POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.) Superintendent, U. S. Naval Observatory. Data from measurements at the U. S. Naval Observatory from plates obtained at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, below longitude, latitude, area of spot or groups, and spot count, are given respectively the assumed longitude of the center of the disk, assumed latitude of the center of the disk, total area of spots and groups, and total spotless count]

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1939	*h m*		°	°	°	°				
Oct. 3	13 34	6629	−49	227	−17	54	291	4	G	U. S. Naval.
		6625	−18	258	−14	27	48	14		
		6627	−13	263	+13	13	24	1		
		6625	−10	266	−13	22	170	8		
		6623	−6	270	+21	16	533	7		
		6630	+3	279	−7	13	73	14		
		(*)	+10	286	+15	13	48	9		
		6622	+20	296	+15	22	194	22		
		6622	+27	303	+14	28	97	6		
		6621	+37	313	+19	37	36	6		
		6621	+37	313	+15	36	436	3		
		6620	+51	327	+17	51	24	1		
		6626	+57	333	−9	59	388	17		
		6618	+77	353	−15	76	970	6		
				(276)	(+7)		3,332	118		
Oct. 4	11 35	6629	−36	228	−17	43	242	3	P	Mt. Wilson.
		6623	−10	254	+22	19	24	5		
		6627	−1	263	+13	7	24	3		
		6625	+3	267	−14	21	145	10		
		6623	+7	271	+21	16	533	12		
		6630	+16	280	−8	22	73	11		
		6622	+32	296	+14	32	97	20		
		6621	+49	313	+15	49	339	7		
		6620	+66	330	+16	65	24	1		
		6626	+70	334	−9	71	291	11		
				(264)	(+7)		1,792	83		
Oct. 5	11 22	6632	−71	180	−18	76	121	5	G	U. S. Naval.
		6629	−23	228	−17	32	339	11		
		6631	−15	236	−12	23	48	12		
		6625	+16	267	−14	25	145	13		
		6623	+20	271	+21	25	485	4		
		6630	+30	281	−8	34	218	16		
		6622	+47	298	+13	48	48	9		
		6621	+62	313	+15	61	485	6		
		6626	+82	333	−9	84	388	4		
				(251)	(+7)		2,277	80		
Oct. 6	10 50	6633	−75	163	−7	76	582	25	VG	Do.
		6632	−59	179	−18	63	109	7		
		(*)	−20	218	−17	30	12	8		
		6629	−9	229	−17	25	315	11		
		6631	−3	235	−12	18	97	11		
		6625	+25	263	−14	32	48	19		
		6625	+30	268	−14	36	97	4		
		6623	+32	270	+20	34	485	10		
		6623	+34	272	+24	38	12	3		
		6630	+43	281	−8	45	97	11		
		(*)	+48	286	+14	48	12	6		
		6622	+60	298	+13	59	48	6		
		6621	+75	313	+14	73	485	5		
				(238)	(+6)		2,399	126		
Oct. 7	10 48	6635	−84	140	−21	86	194	1	VG	Do.
		6633	−61	163	−7	62	436	37		
		6632	−47	177	−17	52	97	12		
		6634	−7	217	+11	9	61	19		
		6629	+3	227	−17	23	291	15		
		6631	+11	235	−12	20	48	12		
		6625	+35	259	−15	41	24	8		
		6625	+42	266	−14	46	97	7		
		6623	+45	269	+21	46	533	9		
		6630	+57	281	−8	58	36	10		
		6622	+74	298	+14	73	24	6		
		6621	+88	312	+14	88	436	1		
				(224)	(+6)		2,277	137		
Oct. 8	11 2	6635	−69	142	−21	73	291	5	G	Mt. Wilson.
		6633	−48	163	−7	50	485	55		
		6632	−35	176	−18	41	194	30		
		6634	+7	218	+11	8	48	9		
		6629	+18	229	−17	29	242	3		
		6631	+26	237	−12	31	48	7		
		6631	+33	244	−10	36	48	5		
		6625	+56	267	−14	59	48	4		
		6623	+57	268	+21	56	533	4		
		6630	+70	281	−8	71	48	5		
				(211)	(+6)		1,985	127		

