SOLAR RADIATION AND SUNSPOT DATA FOR DECEMBER 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 December 1947*

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

CLIMAX, COLO.

Date	Sun's zenith distance, A. M. 78.7°	75.7°	70.7°	60.0°	0.0°	P. M. 60.0°	70.7°	75.7°	78.7°	Vapor pressure 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		
December	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
5			1.47	1.60		1.60	1.46	1.36	1.29		
6			1.36								
8			1.48								
9							1.48				
10			1.49	1.54		1.55	1.42	1.36	1.28		
12			1.47	1.52							
13									1.24		
14		1.34	1.47								
19			1.40	1.51		1.52	1.36	1.28	1.18		
20			1.43								
23	1.08	1.23	1.39	1.60		1.58	1.47	1.34	1.37		
26							1.45	1.32			
27	1.30	1.39	1.47	1.61		1.62	1.44	1.33	1.24		
28		1.40	1.50	1.62		1.62	1.51	1.40	1.33		
29	1.23	1.36	1.46								
31	1.24	1.39	1.47								
Means	1.21	1.35	1.45	1.57		1.58	1.45	1.34	1.28		
Departures	−.13	−.13	−.11			−.03	−.03	−.01			

LINCOLN, NEBR.

	Air mass 4.77	3.81	2.86	1.91	*0.95	1.91	2.86	3.81	4.77		
December	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
5							1.14	1.01	0.92	3.5	4.4
8		1.00	1.13							2.9	2.9
10							1.11	.96	.89	4.0	3.8
11	0.77	.87	1.04				1.11	.98	.85	1.4	3.7
12	.77	.87	1.09				1.18	1.04	.98	1.7	4.4
13	.77	.96	1.11				1.18	1.05	.96	2.1	3.7
15	.92	1.04	1.18				1.27	1.15	1.04	2.6	2.9
20	.92	1.00	1.13				1.16	1.01	.92	4.2	6.1
27	.79	.94	1.11							4.8	6.1
Means	.82	.95	1.11				1.16	1.03	.95		
Departures	.00	−.01	.00				.00	.00	.00		

TABLE MOUNTAIN, CALIF.

	Air mass 3.76	3.01	2.26	1.51	*0.75	1.51	2.26	3.01	3.76		
December	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
6				1.50							
7				1.55							
9				1.54							
13				1.53							
21				1.45							
23				1.51							
24				1.48							
25				1.57							
26				1.51							
27	1.21	1.30	1.41	1.53							
31				1.53							
Means	(1.21)	(1.30)	(1.41)	1.52							
Departures	−.01	−.02	−.01	−.01							

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

BLUE HILL, MASS.

Date	Sun's zenith distance, A. M. 78.7°	75.7°	70.7°	60.0°	0.0°	P. M. 60.0°	70.7°	75.7°	78.7°	Vapor pressure 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		
December	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	1.02	1.11	1.23				1.21	1.08	0.98	2.8	2.5
6							1.21	1.11	1.03	3.0	2.6
7	.93									4.1	3.5
10	1.02	1.08	1.21							2.6	3.0
11							1.21	1.10	.99	4.6	4.6
12	1.00									3.0	2.6
13							1.25	1.15	1.04	3.0	2.2
14								1.01	.90	1.4	1.8
17	.95	1.04								3.0	2.7
19							1.30	1.17	1.06	1.4	.9
20	1.03	1.14	1.24					.94	.76	1.7	2.1
22	.88	.99	1.11				1.13	1.02	.87	2.6	2.4
24							1.10	1.03	.95	3.6	3.2
25	1.01	1.11	1.22				1.24	1.11	1.00	1.7	2.4
29	.95	1.09	1.22				1.30	1.21	1.12	1.7	1.7
30	1.09	1.19	1.29				1.24	1.14		1.2	1.8
Means	.99	1.09	1.22				1.22	1.09	.97		
Departures	+.09	+.05	+.05				+.07	+.05	.00		

BOSTON, MASS.

	Air mass 4.96	3.96	2.97	1.98	*0.99	1.98	2.97	3.96	4.96		
December	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
4			1.03			1.12				6.7	1.7
10		0.91								2.9	4.4
17	0.81	.93	1.10			1.31		0.89	0.76	3.0	2.6
19							1.16		.97	1.1	1.2
20	.76	.88	.99			1.19				1.8	3.0
22	.68	.78	.91			1.25		.83	.72	2.6	2.5
24	.51	.70								4.0	3.3
29	.82	.94	1.16			1.49	1.22	.98	.89	1.8	1.8
30	.97	1.08								1.1	1.9
Means	.76	.89	1.04			1.27	(1.19)	.90	.84		
Departures	+.03	+.03	+.02			.00	+.24	+.04	+.06		

RATIO, BOSTON/BLUE HILL ON COMPARABLE DATES

	0.83	0.84	0.86				(0.92)	0.80	0.84		

*Extrapolated.
[1] 75th meridian time.

LATE DATA FOR MADISON, WIS.

