SOLAR RADIATION DATA FOR DECEMBER 1948

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

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 pyreheliometric 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.

TABLE 1.—*Solar radiation intensities during December 1948*

[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]
CLIMAX, COLO.											
	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.*
2							1.43	1.32	1.24		
9	1.24	1.32	1.44				1.40	1.31	1.23		
12		1.37	1.46								
13							1.46	1.38	1.26		
14	1.29	1.36	1.46				1.42	1.34	1.26		
15								1.26	1.20		
29		1.40	1.48				1.42	1.26	1.20		
30							1.41	1.32	1.28		
Means	(1.26)	1.36	1.46				1.42	1.31	1.24		
Departures	+.03	+.02	+.02				−.01	.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.*
1				1.52							
2	1.21	1.29	1.39	1.51							
10				1.55							
24	1.29	1.38	1.47	1.59							
25				1.59							
28				1.56							
Means	(1.25)	(1.34)	(1.43)	1.55							
Departures	+.01	+.01	.00	+.02							
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.*
1	0.70	0.81	0.98							4.8	5.6
2	.89	1.02	1.18				1.18	1.07	0.96	4.0	6.1
3	.88	.99	1.14				1.20	1.06	.94	5.1	6.4
4	.88	.99	1.12				1.14	.99	.90	5.6	6.9
7	.83	.98	1.11				1.13	1.00	.87	2.9	3.7
9	.92	1.02	1.18				1.18	1.02	.92	3.3	1.9
29	.98	1.09	1.24				1.29	1.18	1.06	2.6	2.6
30	.89	1.04	1.18				1.13	.92		1.2	2.9
Means	.87	.99	1.14				1.18	1.03	.94		
Departures	−.07	−.09	−.07				−.01	−.02	.00		

TABLE 1.—*Solar radiation intensities during December 1948*—Con.

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]
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.*
2	0.80	0.92								4.4	4.2
7		.88	.82							4.4	3.7
13		.81	.98							8.4	4.2
14	.91		1.12							4.8	3.3
17	.41	.66								6.4	6.4
20		.70								3.7	3.5
21	.75	.79								3.0	3.7
23	.62									4.4	4.2
Means	.70	.79	.97								
Departures	−.02	−.05	−.02								
MADISON, WIS.											
	Air mass										
	4.81	3.84	2.88	1.92	*0.96	1.92	2.88	3.84	4.81		
December	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2	0.50	0.64	0.81		1.22		0.76			4.0	5.3
3	.64	.76	.91		1.47		.95			4.6	6.1
7	.98	1.02	1.19		1.60		1.21			2.9	2.9
9	.84	.98	1.03							2.0	2.2
13	.32		.57							4.0	5.1
16	.88	1.03	1.15		1.46		1.11			4.2	3.3
17	.92	1.03	1.14							2.5	2.3
21	.92									5.6	5.3
22	.99	1.03	1.16		1.52					1.7	2.5
23	.88	1.01	1.15		1.53					1.5	2.0
30	1.04	1.11	1.22		1.57		1.25			1.8	2.7
Means	.81	.96	1.03		1.48		1.06				
Departures	−.09	−.06	−.14		−.03		−.13				
BLUE HILL, MASS.											
	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.*
2	1.05	1.14	1.22							4.2	4.0
7	.85	.91								3.8	4.1
11	.98	1.12	1.24							3.1	2.7
13	.80	.91	1.00				1.16	1.05	0.96	7.9	4.3
14	1.02	1.12	1.24				1.23	1.09	.98	4.4	2.7
18	.96	1.07	1.18				1.24	1.06	.90	3.1	2.6
20	.95	1.05	1.13							3.1	3.0
21	.84	.91	.92							2.6	3.6
22	.69	.85	1.05				1.01	.91		4.4	5.1
23	.87	.93	1.07				1.14			4.0	4.5
24	.91	1.07	1.22				1.29	1.14	1.04	2.2	1.4
26	.97	1.08	1.31				1.34	1.21	1.10	1.0	1.1
28							.79	.61	.50	2.1	4.0
Means	.91	1.01	1.14				1.15	1.01	.91		
Departures	+.01	−.03	−.03				.00	−.03	−.05		