POSITIONS AND AREAS OF SUNSPOTS—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1939	*h m*		°	°	°	°				
Oct. 9	10 56	6635	−56	142	−21	62	436	7	VG	U. S. Naval.
		6633	−35	163	−7	37	485	35		
		6632	−22	176	−17	31	242	20		
		6629	+30	228	−17	37	218	1		
		6631	+39	237	−12	43	48	4		
		6625	+71	269	−14	75	97	3		
		6623	+71	269	+20	70	533	3		
				(198)	(+6)		2,059	73		
Oct. 10	11 4	6635	−42	143	−21	49	339	5	VG	Do.
		6633	−21	164	−7	25	388	36		
		6632	−9	176	−17	24	145	22		
		(*)	+10	195	−18	26	6	1		
		6629	+32	217	−16	38	6	1		
		6629	+42	227	−17	47	218	1		
		6631	+54	239	−12	56	48	11		
		6623	+85	270	+20	84	533	1		
				(185)	(+6)		1,683	78		
Oct. 11	10 52	6635	−30	142	−21	40	315	20	VG	Do.
		6636	−27	145	+ 9	26	48	9		
		6633	− 7	165	− 7	13	339	53		
		6632	+ 4	176	−17	23	97	21		
		6629	+46	218	−17	51	48	10		
		6629	+56	228	−17	60	218	1		
				(172)	(+6)		1,065	114		
Oct. 12	11 29	6639	−63	95	+ 9	61	6	2	G	Do.
		6638	−26	132	+20	28	170	15		
		6635	−16	142	−21	31	291	16		
		6636	−13	145	+10	13	12	5		
		6633	+ 3	161	− 8	13	73	7		
		6633	+8	166	−6	14	339	40		
		6632	+18	176	−15	27	24	4		
		(*)	+49	207	+16	49	6	4		
		6629	+60	218	−16	64	48	5		
		6629	+69	227	−17	71	218	1		
				(158)	(+6)		1,187	99		
Oct. 13	10 52	6640	−69	76	+12	67	6	1	VG	Do.
		6639	−50	95	+9	50	97	18		
		6638	−12	133	+20	18	194	16		
		6635	−2	143	−21	26	291	24		
		6633	+16	161	−8	21	48	10		
		6633	+22	167	−6	24	727	65		
		6632	+33	178	−15	39	6	2		
		6637	+38	183	−15	44	48	13		
		6629	+85	230	−17	82	242	1		
				(145)	(+6)		1,659	150		
Oct. 14	10 46	6639	−38	94	+9	37	48	2	F	Do.
		6638	+2	134	+20	14	218	14		
		6635	+11	143	−21	29	218	17		
		6633	+36	168	−6	38	679	46		
		6632	+47	179	−16	52	6	2		
				(132)	(+6)		1,169	81		
Oct. 15	10 42	6642	−39	80	+11	38	97	9	G	Mt. Wilson.
		6641	−36	83	−21	44	97	10		
		6639	−21	98	+8	22	36	11		
		6638	+14	133	+20	20	194	18		
		6635	+23	142	−21	34	170	7		
		6633	+49	168	−7	51	679	45		
		6637	+68	187	−14	70	12	2		
				(119)	(+6)		1,285	102		
Oct. 16	11 8	6643	−31	75	−20	40	24	2	G	U. S. Naval.
		6642	−24	82	+11	25	388	28		
		6641	−20	86	−21	33	194	26		
		6639	−10	96	+10	12	24	1		
		6638	+28	134	+19	32	170	9		
		6635	+38	144	−20	46	145	4		
		6633	+63	169	−7	63	582	20		
				(106)	(+6)		1,527	90		
Oct. 17	11 14	6644	−88	4	+14	88	97	1	VG	Do.
		6642	−10	82	+11	12	388	34		
		6641	−5	87	−21	27	436	36		
		6638	+41	133	+19	43	218	14		
		6635	+50	142	−20	56	121	9		
		6633	+79	171	−7	80	582	23		
				(92)	(+6)		1,842	117		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1939	*h m*		°	°	°	°				
