

SECTION I.—AEROLOGY.

SOLAR AND SKY RADIATION MEASURED AT WASHINGTON, D. C., DURING SEPTEMBER, 1915.

By HERBERT H. KIMBALL, Professor of Meteorology.

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In Table 1 are summarized the measurements of the intensity of direct solar radiation made by the Weather Bureau at the American University,<sup>1</sup> Washington, D. C., during September, 1915. The 8th to the 20th, inclusive, was a period of few clouds, with many days of continuous sunshine, but low radiation intensity. During the last decade the radiation intensities were above the normal. A noon reading of 1.45 calories, obtained on the 22d, is higher than any noon reading previously obtained at Washington in September. On the morning of the 27th, with the sun at zenith distance 66.5° to 48.3°, inclusive, the radiation intensities were higher than the corresponding intensities on the 22d, but clouds prevented the measurement of the intensity at noon. The monthly means are lower than the 5-year means published in the Bulletin of the Mount Weather Observatory, 1912, 5: 182.

TABLE 1.—Solar radiation intensities at Washington, D. C., during September, 1915.

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

Date.	Sun's zenith distance.										
	0.0°	48.3°	60.0°	66.5°	70.7°	73.6°	75.7°	77.4°	78.7°	79.8°	80.7°
	Air mass.										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
<b>A. M.</b>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>
September 8.....	0.84	0.63									
9.....	1.18	1.02				0.43	0.39	0.35			
10.....	1.06	0.91	0.75								
13.....	1.18	0.94	0.80	0.71	0.63	0.55	0.48	0.43	0.38	0.34	
14.....	1.24	1.11	0.98	0.87	0.77	0.69	0.62	0.56	0.50	0.44	
16.....	1.37										
17.....		0.98	0.87	0.73	0.64			0.48	0.45	0.42	0.39
20.....			0.87	0.69	0.54	0.46	0.42	0.38			
22.....	1.50	1.40	1.28	1.20	1.14	1.06	1.01	0.97	0.92	0.87	
24.....	1.35	1.25	1.17								
27.....		1.44	1.35	1.25		0.85					
28.....		1.34	1.24	1.15	1.07	1.00	0.94	0.88	0.83	0.79	0.76
29.....						0.81					
<b>Means.....</b>	<b>1.17</b>	<b>1.12</b>	<b>0.99</b>	<b>0.94</b>	<b>0.80</b>	<b>0.73</b>	<b>0.64</b>	<b>0.58</b>	<b>0.62</b>	<b>0.57</b>	<b>(0.58)</b>
<b>P. M.</b>											
September 9.....				0.84							
10.....		0.88	0.75	0.65	0.54	0.49	0.46				
13.....		1.07	0.91	0.78	0.66	0.57					
14.....		1.09	0.98	0.88	0.77	0.67	0.58				
15.....		1.19	1.10	1.01	0.91	0.82	0.75	0.69	0.64	0.58	
16.....		1.22	1.09	0.98	0.88	0.78					
21.....		1.07	0.92	0.85							
22.....		1.41	1.33								
23.....		1.34	1.24	1.14	1.10	1.06	1.00	0.95	0.91	0.87	
24.....		1.22	1.07	0.93	0.82	0.72	0.64				
<b>Means.....</b>	<b>1.17</b>	<b>1.04</b>	<b>0.90</b>	<b>0.81</b>	<b>0.73</b>	<b>0.69</b>	<b>(0.82)</b>	<b>(0.78)</b>	<b>(0.72)</b>	<b>0.72</b>	<b>0.68</b>

<sup>1</sup> For a description of exposures of instruments and details of methods of observations, see this REVIEW, December, 1914, 42: 648.

Skylight polarization, measured at solar distance 90° and in his vertical, with the sun at zenith distance 60°, averaged 53 per cent, with a maximum of 72 per cent on the 27th, which is higher than any previous September reading obtained at Washington.

In Table 2, column 2 gives the daily totals of solar and sky radiation received on a horizontal surface at the American University during September, 1915. The measurements were made with a Callendar recording pyrheliometer as described in the REVIEW for March, 1915, 43: 100. Table 2, column 3, gives the daily departures from the normals published in the same number of the REVIEW, page 110, Table 4. An excess of radiation is shown beginning with the 8th.

The "Percentage of possible sunshine," and the "Average cloudiness," given in columns 5 and 6 of Table 3, have been taken from the records of the observatory at the central office of the Weather Bureau. The monthly mean percentage of possible sunshine is 79, as compared with a normal of 60. The decade means are 58, 91, and 87, respectively.

Thus, while the second decade had the maximum percentage of possible sunshine, the third decade shows the maximum excess of radiation, due to the increased intensity of radiation after the 20th of the month.

TABLE 2.—Daily totals and departures of solar and sky radiation at Washington, D. C., during September, 1915.

[Gram-calories per square centimeter of horizontal surface.]

Day of month.	Daily totals.	Departure from normal.	Excess or deficiency since first of month.	Percentage of possible sunshine.	Average cloudiness.
	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Gr.-cal.</i>	<i>Per cent.</i>	<i>0-10</i>
September 1.....	362	- 54	- 54	25	9
2.....	228	-185	-239	2	10
3.....	371	- 40	-279	67	8
4.....	352	- 56	-325	50	8
5.....	422	16	-319	66	6
6.....	349	- 54	-373	50	5
7.....	362	- 38	-411	48	6
8.....	438	40	-371	69	4
9.....	480	85	-286	100	1
10.....	431	39	-247	100	1
11.....	474	84	-163	100	0
12.....	445	58	-105	98	0
13.....	464	80	- 25	100	0
14.....	485	103	78	100	0
15.....	491	112	190	100	0
16.....	468	92	282	87	2
17.....	445	71	353	95	2
18.....	317	- 54	299	49	7
19.....	435	67	366	84	4
20.....	405	39	405	99	3
<b>Decade departure.....</b>			<b>652</b>		
21.....	380	17	422	73	5
22.....	538	178	600	100	0
23.....	514	156	756	100	0
24.....	468	113	869	96	1
25.....	365	13	882	100	4
26.....	281	- 69	813	53	9
27.....	377	30	843	84	4
28.....	416	72	915	86	4
29.....	458	116	1,031	100	0
30.....	368	29	1,060	81	7
<b>Decade departure.....</b>			<b>655</b>		
<b>Excess or deficiency since first of year.....</b>			<b>- 1,021</b>		