* Extrapolated.
[1] 75th Meridian Time.
Note.—Figures in parenthesis are interpolated.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct + diffuse) received on a horizontal surface during December, 1948*

[Gram-calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	New York, N. Y.	Fresno, Calif.	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.	E. Wareham, Mass.	Honolulu, T. H.	Pearl Harbor, T. H.	East Lansing, Mich.	Summit, Mont.	Soda Springs, Calif.	Grand Lake, Colo.	Inyokern, Calif.
1948	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
December 3	42	195	235	27	89	204	50	68	74	199	257	80	58	58	186	47	250	121	62	76	446	446	126	70	67	277	264
December 4	205	188	230	79	270	229	63	262	204	260	292	84	54	145	207	225	218	122	107	60	482	415	131	91	191	164	322
December 5	176	75	119	193	86	57	140	22	73	268	258	160	197	----	29	152	20	61	97	185	471	439	8	77	17	170	308
December 6	187	188	132	54	161	119	1	278	134	155	271	9	31	148	178	202	72	29	34	37	508	445	66	88	262	178	300
December 7	197	203	236	140	193	254	144	214	67	254	269	196	159	102	170	207	43	130	104	178	483	381	118	77	56	189	300
December 8	179	113	72	156	48	87	112	301	203	257	236	132	149	212	145	192	165	84	45	139	419	396	56	98	253	130	301
December 9	140	146	255	115	197	84	99	257	161	252	276	123	130	209	206	201	128	155	42	126	276	322	90	66	202	200	305
Means	161	158	183	109	149	148	87	194	131	235	266	112	111	146	160	175	128	100	70	114	441	406	85	81	150	187	300
Departures	+1	+41	+11	−15	−32	+5	−7	+60	+9	−3	+42	−22	−24	−6	+45	+47	−42	+13	−25	−19	+9	+26	0	+4	−16	----	----
December 10	171	133	181	173	48	250	92	265	132	246	261	101	124	176	89	86	217	133	71	85	393	300	23	49	240	116	303
December 11	181	146	131	131	160	190	129	200	99	171	181	156	162	53	114	154	175	66	68	141	442	462	110	101	150	74	238
December 12	33	188	185	34	238	230	36	67	50	176	256	55	39	128	39	65	47	19	14	64	462	419	20	45	(25)	230	217
December 13	202	154	156	191	221	235	156	32	101	183	118	197	208	70	42	204	73	58	98	179	486	314	16	141	(32)	258	251
December 14	173	67	22	205	177	28	166	49	142	194	261	220	219	59	141	218	189	111	107	199	476	327	69	86	66	229	278
December 15	5	35	39	22	188	155	58	45	201	260	290	86	59	156	14	12	71	12	10	73	508	432	1	72	213	116	274
December 16	22	183	217	13	114	264	6	30	188	66	128	27	45	235	139	19	34	81	16	43	494	439	118	90	35	165	295
Means	112	129	133	110	164	193	92	98	130	185	214	120	122	125	83	108	115	61	55	112	466	385	51	83	109	170	265
Departures	−28	+11	−28	−8	−3	+43	−33	−26	+2	−47	+2	−21	−26	−3	−20	−4	−45	−13	−54	−40	+19	+5	−43	−2	−35	----	----
December 17	210	170	134	158	106	256	113	173	160	145	119	146	164	72	56	78	93	81	19	115	458	408	82	106	----	83	177
December 18	144	62	50	210	50	30	148	30	210	258	276	197	209	180	76	100	246	99	60	197	447	410	33	72	----	102	309
December 19	22	70	152	22	46	69	3	24	124	275	287	31	26	138	112	55	229	23	23	28	373	293	102	54	----	83	310
December 20	105	67	129	106	36	205	124	254	115	190	202	181	192	48	74	139	33	41	87	----	382	310	610	71	177	57	308
December 21	164	128	174	55	50	260	72	224	202	161	148	133	128	134	200	148	233	9	27	121	387	240	91	69	154	47	203
December 22	156	209	163	176	125	188	154	174	178	50	69	186	186	136	85	210	107	89	98	172	461	356	63	146	(256)	70	197
December 23	87	192	40	192	268	22	160	127	82	259	160	192	199	116	179	132	258	163	70	193	390	397	122	142	242	72	317
Means	127	128	120	132	98	147	111	144	153	191	180	152	158	118	111	123	171	72	55	138	414	345	79	94	207	73	260
Departures	−22	+5	−49	+19	−44	−28	0	−9	+36	−31	−32	+13	+17	−14	−5	−5	+56	−2	−42	−21	−14	−13	−24	−2	+30	----	----
December 24	103	186	60	225	251	58	185	19	211	267	267	221	225	324	93	172	159	99	73	205	276	241	92	140	268	177	305
December 25	63	226	216	66	246	255	107	196	208	158	280	129	123	253	228	167	24	185	89	99	498	448	164	145	156	270	287
December 26	242	209	182	233	55	266	188	264	142	208	179	231	230	258	206	243	10	149	83	208	421	377	160	168	29	266	266
December 27	230	58	198	179	147	140	108	236	121	290	145	151	163	32	134	198	112	80	36	118	496	400	20	165	174	251	287
December 28	200	26	49	150	259	11	96	43	170	272	292	132	171	12	127	194	162	43	40	145	430	354	57	88	276	131	305
December 29	15	106	251	29	94	11	27	135	150	237	262	52	64	159	63	14	65	2	16	83	385	264	3	(35)	234	280	276
December 30	7	219	248	18	25	255	30	19	210	131	131	39	49	206	15	22	162	23	T	64	395	317	139	118	210	207	165
December 31	107	172	246	31	108	63	10	224	173	136	159	13	18	98	248	53	37	54	20	36	452	459	184	51	137	180	241
Means	121	150	181	117	148	132	94	141	173	213	214	121	130	168	139	133	104	91	51	120	419	358	102	114	185	220	266
Departures	−23	+34	+21	−4	+8	+5	−5	+48	+42	−10	+6	−5	−3	+28	+48	+33	−17	+8	−43	−12	+15	0	+26	+24	+27	----	----
ACCUMULATED DEPARTURES ON DECEMBER 31, 1948	−7784	+7931	+5964	−7063	+12761	{---}	−4816	{---}	{---}	−6888	{---}	−6496	−616	−476	{---}	−1904	−3080	+1750	−26621	−2734	{---}	{---}	−1575	{---}	----	----	----
PERCENTAGE DEPARTURES FOR THE YEAR	−6.3	+6.6	+4.5	−6.3	+7.8	----	−4.6	----	----	−4.6	----	−5.3	−0.5	−0.3	----	−1.7	−1.9	+1.7	−24.8	−2.3	----	----	−1.5	----	----	----	----