Oct. 18	11 8	6644	−75	4	+14	73	388	7	F	U. S. Naval.
		6646	−42	37	−5	43	24	5		
		6645	−19	60	−5	23	24	2		
		6642	+5	84	+11	7	291	26		
		6641	+9	88	−20	27	388	27		
		6638	+54	133	+19	54	121	7		
		6635	+64	143	−20	70	73	1		
				(79)	(+6)		1,309	75		
Oct. 19	10 50	6648	−85	341	−9	86	1,212	8	VG	Do.
		6647	−70	356	−12	71	194	3		
		6644	−61	5	+14	61	339	12		
		6646	−28	38	−5	31	145	13		
		6642	+18	84	+10	20	291	19		
		6641	+23	89	−20	33	436	30		
		6638	+67	133	+19	58	145	3		
		6635	+78	144	−20	79	48	1		
				(66)	(+6)		2,810	89		
Oct. 20	11 11	6648	−71	342	−9	72	1,939	22	VG	Do.
		6647	−58	355	−12	60	97	2		
		6644	−48	5	+14	49	145	12		
		6646	−14	39	−6	17	194	26		
		6642	+32	85	+10	33	145	10		
		6641	+36	89	−20	43	388	22		
		6638	+82	135	+19	82	145	1		
				(53)	(+5)		3,053	95		
Oct. 21	10 46	6648	−68	332	−8	69	291	11	G	Do.
		6648	−59	341	−8	60	1,794	25		
		6648	−54	346	−11	56	242	6		
		6647	−45	355	−12	47	73	2		
		6649	−43	57	−4	44	6	2		
		6644	−35	5	+14	36	170	10		
		6646	−2	38	−7	12	194	19		
		6642	+46	86	+10	47	97	6		
		6641	+50	90	−21	56	388	18		
				(40)	(+5)		3,255	99		
Oct. 22	10 41	6652	−76	311	+12	75	436	10	VG	Do.
		6648	−54	333	−8	56	194	18		
		6651	−47	340	−17	51	6	4		
		6648	−46	341	−18	49	1,454	27		
		6648	−40	347	−11	43	194	20		
		6649	−34	353	−4	36	48	8		
		6650	−34	353	−19	41	48	3		
		6647	−31	356	−12	35	48	3		
		6644	−22	5	+12	23	194	10		
		6646	+14	41	−8	19	97	6		
		6642	+60	87	+9	61	73	10		
		6641	+64	91	−21	67	485	21		
				(27)	(+5)		3,277	145		
Oct. 23	10 48	6652	−62	311	+12	63	436	9	G	Do.
		6648	−42	331	−8	44	145	10		
		6651	−34	339	−17	42	12	4		
		6648	−32	341	−8	35	1,454	28		
		6648	−28	345	−11	33	170	10		
		6649	−20	353	−4	22	24	3		
		6650	−20	353	−19	31	12	3		
		6647	−18	355	−12	25	48	2		
		6644	−8	5	+13	12	145	11		
		6653	+27	40	+8	27	48	4		
		6646	+28	41	−7	31	97	3		
		6642	+74	87	+9	74	73	1		
		6641	+85	98	−20	87	436	1		
				(13)	(+5)		3,100	89		
Oct. 24	10 33	6652	−49	311	+12	50	436	13	VG	Do.
		6648	−30	330	−8	33	97	9		
		6651	−21	339	−18	31	12	5		
		6648	−18	342	−8	23	1,454	47		
		6648	−14	346	−10	20	170	14		
		6649	−10	350	−4	14	12	3		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1939	*h m*		°	°	°	°				
Oct. 24		6650	−8	352	−18	23	12	1		U. S. Naval.
		6647	−5	355	−12	17	48	3		
		6644	+3	3	+13	8	145	23		
		6653	+39	39	+7	39	97	14		
		6646	+41	41	−7	43	97	1		
		(*)	+61	61	−6	63	24	5		
				(360)	(+5)		2,604	138		
Oct. 25	19 17	6655	−76	266	+21	77	97	2	F	Mt. Wilson.
		6652	−32	310	+14	34	339	11		
