SOLAR RADIATION AND SUNSPOT DATA FOR OCTOBER 1947

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

Explanations of the tables and references to descriptions of instruments, stations, methods of observation, and summaries of data are given in the Monthly Weather Review, vol. 72, page 43, January 1944. A list of pyrheliometric stations is given on page 45 of the same Review. An explanation of the formula used in computing the air mass values for each station will be found in vol. 75, page 47, March 1947.

SOLAR RADIATION OBSERVATIONS

TABLE 1.—*Solar radiation intensities during October 1947*

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

MADISON, WIS.

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]
	Air mass										
	4.81	3.84	2.88	1.92	*0.96	1.92	2.88	3.84	4.81		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1		0.74	0.88	1.06	1.27					4.8	7.2
2				.71						9.4	10.6
6		.54	.75	.95						15.3	18.3
9	0.74	.87	1.03	1.18	1.46					7.8	9.8
10			.91	1.04	1.40					6.9	11.4
13	.73	.99	1.16	1.31	1.49					9.1	10.2
14	.55	.62	.75	.96	1.36					12.3	17.3
15	.48	.60	.71	.92	1.31					14.2	17.0
16	.58	.70	.81	.94	1.09					12.3	14.2
17	.35	.43	.55	.80						15.3	18.3
18	.36	.52	.66	.77	.98					15.8	16.5
20	.88	.96	1.06	1.16	1.36					7.8	9.1
21	.74	.84	.98	1.15	1.29					10.6	13.2
22	.70	.81	.95	1.13	1.40					13.2	14.2
Means	.61	.72	.86	1.01	1.31						
Departures	−.12	−.15	−.15	−.17	−.11						

LINCOLN, NEBR.

	Air mass										
	4.77	3.81	2.86	1.91	*0.95	1.91	2.86	3.81	4.77		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
4				1.18	1.36					10.6	9.1
7				1.06	1.18	0.99				14.6	16.9
10	0.30	0.49	0.62	.88	1.20					15.8	16.4
13	.62	.72	.88	1.03	1.30	1.10	0.92	0.79	0.71	9.8	13.2
16					1.28	1.17	1.06	.92	.82	15.3	14.2
17	.54	.64	.75	.88	1.27	1.08	.92	.79	.67	13.2	16.9
18	.85	.96	1.07	1.25	1.43	1.28				9.4	6.9
20	.84	.94	1.05	1.22	1.41	1.28	1.12	1.03	.94	9.8	11.4
21	.72	.85	.97	1.17	1.34	1.10	.92	.82	.73	10.6	11.0
25	.88	.94	1.07	1.20	1.40	1.18	.96			8.7	7.4
28	.83	.92	1.05	1.27	1.42	1.31	1.14	1.07	.98	7.8	8.4
29	.56	.64	.83	1.22	1.41	1.21	.98	.96	.77	5.3	9.4
Means	.68	.79	.92	1.12	1.33	1.17	1.00	.91	.80		
Departures	−.12	−.12	−.15	−.14	−.13	−.07	−.06	−.01	−.02		

* Extrapolated [1] Meridian time.

SOLAR RADIATION OBSERVATIONS—Continued

TABLE 1.—*Solar radiation intensities during October 1947*—Con.

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

CLIMAX, COLO.

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]
	Air mass										
	3.24	2.59	1.94	1.29	*0.65	1.29	1.94	2.59	3.24		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
3						1.42	1.29				
4			1.38	1.48		1.43	1.32				
6				1.46							
8			1.29	1.45		1.46	1.34				
9				1.46		1.46	1.32	1.24	1.16		
10			1.33	1.41							
13			1.33	1.49							
16			1.43	1.55		1.54	1.40	1.32	1.24		
18			1.45	1.55		1.52	1.38	1.28	1.20		
20		1.34	1.43	1.50		1.50	1.36	1.22	1.12		
24				1.48							
25								1.28			
26							1.44	1.34	1.23		
27				1.56		1.53			1.21		
28						1.53	1.40	1.30	1.20		
31						1.52	1.42	1.30	1.18		
Means		(1.34)	1.38	1.48		1.49	1.37	1.28	1.19		
Departures		.00	.00	+.08		+.02	+.03	+.03	+.03		

TABLE MOUNTAIN, CALIF.

