POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), Superintendent, U. S. Naval Observatory. Data furnished by the U. S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. The difference in longitude is measured from the central meridian, positive west. The north latitude is positive. Areas are corrected for foreshortening and are expressed in millionths of the sun's visible hemisphere. The total area for each day includes spots and groups]

Date	Eastern standard time	Mt. Wilson group No.	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot or group	Area: Total for each day	Spot count	Observatory
	h m		°	°	°				
June 1	10 52	5914	−64.0	190.2	−6.5	242	-------	1	U. S. Naval.
		5913	−22.0	232.2	+4.0	73	-------	8	
		5911	−11.0	243.2	+28.0	339	-------	22	
		5910	+21.5	275.7	−8.0	145	-------	13	
		5909	+28.0	282.2	−21.0	48	-------	1	
		5905	+31.0	285.2	+20.0	36	-------	1	
		5907	+85.0	339.2	+19.0	145	1,028	2	
June 2	11 34	5917	−75.0	165.6	−19.5	97	-------	2	Do.
		5914	−49.5	191.1	−7.0	242	-------	4	
		5913	−7.5	233.1	+5.0	73	-------	18	
		5911	+2.5	243.1	+28.0	339	-------	23	
		5910	+37.0	277.6	−7.0	170	-------	15	
		5915	+39.0	279.6	+20.0	97	-------	10	
		5916	+39.5	280.1	+26.0	24	-------	2	
		5909	+42.0	282.6	−21.0	24	-------	1	
		5905	+46.0	286.6	+20.5	12	1,078	2	
June 3	8 27	5917	−63.0	166.0	−20.0	97	-------	6	Mt. Wilson.
		5914	−37.0	192.0	−7.0	267	-------	7	
		5918	−18.0	211.0	−5.0	36	-------	5	
		5913	+4.0	233.0	+5.0	145	-------	21	
		5911	+13.0	242.0	+28.0	388	-------	24	
		5916	+50.0	279.0	+26.0	12	-------	4	
		5910	+50.0	279.0	−7.0	73	-------	11	
		5915	+50.5	279.5	+21.0	73	-------	10	
		5909	+53.0	282.0	−20.0	24	-------	1	
		5905	+57.0	286.0	+20.5	12	1,127	1	
June 4	10 56	5919	−68.0	146.4	+37.0	6	-------	1	U. S. Naval.
		5917	−48.0	166.4	−20.0	97	-------	6	
		5914	−23.0	191.4	−7.0	291	-------	8	
		5918	−4.0	210.4	−5.0	73	-------	8	
		5913	+21.0	235.4	+4.0	145	-------	14	
		5911	+28.0	242.4	+28.0	291	-------	18	
		5916	+62.0	276.4	+25.0	12	-------	2	
		5915	+62.0	276.4	+21.0	36	-------	2	
		5910	+64.0	278.4	−7.0	73	-------	2	
		5905	+70.5	284.9	+21.0	12	1,036	1	
June 5	13 48	5921	−78.0	121.6	+13.5	339	-------	4	Do.
		5919	−54.0	145.6	+37.0	24	-------	3	
		5917	−31.0	168.6	−19.0	97	-------	9	
		5914	−8.0	191.6	−7.0	218	-------	5	
		5918	+11.0	210.6	−5.0	48	-------	5	
		5913	+35.0	234.6	+4.0	145	-------	7	
		5911	+42.0	241.6	+29.0	145	-------	10	
		5910	+77.0	276.6	−7.0	6	1,022	2	
June 6	10 58	5923	−85.0	102.9	−10.5	97	-------	1	Do.
		5921	−67.0	120.9	+13.0	582	-------	20	
		5922	−58.0	129.9	+12.0	24	-------	2	
		5919	−41.5	146.4	+37.0	97	-------	8	
		5917	−19.5	168.4	−19.0	170	-------	22	
		5920	−0.5	187.4	+23.0	6	-------	1	
		5914	+5.0	192.9	−6.5	218	-------	10	
		5913	+48.0	235.9	+4.0	121	-------	9	
		5911	+55.0	242.9	+28.0	145	1,460	7	
June 7	11 3	5923	−71.0	103.7	−10.5	145	-------	2	Do.
		5926	−58.0	116.7	+21.0	24	-------	5	
		5921	−53.0	121.7	+14.0	679	-------	28	
		5922	−44.0	130.7	+12.0	48	-------	7	
		5919	−30.0	144.7	+36.5	85	-------	7	
		5925	−12.0	162.7	+19.0	24	-------	7	
		5917	−7.0	167.7	−19.0	194	-------	14	
		5924	−1.0	173.7	+19.0	12	-------	4	
		5920	+12.0	186.7	+22.0	12	-------	2	
		5914	+17.5	192.2	−7.0	194	-------	8	
		5913	+62.0	236.7	+4.0	48	-------	4	
		5911	+75.0	249.7	+26.0	73	1,538	3	
June 8	11 16	5923	−58.0	103.3	−10.5	97	-------	1	Do.
		5926	−46.0	115.3	+21.0	24	-------	7	
		5921	−40.0	121.3	+14.0	921	-------	57	
		5928	−33.0	128.3	+25.0	24	-------	2	