		6654	−30	312	+3	30	73	8		
		6648	−12	330	−8	17	97	9		
		6648	−1	341	−8	13	1,454	50		
		6648	+4	346	−10	15	97	11		
		6650	+7	349	−17	23	12	1		
		6649	+9	351	−4	13	24	4		
		6647	+13	355	−12	20	36	1		
		6644	+20	2	+14	22	73	12		
		6653	+56	38	+7	56	24	1		
		6646	+59	41	−7	60	48	6		
				(342)	(+5)		2,374	116		
Oct. 26	11 8	6656	−85	249	−8	86	145	1	G	U. S. Naval.
		6655	−67	267	+22	68	194	2		
		6652	−23	311	+14	25	242	8		
		6654	−20	314	+3	20	97	11		
		6648	−2	332	−8	12	73	9		
		6648	+8	342	−8	16	1,333	66		
		6648	+14	348	−10	15	73	1		
		6649	+20	354	−4	23	12	3		
		6647	+22	356	−12	27	36	1		
		6644	+31	5	+14	33	73	9		
		6653	+65	39	+7	64	97	10		
		6646	+69	43	−7	68	97	1		
				(334)	(+5)		2,472	122		
Oct. 27	14 40	6656	−69	250	−8	68	218	1	VG	Do.
		6655	−52	267	+22	53	194	1		
		6652	−9	310	+15	14	291	8		
		6654	−6	313	+2	6	48	8		
		6648	+13	332	−9	17	48	9		
		6648	+19	338	−8	23	73	7		
		6648	+25	344	−8	27	1,067	40		
		6648	+29	348	−10	33	73	1		
		6647	+37	356	−12	42	24	1		
		6644	+45	4	+14	46	12	3		
		6646	+86	45	−7	88	97	1		
				(319)	(+5)		2,145	80		
Oct. 28	10 32	6656	−63	245	−11	65	48	8	G	Do.
		6656	−58	250	−8	60	218	3		
		6657	−50	258	+5	51	24	1		
		6655	−40	268	+22	43	194	5		
		6652	+3	311	+15	11	291	16		
		6654	+7	315	+2	8	24	8		
		6648	+25	333	−8	28	48	6		
		6648	+30	338	−8	33	73	9		
		6648	+36	344	−8	38	970	33		
		6648	+40	348	−9	43	73	4		
		6647	+49	357	−12	52	24	1		
				(308)	(+5)		1,987	94		
Oct. 29	10 52	6658	−71	223	−14	73	48	2	VG	Mt. Wilson.
		6656	−47	247	−10	50	24	8		
		6656	−43	251	−6	45	218	2		
		6657	−38	256	+5	38	194	21		
		6655	−28	266	+21	33	194	5		
		6652	+17	311	+15	20	218	9		
		6654	+24	318	+3	24	6	2		
		6648	+44	338	−8	46	48	5		
		6648	+49	343	−9	51	921	30		
		6648	+53	347	−9	54	73	3		
		6647	+63	357	−12	65	12	1		
				(294)	(+5)		1,956	88		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1939	*h m*		°	°	°	°				
Oct. 30	10 39	6658	−58	223	−14	62	12	2	VG	Mt. Wilson.
		6656	−32	249	−10	34	48	9		
		6656	−30	251	−7	33	194	8		
		6657	−25	256	+5	25	824	52		
		6655	−15	266	+22	23	194	14		
		6652	+29	310	+14	31	145	14		
		6654	+33	314	+4	34	6	3		
		6648	+57	338	−8	58	24	2		
		6648	+63	344	−9	64	727	20		
		6648	+68	349	−9	70	73	7		
				(281)	(+5)		2,247	131		
Oct. 31	11 7	6660	−68	200	+22	69	16	3	P	Do.
		6658	−45	223	−14	49	12	2		
		6656	−19	249	−10	24	48	6		
		6656	−17	251	−7	20	170	4		
		6657	−11	257	+7	16	679	30		
		6655	−3	265	+22	18	145	6		
		6659	+48	316	−6	50	6	1		
		6648	+78	346	−8	80	582	9		
				(268)	(+4)		1,658	61		

