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SPECIAL OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING OCTOBER, 1920.

By HERBERT H. KIMBALL, Meteorologist.

[Solar Radiation Investigations Section, Washington, Nov. 30, 1920.]

For a description of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this Review for April, 1920, **48**:225.

The monthly means and departures from normal in Table 1 indicate that solar radiation intensities were close to normal values at all stations except Washington, D. C., where they were decidedly below normal, due to the haze that prevailed during the second, third, and fourth weeks. Noon intensities of 1.57 calories per minute per square centimeter, measured at Santa Fe on the 15th and 28th, equal the maximum noon readings previously obtained at that station in October.

For the month as a whole there was an excess in the total radiation received on a horizontal surface at all three stations.

Skylight polarization measurements obtained on 10 different days at Washington give a mean of 56 per cent and a maximum of 64 per cent on the 6th. Measurements obtained at Madison on 12 days give a mean of 63 per cent, and a maximum of 76 per cent on the 29th. These are only slightly below average values for October for the respective stations.

TABLE 1.—*Solar radiation intensities during October, 1920.*

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

WASHINGTON, D. C.

Date.	Sun's zenith distance.										
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon.
	75th meridian 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.*
Oct. 1	6.50	0.71	0.75	0.87	.....	.....	.....	.....	.....	.....	5.79
2	5.79	0.80	0.90	1.05	1.26	.....	.....	0.93	0.76	0.61	5.36
4	8.18	.....	.....	.....	.....	.....	1.13	.....	.....	.....	10.21
5	8.18	.....	.....	.....	0.65	.....	.....	.....	.....	.....	7.29
6	5.56	0.90	1.02	1.15	1.31	.....	.....	.....	.....	.....	4.95
7	6.02	0.86	0.97	1.10	1.25	1.45	1.24	1.09	0.93	0.83	5.36
11	8.81	.....	.....	0.61	0.85	.....	0.89	0.63	0.51	0.39	7.57
12	10.97	.....	.....	.....	0.97	.....	0.84	0.64	0.51	.....	8.18
14	9.83	.....	.....	0.47	0.73	.....	0.91	.....	.....	.....	9.83
15	9.83	.....	.....	0.54	.....	.....	.....	.....	.....	.....	10.59
20	10.59	0.28	0.37	0.51	0.70	.....	0.64	0.41	.....	.....	12.68
21	10.59	.....	.....	0.39	0.57	.....	0.55	0.39	0.25	0.16	14.60
22	12.24	.....	.....	0.55	0.78	.....	0.82	0.63	0.45	.....	11.81
23	9.47	.....	.....	.....	.....	.....	1.14	0.94	0.74	0.63	7.57
26	14.60	.....	.....	.....	1.12	.....	.....	.....	.....	.....	12.24
29	3.63	0.87	0.99	1.10	1.24	1.40	.....	.....	.....	.....	4.57
Means	.....	0.74	0.83	0.76	0.95	(1.42)	0.91	0.71	0.59	0.52	.....
Departures	.....	−0.01	+0.02	−0.13	−0.14	.....	−0.17	−0.17	−0.15	−0.13	.....

TABLE 1.—*Solar radiation intensities during October, 1920*—Continued

MADISON, WIS.

Date.	Sun's zenith distance.										
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon.
	75th meridian 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.
Oct. 1	4.37	.....	.....	1.16	1.35	.....	1.23	1.06	.....	.....	4.37
2	3.81	.....	.....	.....	1.27	.....	.....	.....	.....	.....	5.36
3	7.04	.....	.....	1.12	.....	.....	.....	.....	.....	.....	5.56
4	5.56	.....	1.02	1.14	1.30	1.50	1.27	.....	.....	.....	5.36
5	6.76	.....	.....	.....	0.98	.....	.....	1.02	0.92	.....	5.79
6	7.87	.....	.....	.....	.....	1.42	1.22	.....	0.90	.....	6.50
7	5.56	.....	.....	.....	1.16	1.36	.....	.....	.....	.....	6.76
8	7.04	.....	.....	.....	1.10	.....	.....	.....	.....	.....	7.87
11	9.14	.....	.....	.....	.....	.....	0.88	0.70	0.54	.....	10.97
12	9.47	.....	.....	.....	1.08	.....	1.07	.....	.....	.....	10.59
16	10.59	.....	.....	.....	.....	.....	1.24	.....	.....	.....	9.83
20	12.24	.....	.....	.....	0.99	1.15	.....	.....	.....	.....	14.10
21	13.13	.....	.....	.....	0.83	.....	.....	.....	.....	.....	15.11
29	2.87	.....	.....	1.22	1.34	.....	.....	1.07	.....	.....	2.49
Means	.....	.....	(1.02)	1.16	1.14	1.36	1.15	0.96	0.79	.....	.....
Departures	.....	.....	+0.13	+0.11	−0.02	.....	−0.02	−0.05	−0.10	.....	.....

