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## SOLAR OBSERVATIONS

## SOLAR AND SKY RADIATION MEASUREMENTS DURING OCTOBER, 1924

By HERBERT H. KIMBALL, In Charge, Solar Radiation Investigations

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January and February, 1924, 53:42 and 113.

From Table 1 it is seen that solar radiation intensities on a horizontal surface averaged above normal at Washington, D. C., and Madison, Wis., and close to normal at Lincoln, Nebr. At Washington a radiation intensity of 1.51 gram-calories per minute per square centimeter of normal surface, measured at noon on October 13,

exceeds any radiation intensity heretofore measured at that station in October, and equals the previous maximum intensity for the year, which was measured on April 5, 1918.

Table 2 shows that the total solar and sky radiation received on a horizontal surface averaged above normal at the three stations for which normals have been determined.

Sky light polarization measurements made on nine days at Washington give a mean of 62 per cent, with a maximum of 68 per cent on the 2d. Measurements obtained on nine days at Madison give a mean of 62 per cent, with a maximum of 66 per cent on the 22d. The values for Washington are above and those for Madison are below the averages for October for the respective stations.

TABLE 1.—Solar radiation intensities during October, 1924

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

Date	Sun's zenith distance										Local mean solar time
	Air mass										
	A. M.					P. M.					
	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		
8 a.m.											Noon
75th mer. time											
e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.	
<b>Washington, D. C.</b>											
Oct. 1	4.75	0.87	1.01	1.33	1.50	1.28	1.11	0.95	0.84	5.36	
2	6.76	0.96	1.01	1.00	1.18	1.43	1.23	1.05	0.91	6.76	
3	7.57	0.96	1.01	1.14	1.25	1.08	1.08	0.91	0.81	7.04	
8	9.14	0.92	1.01	1.16	1.31	1.49	1.31	1.07	0.98	6.50	
9	5.36	0.92	1.01	1.16	1.31	1.49	1.27	1.03	0.93	5.56	
10	6.02	0.91	1.12	1.24	1.37	1.55	1.42	1.03	0.93	5.56	
13	4.95	0.98	1.08	1.21	1.37	1.60	1.48	1.03	0.93	3.30	
14	6.02	0.81	0.98	1.03	1.19	1.42	1.48	1.03	0.93	4.95	
21	3.45	0.94	1.04	1.18	1.33	1.48	1.48	1.03	0.93	3.30	
22	3.81	0.91	1.00	1.17	1.34	1.48	1.48	1.03	0.93	3.30	
23	4.17	0.98	1.14	1.32	1.54	1.32	0.97	0.86	0.75	3.45	
24	4.57	0.76	0.91	1.09	1.09	1.09	1.09	0.86	0.75	4.95	
Means	0.92	0.99	1.12	1.28	1.50	1.25	1.05	0.93	0.82		
Departures	+0.14	+0.14	+0.18	+0.17	+0.04	+0.14	+0.13	+0.14	+0.12		
<b>Madison, Wis.</b>											
Oct. 1	4.57			0.93	1.14	1.38	1.07			7.04	
2	78.7			1.04	1.04	1.14	1.14			9.33	
17	7.57			1.07	1.07	1.14	1.14			9.14	
21	4.57	1.03	1.11	1.22	1.33	1.47	1.33			4.37	
22	4.57	1.05	1.18	1.33	1.53	1.33	1.05			4.37	
23	3.46			1.18	1.18	1.18	1.18			4.37	
27	3.99			1.23	1.18	1.18	1.18			3.81	
31	6.27			1.32	1.30	1.30	1.15			6.02	
Means	(1.03)	(1.08)	1.11	1.20	1.22	(1.10)					
Departures	+0.31	+0.16	+0.05	+0.02	+0.04	+0.08					

\* Extrapolated

TABLE 1.—Solar radiation intensities during October, 1924—Contd.