Mean daily area for 29 days=2,131.

*=not numbered.
VG=very good; G=good; F=fair; P=poor.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR OCTOBER 1939

[Dependent alone on observations at Zurich]

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

October 1939	Relative numbers	October 1939	Relative numbers	October 1939	Relative numbers
1	*ad* 144	11	56	21	*a* —
2	*a* 143	12	*Eac* —	22	*d* 94
3	----------	13	*a* —	23	----------
4	*aa* 92	14	*Eac* 68	24	*a* 112
5	----------	15	*Ec* 73	25	*bd* —
6	*ad* —	16	68	26	*d* 100
7	----------	17	*a* 79	27	----------
8	*d* —	18	*Eacd* 74	28	*a* 64
9	77	19	*d* 92	29	*Ec* 81
10	67	20	95	30	85
				31	*a* —

Mean, 19 days=87.6

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group 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 center-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

The establishment of a widespread network of radiosonde observations became an accomplished fact during October with the opening of additional stations at Juneau and Fairbanks, Alaska, and Lakehurst, N. J.; the latter being changed by the United States Navy from an airplane station. For the first time, regularly scheduled daily observations of pressure, temperature and humidity, in the high levels above 28 radiosonde stations, extended from Alaska to the Caribbean. These stations are listed in table 1a, and the observations of the United States Navy by airplanes at 7 stations are given in table 1. Charts VIII, IX, X, and XI show the mean pressures and temperatures, as well as the resultant winds, at 1.5, 3, 4, and 5 kilometers, respectively. The pressures shown on chart VIII are for 5,000 feet only. Tables 2 and 3 list certain wind data, and table 4 shows the heights of the tropopauses. Isentropic data for October are shown on chart XII. A detailed description of the charts and tables was given in the January 1939 issue of the MONTHLY WEATHER REVIEW.

The mean free-air pressures for the current month for 5,000 feet, and 3, 4, and 5 kilometers, were well distributed. Highest pressure was indicated over the Southeast, being located at Pensacola, Fla., at 5,000 feet, and 3 and 4 kilometers, and over Miami, Fla., at 5 kilometers. Lowest mean pressure existed over the northern portion of the United States, being indicated at Sault Ste. Marie, Mich. To the south of the high-pressure area diminishing pressures were noted over Puerto Rico and Swan Island. Above 5 kilometers, where observations were made by radiosondes, lowest pressures prevailed along the northern border. These were centered over Sault Ste. Marie, Mich., up to 14 kilometers, and over Bismarck, N. Dak., in the higher levels. Lowest pressures occurred over Alaska, being lower at Fairbanks than at any station in the United States. Above 5 kilometers the highest mean pressures were noted over Miami, Fla., up to 11 kilometers, and then equalled by San Juan, P. R. Pressures over Swan Island were lower than those recorded at either Miami, Fla., or San Juan, P. R.

Mean pressures at stations using radiosonde in 1938 showed the current month to be lower than in October 1938 at all levels over Nashville, Tenn., Oklahoma City, Okla., Omaha, Nebr., and Sault Ste. Marie, Mich. The pressures at Nashville, Tenn., were very little lower than the previous year, but those at Sault Ste. Marie, Mich. became lower by a difference of 5 millibars at the surface to 10 millibars at 8 kilometers, then decreased with altitude to 2 millibars at 18 kilometers. Over Oakland, Calif., the current mean pressure was higher than in 1938 from the surface up to 11 kilometers, and then lower above. At Washington, D. C., the 1939 means were higher at all levels, the difference also becoming greatest at 8 kilometers.

During October the pressure differences at all levels between the southeastern HIGH (Miami, Fla.), and the northern LOW (Sault Ste. Marie, Mich.), showed a gradient increasing with altitude from 4 millibars at 500 meters to 25 millibars at 8 kilometers, and decreasing with additional altitude to 6 millibars at the maximum height of 17 kilometers. Also, a parallel case existed between the low-pressure area over Sault Ste. Marie, Mich., and the still lower one over Fairbanks, Alaska. In both cases the maximum gradient in millibars occurred at 8 kilometers. The pressure differences in millibars for all levels averaged 45 percent of those noted between Miami, Fla., and Sault Ste. Marie, Mich. And, as an interesting incidental, the difference in latitude between Fairbanks, Alaska, and Sault Ste. Marie, Mich., also is 45 percent of the difference between the latter place and Miami, Fla.

Mean relative humidities were high in the northern sections of the country (Sault Ste. Marie, Mich., Billings, Mont., Bismarck, N. Dak., and Spokane, Wash.). But outside of the United States proper the highest humidities