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 December 1948*

Date	3	4	5	6	7	8	9	Mean	10	11	12	13	14	15	16	Mean
Gm cal/cm²	45	56	285	7	458	258	175	183	118	295	56	481	519	109	10	227

Date	17	18	19	20	21	22	23	Mean	24	25	26	27	28	29	30	31	Mean
Gm cal/cm²	267	487	13	402	228	455	480	333	603	134	657	258	251	32	21	6	245

LATE REPORTS OF SOLAR RADIATION

TWIN FALLS, IDAHO

Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface

[Gram calories per square centimeter]

Oct. 29	190
Oct. 30	289
Oct. 31	145
Nov. 1	84
Nov. 2	277
Nov. 3	189
Nov. 4	295
Mean	210
Nov. 5	247
Nov. 6	81
Nov. 7	209
Mean (Nov. 5-11)	200

Note.—The Weather Bureau receives frequent inquiries about sunspot data formerly published in the MONTHLY WEATHER REVIEW. Therefore, the following note is reprinted for the information of readers who may have overlooked the original notice in the December 1947 issue of the REVIEW:

Publication of "Positions, Areas, and Counts of Sunspots" in the MONTHLY WEATHER REVIEW will be *discontinued* with the December 1947 issue. The data will be issued thereafter through publications of the U. S. Naval Observatory at various times, depending on the sunspot activity. Current data will be distributed monthly to a limited number of persons on request addressed to Superintendent, U. S. Naval Observatory, Washington 25, D. C.

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