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SOLAR OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING DECEMBER, 1921.

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[Solar Radiation Investigations, Weather Bureau, Washington, January 27, 1922.]

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.

Table 1 indicates that solar radiation intensities averaged slightly above the December normal at Madison, Wis., and Santa Fe, N. Mex., and very close to normal at Washington, D. C., and Lincoln, Nebr. At the first two named stations there were few days on which measurements could be obtained, however.

Table 2 shows that the total radiation received on a horizontal surface was below the normal for December at both Washington and Madison, the deficiency at each station being more marked during the first half than during the second half of the month.

For the year 1921, the last two columns of Table 2 show that at Washington the accumulated excess of radiation was 1.4 per cent of the annual normal, and at Madison the accumulated deficiency was 3.7 per cent. Practically all this latter was accumulated before the end of April, however.

Skylight polarization measurements made on four days at Washington give a mean of 55 per cent and a maximum of 65 per cent on the 28th. These are slightly below the average December values for Washington. At Madison snow covered the ground during most of the month. A measurement made on the 10th, when the ground was free from snow, gave a percentage of polarization of 72, or about the average for December for that station.

TABLE 1.—Solar radiation intensities during December, 1921.

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

Washington, D. C.

Date.	Sun's zenith distance.										Local mean solar time.	
	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.										
		A. M.					P. M.					
e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.		
Dec. 1.....	mm. 5.56	cal. 0.68	cal. 0.78	cal. 0.89	cal. 1.17	cal. 1.59	cal. 1.92	cal. 2.27	cal. 2.62	cal. 2.97	mm. 5.36	
3.....	4.57	0.66	0.87	1.09	1.19	1.59	1.92	2.27	2.62	2.97	3.45	
6.....	2.82	0.84	0.94	1.32	1.32	1.32	1.32	1.32	1.32	1.32	3.00	
7.....	2.74	0.59	0.59	1.22	1.22	1.22	1.22	1.22	1.22	1.22	3.15	
10.....	3.63	0.66	0.86	1.04	1.14	1.14	1.14	1.14	1.14	1.14	4.95	
15.....	2.16	0.85	1.04	1.27	1.27	1.27	1.27	1.27	1.27	1.27	2.62	
17.....	4.95	0.91	0.91	1.27	1.27	1.27	1.27	1.27	1.27	1.27	6.02	
20.....	3.63	0.72	0.72	1.27	1.27	1.27	1.27	1.27	1.27	1.27	3.99	
22.....	0.96	1.05	1.16	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.19	
27.....	3.45	0.88	1.02	1.27	1.27	1.27	1.27	1.27	1.27	1.27	3.99	
28.....	2.49	1.01	1.13	1.23	1.23	1.23	1.23	1.23	1.23	1.23	2.74	
Means.....	0.85	0.87	1.00	1.23	1.23	1.23	1.23	1.23	1.23	1.23	2.74	
Departures.....	+0.08	-0.01	-0.04	+0.01	.....	.....	.....	.....	.....	.....	.....

Madison, Wis.

Dec. 10.....	3.99	0.88	1.09	.....	.....	.....	.....	.....	.....	.....	4.17
27.....	0.74	1.06	1.20	1.32	.....	1.59	.....	.....	.....	.....	1.37
29.....	1.24	1.11	1.21	1.33	.....	1.59	.....	.....	.....	.....	1.37
Means.....	1.65	1.17	(1.32)	.....	.....	.....	.....	.....	.....	.....	.....
Departures.....	+0.10	+0.03	+0.10	.....	.....	.....	.....	.....	.....	.....	.....

* Extrapolated.

TABLE 1.—Solar radiation intensities during December, 1921—Con.

Lincoln, Nebr.

Date.	Sun's zenith distance.										Local mean solar time.	
	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.										
		A. M.					P. M.					
e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.		
Dec. 5.....	mm. 3.81	cal. 1.22	cal. 1.06	cal. 1.06	cal. 1.06	cal. 1.06	cal. 1.25	cal. 1.12	cal. 1.04	mm. 3.81		
6.....	2.57	0.84	1.06	1.06	1.06	1.06	1.21	1.07	0.95	3.45		
8.....	2.36	1.07	1.27	1.27	1.27	1.27	1.21	1.07	0.95	4.75		
9.....	3.30	0.97	1.10	1.20	1.20	1.20	1.20	1.20	1.20	2.16		
16.....	3.99	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	4.57		
13.....	4.75	1.19	1.04	0.90	0.90	0.90	1.19	1.04	0.90	4.17		
17.....	2.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	2.06		
19.....	2.26	0.99	0.71	0.62	0.62	0.62	0.99	0.71	0.62	3.63		
24.....	0.40	1.12	1.26	1.26	1.26	1.26	1.23	1.14	1.00	0.91		
25.....	3.45	1.19	1.02	0.99	0.99	0.99	1.19	1.02	0.99	3.63		
Means.....	(0.97)	1.03	1.23	.....	.....	.....	1.23	1.05	0.99	.....	
Departures.....	+0.06	-0.02	+0.01	.....	.....	.....	-0.01	-0.04	-0.05	.....	

Santa Fe, N. Mex.

Dec. 12.....	2.62	1.36	1.61	1.61	1.61	1.61	1.43	1.21	1.00	3.15
13.....	3.81	1.24	1.35	1.48	1.61	1.61	1.43	1.21	1.00	3.63
17.....	1.45	1.25	1.35	1.46	1.55	1.65	1.43	1.21	1.00	1.96
Means.....	(1.25)	(1.30)	1.39	(1.52)	.....	.....	(1.43)	(1.21)	.....	.....
Departures.....	+0.09	+0.04	+0.03	+0.02	.....	.....	+0.12	±0.00	.....	.....

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

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.
Dec. 3.....	cal. 142	cal. 118	cal. 118	cal. -15	cal. -5	cal. -5	cal. +1826	cal. -4326	cal. -4326
10.....	137	84	84	-16	-41	-41	+1714	-4611	-4611
17.....	161	124	124	+8	-4	-4	+1772	-4642	-4642
24*.....	152	162	162	-3	+31	+31	+1750	-4427	-4427

* For eight days.

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

By C. G. ABBOT, Assistant Secretary.

[Smithsonian Institution, Washington, Jan. 25, 1922.]

In continuation of preceding publications, in the following table are given the results for the solar constant of radiation obtained at Montezuma, near Calama, Chile, in August, September, October, November, and for the first half of December, 1921. The values for the remainder of December will be given with the January values when they shall have been received.

From now on, we give ρ/p_{sc} at air mass 2. The reader is referred for further statements regarding the arrangement and meaning of the table to the REVIEW for February, August and September, 1919.

For an account of the circumstances surrounding the recent delay in the publication of these data, see pp. 651-652 of this REVIEW.