	Air mass 4.81	3.84	2.88	1.92	*0.96	1.92	2.88	3.84	4.81		
November	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
13	0.71	0.88	1.08		1.45					2.0	2.6
Means	(0.71)	(0.88)	(1.08)		(1.45)						
Departures	−.16	−.01	−.06		−.07						

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.	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	Ithaca, N. Y.	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.*
Dec. 3	198	27	142	137	T*	4	121	72	170	223	197	158	201	113	17	180	222	5	39	1	161	265	214
Dec. 4	144	25	214	260	2	190	175	189	120	68	76	213	201	136	84	185	165	149	139	204	212	319	336
Dec. 5	46	241	17	154	2	138	8	232	27	166	162	31	14	183	24	3	258	7	7	226	29	394	344
Dec. 6	81	46	204	260	T	66	174	189	113	184	180	210	168	78	40	51	208	43	40	194	202	397	390
Dec. 7	65	125	68	257	1	169	153	61	65	283	250	204	196	131	15	29	213	12	50	141	211	434	403
Dec. 8	41	225	30	269	5	262	6	58	86	225	257	22	25	31	30	87	193	39	16	179	20	415	376
Dec. 9	215	42	226	211	3	155	151	161	61	274	306	173	162	11	118	91	215	191	89	170	135	450	371
Means	113	104	129	221	2	140	113	138	92	203	204	145	138	98	47	90	211	64	54	159	138	382	348
Departures	−46	−67	+4	+39	−4	−6	+8	+14	−29	−35	−18	+9	0	−24	−61	−31	+34	−24	−44	−34	+1	------	------
Dec. 10	52	166	152	117	6	67	152	28	168	265	308	204	195	148	31	74	208	40	44	220	201	372	363
Dec. 11	126	264	170	229	3	41	126	17	184	262	269	181	189	140	52	48	219	132	62	165	152	378	348
Dec. 12	173	265	193	248	3	31	158	117	197	285	276	197	191	223	51	152	161	176	114	207	196	233	271
Dec. 13	75	261	129	254	2	254	182	167	178	253	289	201	178	182	201	107	216	74	71	201	184	354	366
Dec. 14	177	161	143	206	1	269	159	231	182	214	225	205	221	47	191	167	198	47	115	193	216	316	403
Dec. 15	59	242	60	216	4	76	108	15	126	186	201	164	168	178	41	69	184	117	107	224	150	391	408
Dec. 16	211	190	108	218	8	242	112	165	166	258	269	140	158	204	44	105	120	106	41	217	153	444	379
Means	125	221	136	213	4	140	142	106	171	246	261	185	186	160	87	103	186	99	79	204	179	355	363
Departures	−16	+59	+18	+46	0	−11	+26	−22	+43	+10	+49	+13	+35	−33	−19	−10	+18	+4	−35	+12	+20	------	------
Dec. 17	211	227	161	72	T	253	170	244	40	182	192	195	213	58	59	161	58	92	102	129	205	429	301
Dec. 18	219	190	131	151	1	232	101	235	165	272	268	113	113	43	62	35	58	163	112	104	105	265	316
Dec. 19	157	175	141	86	3	228	168	180	165	270	235	200	209	130	148	160	86	172	110	207	199	425	393
Dec. 20	215	238	189	43	2	198	157	193	62	254	274	201	212	30	168	196	80	104	161	163	220	380	328
Dec. 21	174	129	102	226	3	127	124	84	157	190	240	147	126	158	65	27	165	47	40	40	122	404	384
Dec. 22	190	26	174	198	1	87	156	175	170	180	274	211	216	156	90	130	128	20	100	48	203	446	421
Dec. 23	80	221	20	70	4	178	7	186	199	281	276	32	60	165	80	63	107	100	28	202	24	349	328
Means	178	172	131	121	2	186	126	185	137	233	251	157	164	106	96	110	97	100	93	128	154	386	353
Departures	+28	+2	+19	−23	−3	+28	+13	+30	+21	+9	+37	+19	+25	−24	−21	−19	−8	+4	−7	−54	−9	------	------
Dec. 24	242	197	210	38	12	165	168	64	172	235	273	218	208	138	133	212	102	111	115	96	154	468	418
Dec. 25	160	206	150	77	3	214	164	173	167	274	266	227	226	132	56	205	50	123	178	191	222	312	319
Dec. 26	157	185	5	53	4	215	6	153	171	270	277	28	24	139	77	61	73	14	40	------	20	430	366
Dec. 27	132	222	130	72	1	244	36	245	174	264	274	65	85	131	135	76	46	46	53	192	73	434	412
Dec. 28	235	218	189	116	T	253	92	229	37	251	274	107	151	102	114	77	75	180	58	216	109	336	392
Dec. 29	221	151	216	178	T	245	206	226	92	142	175	233	242	172	198	186	258	159	136	166	216	422	354
Dec. 30	158	102	164	251	T	143	200	41	51	269	306	226	201	196	26	153	259	16	138	71	215	423	408
Dec. 31	163	57	48	210	7	1	96	96	186	264	298	118	98	94	10	2	118	14	35	215	112	------	------
Means (8-day)	184	167	139	124	3	189	121	154	131	252	268	153	154	138	94	122	122	83	94	164	140	404	381
Departures	+39	+8	+18	−16	−2	+45	+15	+69	+2	+28	+60	+27	+21	−4	+12	+27	−2	0	−4	−19	+5	------	------

ACCUMULATED DEPARTURES ON DECEMBER 31, 1947

	+5,397	−1,883	−5,677	+8,001	------	------	+1,603	+1,309	−1,470	−7,567	+9,093	+1,533	−3,129	------	------	−6,020	+3,920	−1,680	------	−1,757	------	------	------

PERCENTAGE DEPARTURES FOR THE YEAR[1]

	+4.4	−1.4	−3.5	+4.9	------	------	+1.5	+1.1	−1.0	−5.0	+6.0	+1.4	−2.5	------	------	−5.2	+2.4	−1.6	------	−1.3	------	------	------

*Trace, less than 0.6.

[1] Percentage departure for the year for Madison, Wis. (not listed) was +1.2.