		5922	−29.0	132.3	+12.0	73	-------	9	
		5919	−17.0	144.3	+36.5	97	-------	9	
		5925	−0.5	160.8	+19.0	36	-------	7	
		5917	+6.0	167.3	−19.5	170	-------	10	
		5920	+23.0	184.3	+23.0	48	-------	7	
		5914	+31.0	192.3	−7.0	242	-------	7	
		5927	+69.0	230.3	−6.0	48	1,780	4	
June 9	11 1[illegible]	5923	−44.0	104.1	−10.5	73	-------	5	Do.
		5926	−32.0	116.1	+21.0	36	-------	8	
		5921	−27.0	121.1	+14.0	727	-------	58	
		5922	−15.0	133.1	+11.0	97	-------	9	
		5919	−6.0	142.1	+37.0	36	-------	4	
		5925	+13.0	161.1	+19.5	12	-------	4	
		5917	+19.0	167.1	−19.0	97	-------	8	
		5920	+37.0	185.1	+23.0	97	-------	9	
		5914	+44.0	192.1	−7.0	218	-------	7	
		5927	+83.0	231.1	−6.0	97	1,490	3	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mt. Wilson group No.	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot or group	Area: Total for each day	Spot count	Observatory
	h m		°	°	°				
June 10	14 16	5932	−78.0	55.2	−16.5	24	-------	1	U. S. Naval.
		5929	−65.0	68.2	+16.0	18	-------	2	
		5923	−29.5	103.7	−10.5	36	-------	3	
		5921	−12.0	121.2	+14.0	436	-------	44	
		5922	+3.0	136.2	+12.0	97	-------	6	
		5919	+9.0	142.2	+37.0	12	-------	4	
		5917	+35.0	168.2	−19.0	97	-------	6	
		5920	+51.0	184.2	+23.0	145	-------	9	
		5914	+60.0	193.2	−7.0	206	1,071	2	
June 11	10 54	5932	−65.0	56.8	−16.0	24	-------	1	Do.
		5929	−53.0	68.8	+17.0	36	-------	9	
		5929	−53.0	68.8	+14.0	6	-------	1	
		5921	0.0	121.8	+15.0	436	-------	46	
		5930	+7.0	128.8	−25.0	48	-------	13	
		5922	+15.0	136.8	+12.0	61	-------	2	
		5917	+42.0	163.8	−19.5	24	-------	5	
		5917	+50.0	171.8	−19.5	48	-------	4	
		5920	+63.0	184.8	+23.0	194	-------	8	
		5914	+71.0	192.8	−7.5	194	1,071	2	
June 12	13 4	5934	−86.0	21.4	+7.0	291	-------	1	Do.
		5933	−67.0	40.4	+15.0	6	-------	1	
		5932	−51.0	56.4	−16.0	24	-------	4	
		5931	−49.0	58.4	−19.0	6	-------	2	
		5929	−39.0	68.4	+17.0	73	-------	5	
		5921	+15.0	122.4	+15.0	436	-------	52	
		5930	+21.0	128.4	−25.0	73	-------	12	
		5922	+30.0	137.4	+12.0	61	-------	2	
		5917	+64.0	171.4	−19.5	48	-------	2	
		5920	+80.0	187.4	+24.0	97	1,115	5	
June 13	11 6	5934	−71.0	24.2	+6.0	485	-------	1	Do.
		5932	−38.0	57.2	−17.0	24	-------	2	
		5931	−36.0	59.2	−20.0	24	-------	4	
		5929	−29.0	66.2	+17.0	24	-------	3	
		5921	+29.0	124.2	+16.0	582	-------	45	
		5930	+36.0	131.2	−25.0	36	-------	2	
		5922	+42.0	137.2	+13.0	48	1,223	2	
June 14	11 0	5938	−78.0	4.0	+7.0	6	-------	1	Do.
		5934	−59.0	23.0	+5.0	436	-------	1	
		5936	−44.0	38.0	+21.0	73	-------	7	
		5933	−40.0	42.0	+12.0	24	-------	4	
		5932	−25.0	57.0	−17.0	24	-------	10	
		5931	−23.0	59.0	−19.0	12	-------	1	
		5921	+42.0	124.0	+16.0	582	-------	60	
		5922	+55.0	137.0	+13.0	24	-------	1	
		5935	+60.0	142.0	+5.0	24	1,205	7	
June 15	11 9	5938	−63.0	5.7	+7.0	6	-------	1	Do.
		5934	−45.0	23.7	+5.0	339	-------	3	
		5936	−30.0	38.7	+21.0	24	-------	8	
		5933	−27.0	41.7	+12.0	36	-------	4	
		5932	−12.0	56.7	−16.0	6	-------	2	
		5931	−10.5	58.2	−19.5	24	-------	4	
		5937	+30.0	98.7	−14.0	12	-------	2	
		5921	+55.0	123.7	+15.0	436	-------	39	
		5922	+69.0	137.7	+13.0	12	895	1	
June 16	14 50	5939	−79.0	334.4	+6.0	97	-------	10	Mt. Wilson.
		5934	−30.0	23.4	+5.0	339	-------	1	
		5936	−14.0	39.4	+20.0	24	-------	10	
		5933	−13.0	40.4	+13.0	73	-------	13	
		5932	+3.0	56.4	−16.0	48	-------	11	
		5931	+4.0	57.4	−18.0	24	-------	7	
		5937	+43.0	96.4	−13.0	36	-------	4	
		5921	+70.0	123.4	+15.0	436	1,077	20	
June 17	11 13	5939	−69.0	333.2	+5.0	303	-------	6	U. S. Naval.
		5941	−37.0	5.2	+13.0	12	-------	2	