Date	Sun's zenith distance										Local mean solar time
	Air mass										
	A. M.					P. M.					
	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		
8 a.m.											Noon
75th mer. time											
e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	e.	
<b>Lincoln, Nebr.</b>											
Oct. 1	0.27	0.87	1.00	1.14	1.31	1.51				6.76	
2	6.76	0.99	1.07	1.29	1.29	0.91				6.76	
9	8.18					1.52	1.28	1.15	1.01	6.02	
13	4.37	0.95	1.03	1.15	1.32	1.52	1.28	1.15	1.01	4.57	
16	8.81		0.54	0.69	0.99		0.99			9.83	
23	2.62		1.00	1.12	1.30		1.26	1.09	0.94	3.45	
24	3.30	0.83	0.95	1.08	1.20	1.35				3.68	
31	3.45	0.79	0.91	1.28	1.39		1.12	0.95		3.00	
Means	0.86	0.92	1.08	1.26		1.11	1.12	0.97	0.86		
Departures	-0.04	-0.04	-0.03	-0.02		-0.14	+0.04	+0.03	+0.03		

TABLE 2.—Solar and sky radiation received on a horizontal surface. [Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation					Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Washington	Madison	Lincoln
Oct. 1	389	352	342	277	327	+61	+68	-11
8	415	267	306	251	357	+107	+12	-17
15	328	225	287	205	301	+41	-5	-5
22	276	266	321	208	266	+12	+60	+59
Excess or deficiency since first of year on Oct. 28, 1924						+1,301	-7,038	+2,850

551.506 (261.1) WEATHER OF NORTH AMERICA AND ADJACENT OCEANS  
NORTH ATLANTIC OCEAN

By F. A. YOUNG

The following table shows the average sea-level pressure at a number of land stations on the coast and islands of the North Atlantic. The readings are for 8 a. m., 75th meridian time, and the departures are only approximate, as the normals were taken from the Pilot Chart and are based on Greenwich mean noon observations, which correspond to those taken at 7 a. m., 75th meridian time.

Station	Average pressure	Departure
	Inches	Inches
St. Johns, Newfoundland.....	29.82	-0.12
Nantucket.....	30.13	+0.11
Hatteras.....	30.17	+0.14
Key West.....	29.91	-0.07
New Orleans.....	30.10	+0.09
Swan Island.....	29.73	-0.18
Turks Island.....	29.95	0.00
Bermuda.....	30.08	+0.06
Horta, Azores.....	30.12	+0.01
Lerwick, Shetland Islands.....	29.78	0.00
Valencia, Ireland.....	29.82	-0.09
London.....	29.92	+0.02

It will be noticed from above table that while the departures were not especially large, they varied considerably. The unusually low pressure in the Caribbean Sea was due to the number of tropical disturbances that prevailed during the month. The barometric readings at Horta ranged from 29.64 inches on the 26th to 30.38 inches on the 1st, and at Lerwick from 29.14 inches on the 6th to 30.42 inches on the 14th.

Taking the ocean as a whole, the month was one of the stormiest Octobers on record. Tropical disturbances, described elsewhere in the REVIEW, were unusually frequent, one of them being exceptionally severe. In northern waters the number of days with winds of gale force was considerably in excess of the normal for the current month, and over the middle and eastern sections of the steamer lanes was fully equal to and in some localities greater than the normal for January, which is considered the most tempestuous month of the year.

The number of days in which fog was reported was considerably less than the normal over the Grand Banks and slightly above over the greater part of the steamer lanes and off the European coast; it was recorded on from 2 to 4 days along the American coast, north of the 35th parallel, and on 2 days in the Gulf of Mexico.

On the 1st the Icelandic Low was unusually well developed, with a barometric reading of 28.50 inches at Seydisfjord, and moderate to strong gales over the region between the 35th meridian and the European coast. On the 2d there was a disturbance of limited extent near 30° N., 55° W., that traveled slowly northward, and on the 4th was central near 42° N., 50° W.; it then curved sharply eastward and on the 6th was about 5° north of the Azores. Four storm logs relating to this disturbance, covering the period from the 2d to 6th, will be found in Table 1.

On the 6th there was also a deep depression central about 10° west of the north coast of Scotland, with strong northerly gales in the western quadrants, as shown by storm log in table.

From the 8th to 10th a disturbance of limited extent moved slowly eastward over the northern steamer lanes,