------	266	40		
Sept. 8	12 54	7482	+64	244	−8	66	194	13	F	U. S. Naval.
				(180)	(+7)	------	194	13		
Sept. 9	10 33	7482	+77	245	−7	78	291	16	F	Do.
				(168)	(+7)		191	16		
Sept. 10	9 31	7483	+16	172	−7	21	18	5	VG	Mt. Wilson.
				(156)	(+7)		18	5		
Sept. 11	11 30	7483	+31	172	−7	36	24	7	G	Do.
				(141)	(+7)		24	7		