		5934	−19.0	23.2	+5.0	303	-------	3	
		5933	−1.0	41.2	+13.0	61	-------	8	
		5936	−1.0	41.2	+19.5	12	-------	2	
		5932	+16.0	58.2	−17.0	73	-------	12	
		5940	+28.5	70.7	+12.0	24	-------	3	
		5921	+85.0	127.2	+13.0	194	982	2	
June 18	12 30	5939	−55.0	333.3	+5.0	485	-------	28	Do.
		5934	−5.0	23.3	+5.0	388	-------	5	
		5933	+13.0	41.3	+13.0	6	-------	6	
		5932	+30.0	58.3	−19.0	36	915	12	
June 19	13 26	5942	−66.0	308.5	+7.0	48	-------	1	Do.
		5939	−39.0	335.5	+5.0	727	-------	17	
		5943	−27.0	347.5	−8.0	24	-------	2	
		5934	+10.0	24.5	+5.0	436	-------	2	
		5932	+43.0	57.5	−19.0	24	1,259	4	
June 20	9 43	5942	−53.0	310.3	+8.0	36	-------	3	Mt. Wilson.
		5939	−26.0	337.3	+6.0	970	-------	45	
		5943	−14.0	349.3	−7.0	36	-------	6	
		5934	+22.0	25.3	+6.0	412	-------	10	
		5944	+39.0	42.3	+21.0	73	-------	5	
		5932	+57.0	60.3	−17.0	48	1,575	4	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mt. Wilson group No.	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot or group	Area: Total for each day	Spot count	Observatory
	h m		°	°	°				
June 21	13 8	5942	−37.0	311.2	+7.0	24	-------	4	U. S. Naval.
		5948	−15.0	333.2	−25.0	24	-------	7	
		5946	−15.0	333.2	+22.0	73	-------	16	
		5947	−13.0	335.2	+13.0	48	-------	10	
		5939	−12.0	336.2	+6.0	970	-------	50	
		5945	−8.0	340.2	−20.0	24	-------	6	
		5934	+37.0	25.2	+6.0	339	-------	5	
		5953	+51.0	39.2	+16.0	24	-------	2	
		5944	+53.0	41.2	+20.0	97	1,623	6	
June 22	13 27	5948	−2.0	332.8	−25.0	12	-------	1	Do.
		5946	−0.5	334.3	+22.0	291	-------	22	
		5939	+1.5	336.3	+6.0	824	-------	62	
		5947	+2.0	336.8	+13.0	12	-------	1	
		5945	+7.0	341.8	−20.0	48	-------	7	
		5934	+50.5	25.3	+5.0	388	-------	1	
		5944	+65.0	39.8	+20.0	16	1,591	3	
June 23	11 12	(*)	−11.0	311.8	+7.0	6	-------	3	Do.
		5946	+12.0	334.8	+22.0	436	-------	20	
		5939	+14.0	336.8	+6.0	679	-------	50	
		5945	+19.0	341.8	−20.5	97	-------	7	
		5949	+41.5	4.3	+6.0	6	-------	2	
		5934	+63.0	25.8	+5.0	388	1,612	2	
June 24	10 28	5951	+11.0	321.0	+7.0	12	-------	2	Do.
		5946	+24.0	334.0	+22.0	485	-------	25	
		5939	+26.0	336.0	+6.0	533	-------	45	
		5945	+32.0	342.0	−20.0	48	-------	6	
		5950	+39.0	349.0	−7.0	12	-------	2	
		5934	+77.0	27.0	+5.0	388	1,478	1	
June 25	11 3	5952	+9.0	305.4	+7.0	6	-------	1	Do.
		5946	+37.0	333.4	+22.0	436	-------	20	
		5939	+40.0	336.4	+6.0	533	-------	32	
		5945	+43.0	339.4	−21.0	48	-------	7	
		5950	+53.0	349.4	−8.0	24	1,047	4	
June 26	13 8	5957	−81.0	201.0	−11.5	291	-------	7	Do.
		5956	−60.0	222.0	+27.0	48	-------	6	
		5955	−48.0	234.0	−8.0	6	-------	1	
		5954	−12.5	269.5	+19.0	48	-------	4	
		5953	−3.0	279.0	−8.0	12	-------	2	
		5946	+52.0	334.0	+22.0	436	-------	16	
		5939	+55.0	337.0	+6.0	436	1,277	11	
June 27	9 5	5962	−78.0	193.0	−7.0	194	-------	1	Mt. Wilson.
		5957	−69.0	202.0	−11.0	436	-------	15	
		5961	−58.0	213.0	−21.0	48	-------	5	
		5956	−50.0	221.0	+27.0	73	-------	14	
		5960	−33.0	238.0	+3.0	36	-------	5	
		5959	−27.0	244.0	−7.0	48	-------	10	
		5954	+1.0	272.0	+20.0	48	-------	2	
		5953	+8.0	279.0	−7.0	36	-------	5	
		5946	+65.0	336.0	+24.0	533	-------	12	
		5939	+69.0	340.0	+7.0	436	1,888	14	
June 28	8 58	5962	−64.0	193.8	−7.0	194	-------	1	Do.
		5957	−55.0	202.8	−10.5	436	-------	20	
		5961	−45.0	212.8	−21.0	242	-------	8	
		5956	−37.0	220.8	+27.0	121	-------	14	
		5960	−19.0	238.8	+3.0	36	-------	9	
		5959	−13.0	244.8	−7.0	61	-------	10	
		5954	+14.0	271.8	+19.0	36	-------	2	
		5946	+78.0	335.8	+23.0	436	-------	5	
		5939	+79.0	336.8	+7.0	97	1,659	5	