	Air mass										
	3.76	3.01	2.26	1.51	*0.75	1.51	2.26	3.01	3.76		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1				1.45							
2				1.45							
3				1.36							
4				1.37							
8				1.46							
9				1.43							
11				1.45							
15				1.44							
16				1.43							
17				1.45							
18				1.44							
19				1.44							
21				1.53							
22				1.45							
25				1.45							
26				1.43							
27				1.42							
30	1.22	1.30	1.39	1.50							
31				1.46							
Means	(1.22)	(1.30)	(1.39)	1.44							
Departures	+.04	+.03	+.03	−.01							

SOLAR RADIATION OBSERVATIONS—Continued

TABLE 1.—*Solar radiation intensities during October 1947*—Con.

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

BLUE HILL, MASS.

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]
	Air mass										
	4.86	3.89	2.92	1.94	*0.97	1.94	2.92	3.89	4.86		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	1.04	1.14	1.21	1.38	------	------	------	------	------	4.4	4.5
3	------	------	1.13	------	------	1.18	1.01	0.87	0.75	8.3	10.1
4	.71	.80	.96	1.13	------	1.00	.76	.66	.52	11.3	10.8
5	------	------	------	------	------	1.04	.85	.71	.66	12.6	13.7
6	------	------	------	------	------	.94	.71	.60	.45	13.3	15.0
7	.61	.71	.83	1.00	------	.92	.78	.66	.57	13.7	15.0
10	.95	1.05	1.19	------	------	------	------	------	------	8.0	9.6
11	.81	.92	1.05	1.19	------	1.18	1.02	.84	.72	8.7	9.1
12	.83	.95	1.09	1.26	------	1.29	1.15	1.00	.89	11.1	9.8
14	.86	.99	1.16	1.25	------	1.31	1.15	1.05	.95	13.5	8.6
15	.83	.95	1.09	1.22	------	1.19	1.06	.95	.86	11.8	9.2
16	.79	.89	1.01	1.18	------	1.00	.79	.64	.52	10.7	12.8
17	.65	.77	.92	1.19	------	------	------	------	------	16.3	16.5
20	------	------	------	------	------	1.15	.94	.91	.78	15.6	10.6
21	.79	.90	1.03	1.24	------	1.32	1.14	1.00	.91	8.4	5.6
22	1.09	1.17	1.26	1.38	------	1.31	1.18	1.05	------	6.4	5.1
27	.46	.56	.71	------	------	1.03	.71	.56	.43	12.8	11.4
Means	.80	.91	1.05	1.22	------	1.13	.95	.82	.69	------	------
Departures	−.06	−.04	−.03	−.01	------	−.08	−.07	−.09	−.09	------	------

SOLAR RADIATION OBSERVATIONS—Continued

TABLE 1.—*Solar radiation intensities during October 1947*—Con.

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

BOSTON, MASS.

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]
	Air mass										
	4.96	3.96	2.97	1.98	*0.99	1.98	2.97	3.96	4.96		
October	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	------	------	------	1.14	------	------	------	------	------	4.8	5.1
10	------	------	------	.46	------	0.96	0.75	0.69	0.57	7.8	9.8
14	0.77	0.89	0.98	1.17	------	------	.91	------	------	14.2	11.4
15	.81	.90	.98	1.14	------	1.15	.98	.83	.72	12.3	12.7
16	------	------	------	------	------	.76	.58	.52	.37	11.8	13.7
17	.55	.68	.82	.99	------	1.00	.65	.58	.50	16.4	15.3
21	------	------	------	1.29	------	------	------	------	------	9.4	7.2
22	------	------	------	1.14	------	------	------	------	------	7.2	6.9
Means	.71	.82	.93	1.05	------	.97	.77	.46	.54	------	------
Departures	+.03	+.07	+.09	.00	------	−.13	−.09	−.23	−.04	------	------

Ratio, Boston/Blue Hill on Comparable Dates

	0.91	0.91	0.88	0.89	------	0.87	0.82	0.85	0.78	------	------

*Extrapolated. [1] Meridian time.