LINCOLN, NEBR.

Oct. 1	4.57	.....	1.00	1.11	1.31	1.51	1.26	1.10	0.93	0.84	3.99
2	2.67	.....	.....	.....	.....	1.29	1.09	0.91	0.76	0.63	6.50
4	6.76	.....	.....	0.94	1.19	.....	1.22	1.06	0.90	0.83	8.49
5	6.76	0.80	0.90	1.04	1.24	1.45	1.26	1.10	0.95	0.82	7.57
6	6.50	.....	0.63	0.77	0.91	.....	.....	.....	.....	.....	7.29
11	9.47	.....	.....	1.07	1.26	.....	.....	.....	.....	.....	10.59
12	6.50	0.94	1.05	1.16	1.30	.....	1.28	1.11	0.97	0.87	6.27
16	6.50	.....	.....	1.16	1.31	.....	.....	1.06	0.95	0.85	9.14
27	3.15	.....	.....	1.26	1.40	.....	.....	.....	.....	.....	3.63
28	3.45	.....	.....	.....	1.43	1.61	1.44	1.27	1.11	0.98	2.49
29	2.62	.....	1.04	1.18	1.33	1.50	.....	.....	.....	.....	4.57
Means	.....	(0.87)	0.92	1.08	1.27	1.47	1.26	1.09	0.94	0.83	.....
Departures	.....	−0.04	−0.06	−0.04	−0.02	.....	+0.01	+0.01	−0.01	−0.02	.....

SANTA FE, N. MEX.

Oct. 2	5.56	1.03	1.12	1.28	.....	.....	.....	.....	.....	.....	4.37
4	4.57	0.99	1.06	1.18	.....	.....	.....	.....	.....	.....	3.81
5	6.50	0.98	1.08	1.19	.....	.....	.....	.....	.....	.....	3.81
8	4.57	1.06	1.17	1.29	.....	1.64	1.42	1.28	1.17	1.06	4.57
15	4.17	.....	.....	.....	1.49	.....	.....	.....	.....	.....	2.36
21	3.45	.....	.....	.....	.....	.....	1.44	1.24	.....	.....	1.12
22	2.87	.....	.....	.....	1.45	1.60	.....	.....	.....	.....	2.49
26	3.30	.....	.....	.....	.....	.....	1.40	.....	.....	.....	3.45
27	3.81	.....	.....	.....	.....	.....	.....	1.34	1.24	.....	3.45
28	2.74	.....	.....	.....	.....	1.65	1.48	.....	.....	.....	3.25
Means	.....	1.02	1.11	1.24	(1.47)	1.63	1.44	1.29	(1.20)	(1.06)	.....
Departures	.....	−0.06	−0.04	+0.01	+0.09	.....	+0.04	+0.05	+0.09	+0.18	.....

* Extrapolated.

TABLE 2.—*Solar and sky radiation received on a horizontal surface.*

[Gram-calories per square centimeter.]

Week beginning—	Average daily radiation.			Average daily departure for the week.			Excess or deficiency since first of year.		
	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Oct. 1	386	387	423	+60	+109	+67	− 53	+2,133	.....
8	355	278	318	+52	+ 28	− 6	+309	+2,329	.....
15	275	195	241	− 8	− 29	−51	+250	+2,127	.....
22	258	156	343	− 8	− 48	+85	+191	+1,794	.....

MEASUREMENTS OF THE SOLAR CONSTANT OF RADIATION AT CALAMA, CHILE, SEPTEMBER, 1920.

By C. G. ABBOT, Assistant Secretary.

[Smithsonian Institution, Washington, Dec. 3, 1920.]

NOTE.—The above report having been delayed in transmission, will be included in the next (November) issue of the REVIEW.—*Editor.*