*Not numbered.

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mt. Wilson group No.	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot or group	Area: Total for each day	Spot count	Observatory
	h m		°	°	°				
June 29	10 58	5966	−69.0	174.5	−25.0	6	-------	1	U. S. Naval.
		5962	−48.0	195.5	−7.5	194	-------	1	
		5957	−39.5	204.0	−12.0	436	-------	40	
		5961	−30.0	218.5	−22.0	533	-------	28	
		5956	−23.0	220.5	+27.0	145	-------	11	
		5960	−3.0	240.5	+3.0	36	-------	9	
		5959	+4.0	247.5	−7.0	97	-------	13	
		5954	+32.0	275.5	+17.0	24	-------	2	
		5965	+35.0	278.5	+7.0	6	-------	2	
		5964	+58.0	301.5	−7.0	6	-------	3	
		5963	+66.0	309.5	+9.0	97	-------	7	
		5946	+88.0	331.5	+22.0	48	1,628	2	
June 30	11 11	5962	−34.5	195.6	−8.0	194	-------	1	Do.
		5957	−25.0	205.1	−11.5	436	-------	46	
		5961	−16.0	214.1	−22.0	533	-------	37	
		5956	−10.0	220.1	+27.0	145	-------	11	
		5960	+10.0	240.1	+3.0	36	-------	4	
		5959	+17.0	247.1	−7.0	97	-------	11	
		5963	+78.0	308.1	+9.0	12	1,453	2	