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.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Newport, R. I.	Salt Lake City, Utah	Put-in-Bay, Ohio	State College, Pa.	Davis, Calif.	Toronto, Canada	Boulder, Colo.	East Wareham, Mass.	Honolulu, Hawaii	Pearl Harbor, Hawaii
1947	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Oct. 1	500	423	294	462	496	75	279	438	444	377	442	389	495	498	410	383	440	392	390	368	450	538	575
Oct. 2	443	356	362	299	476	78	440	162	438	242	450	415	230	248	342	427	323	356	291	256	186	600	578
Oct. 3	379	233	186	404	474	------	466	321	423	377	335	430	404	460	404	331	369	434	284	360	311	542	518
Oct. 4	415	338	480	326	467	191	476	357	356	408	174	437	412	417	402	367	345	429	293	440	361	594	578
Oct. 5	444	393	440	351	368	155	470	346	347	122	320	439	364	428	407	406	328	282	322	429	383	484	498
Oct. 6	390	323	289	363	478	50	457	327	410	333	270	168	392	416	284	413	347	440	334	301	368	552	480
Oct. 7	347	264	414	349	308	143	369	321	364	354	410	450	392	437	282	406	367	61	307	338	395	571	548
Means	417	333	352	365	438	115	422	325	397	316	343	390	384	415	362	405	360	342	317	356	351	554	539
Departures	−88	+49	+21	+64	+12	0	+60	+56	+53	−42	−40	−1	+73	+112	------	+59	+80	−52	+45	+24	+52	------	------
Oct. 8	213	311	165	105	369	167	311	247	144	290	418	459	310	244	349	91	278	335	323	388	187	537	556
Oct. 9	131	401	363	279	274	75	385	365	101	352	394	441	394	413	377	367	175	87	367	391	404	575	505
Oct. 10	211	377	410	308	212	36	448	290	367	185	400	283	380	343	79	391	69	167	351	307	362	370	388
Oct. 11	194	312	275	368	309	133	418	335	221	258	169	231	401	415	121	306	337	467	322	130	370	557	448
Oct. 12	192	299	264	368	453	52	398	342	412	376	303	195	408	417	376	387	262	440	269	308	346	348	393
Oct. 13	329	382	417	154	412	146	388	217	344	319	118	234	330	298	274	244	287	416	220	389	294	252	244
Oct. 14	352	342	301	345	434	53	402	325	352	345	379	422	412	390	260	358	371	414	323	126	360	439	352
Means	232	346	314	275	352	95	393	303	277	304	312	324	377	360	262	306	254	332	311	291	33	440	412
Departures	−73	+88	+7	−12	−41	+5	+32	+57	−10	−36	−72	−54	+61	+46	------	+34	−6	−32	+77	−36	+44	------	------
Oct. 15	305	321	276	328	418	44	424	332	383	280	400	411	387	387	361	365	337	324	258	343	356	528	532
Oct. 16	92	311	414	271	233	------	318	285	211	108	331	243	368	331	283	351	138	203	232	368	321	579	545
Oct. 17	161	242	384	213	430	------	265	306	368	349	377	350	369	192	311	308	182	434	213	393	234	545	471
Oct. 18	160	244	417	146	427	------	385	224	378	349	199	406	252	260	343	101	188	416	137	371	236	561	526
Oct. 19	303	349	413	77	420	------	398	179	360	333	186	414	156	122	378	315	80	392	182	395	148	504	404
Oct. 20	401	331	414	346	386	------	416	279	108	325	76	394	341	320	366	382	395	284	306	355	277	512	505
Oct. 21	370	319	391	317	418	95	370	310	222	300	350	379	375	342	96	362	354	302	282	327	337	514	413
Means	256	302	387	242	390	------	368	273	290	292	274	371	321	279	305	312	239	336	230	364	273	535	485
Departures	−28	+69	+92	−23	+25	------	+42	+47	−6	−16	−62	+23	+37	−4	------	+65	+9	−8	+17	+43	+18	------	------
Oct. 22	326	313	347	252	393	99	301	318	381	337	361	419	388	370	141	342	297	326	234	51	327	540	504
Oct. 23	357	213	74	263	346	44	242	254	284	270	354	344	312	288	197	326	312	297	297	163	264	397	365
Oct. 24	292	147	117	317	393	23	155	269	268	331	352	376	340	296	335	325	385	380	316	134	234	410	467
Oct. 25	282	60	374	248	370	73	53	274	279	330	337	387	336	271	329	149	276	351	201	279	245	161	219
Oct. 26	319	86	131	219	368	103	32	173	184	315	352	380	250	291	371	201	223	351	184	353	252	352	320
Oct. 27	356	28	183	220	297	8	199	244	390	264	316	375	302	274	316	278	320	270	194	341	258	429	379
Oct. 28	100	248	386	170	130	23	143	239	83	155	284	316	274	283	253	175	108	91	120	328	308	482	441
Means	290	156	230	241	328	53	161	253	267	286	336	371	314	296	277	257	274	295	221	235	270	396	385
Departures	+32	−55	−46	+15	−16	−5	−112	+59	+27	+10	+24	+43	+95	+68	------	+31	+67	−26	+32	−58	+64	------	------

ACCUMULATED DEPARTURES ON OCTOBER 28, 1947

+6,251	+1,981	−392	−5,418	+7,910	------	------	+882	+791	−812	−6,447	+8,127	+994	−3,108	------	------	−5,726	+2,520	−1,736	−203	------	------	------