Mean daily area for 30 days=1,307.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR JUNE 1938

[Dependent alone on observations at Zurich]

[Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich Switzerland]

June 1938	Relative numbers	June 1938	Relative numbers	June 1938	Relative numbers
1	113	11	*b* 106	21	*Ec* 103
2	*a* 100	12	99	22	*ab* 101
3	*a* 107	13	*d* —	23	98
4	103	14	----------	24	87
5	*d* 91	15	87	25	76
6	*Eac* 84	16	*d* 76	26	72
7	*Mc* 134	17	76	27	*EEccdd* 108
8	*Wac* 139	18	*a* 56	28	106
9	115	19	69	29	128
10	*a* —	20	76	30	119

Mean, 27 days=97.4.

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group or spot through the central meridian.
c=New formation of a group developing into a middle-sized or large center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central circle zone.
d=Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE in Charge]

By B. FRANCIS DASHIELL

Mean free-air data, for the month of June 1938, based on a total of 817 airplane and radiometeorograph observations, are given in table 1. This information includes the basic meteorological elements of barometric pressure (P), temperature (T), and relative humidity (R.H.), recorded at certain geometric heights.

These "means" are computed by the customary method of differences, and are omitted when less than 15 observations have been made at the surface and less than 5 at a standard height. However, at those standard heights within the limits of the monthly vertical range of the tropopause, at least 15 observations are required. Further details will be found under "Aerological Observations," appearing in the January 1938, MONTHLY WEATHER REVIEW.

Chart I, published elsewhere in this REVIEW, shows the departures of mean surface temperatures from normal during June. These departures were moderate over most of the United States, but reached above-normal maxima over the Northwestern States (except on the Pacific coast itself), the northern Rocky Mountains, New England, and western Texas. The greatest departure above normal was +4.1° F. at Walla Walla, Wash. In the southeastern states and Ohio Valley temperatures were slightly below normal, as compared to an above-normal departure in May; the largest departure below normal (−3.1° F.) occurred at Pittsburgh, Pa.

The highest mean free-air temperature (°C.) for June (table 1) prevailed over Kelly Field, Tex., at the surface; over Pensacola, Fla., at 0.5 kilometer; Oklahoma City,