POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U.S. Navy, Superintendent U.S. Naval Observatory. Data furnished by the U.S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. Difference in longitude is measured from the central meridian, positive west. 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		Heliographic			Area		Total area for each day	Observatory
			Diff. in longitude	Longitude	Latitude	Spot	Group		
1934	h.	m.	°	°	°				
Mar. 1	11	0	No spots						U.S. Naval.
Mar. 2	11	15	No spots						Mt. Wilson.
Mar. 3	11	20	No spots						U.S. Naval.
Mar. 4	11	45	−12.0	180.4	+0.5	3		3	Mt. Wilson.
Mar. 5	11	34	No spots						U.S. Naval.
Mar. 6	11	18	No spots						Do.
Mar. 7	12	50	−64.0	88.4	−27.0	2			Mt. Wilson.
			−26.0	126.4	−3.0		21	23	
Mar. 8	13	10	−54.0	84.9	−28.0		4		Do.
			−11.0	127.9	−3.0		37	41	
Mar. 9	11	18	−40.0	86.8	−27.5		9		U.S. Naval.
			+2.0	128.8	−3.0		31	40	
Mar. 11	12	28	No spots						Do.
Mar. 12	11	16	No spots						Do.
Mar. 13	11	22	No spots						Do.
Mar. 14	11	0	No spots						Mt. Wilson.
Mar. 15	11	6	No spots						U.S. Naval.
Mar. 16	13	17	No spots						Do.
Mar. 17	11	10	No spots						Do.
Mar. 18	10	50	No spots						Do.
Mar. 19	11	54	No spots						Mt. Wilson.
Mar. 20	11	33	No spots						U.S. Naval.
Mar. 21	11	20	No spots						Do.
Mar. 22	10	58	No spots						Mt. Wilson.
Mar. 24	10	56	No spots						Do.
Mar. 25	12	9	No spots						U.S. Naval.
Mar. 26	10	30	+3.0	266.1	−28.0	6		6	Mt. Wilson.
Mar. 27	9	45	No spots						Do.
Mar. 28	11	35	No spots						Do.
Mar. 29	11	10	No spots						U.S. Naval.
Mar. 30	11	8	No spots						Do.
Mar. 31	11	0	No spots						Mt. Wilson.
Mean daily area for March.								4	

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR MARCH 1934

(Dependent alone on observations at Zurich and its station at Arosa)

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

March 1934	Relative numbers	March 1934	Relative numbers	March 1934	Relative numbers
1		11	15	21	0
2	0	12	7	22	0
3	0	13	0	23	0
4	7	14	0	24	0
5	0	15	0	25	7
6	*Ec* 7	16	0	26	7
7	9	17	0	27	0
8	19	18	7	28	0
9	*a* 22	19	0	29	7
10	12	20	0	30	7
				31	0

Mean: 30 days—4.4.

a=Passage of an average-sized group through the central meridian.
c=New formation of a center of activity: *E*, on the eastern part of the sun's disk; *W*, on the western part; *M*, in the central zone.

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. Little, in charge]

By L. T. SAMUELS

Free-air temperatures during March averaged below normal at all levels at Omaha and Pembina; at the upper levels at Pensacola and San Diego; and lower levels at Cleveland and Washington (table 1). Elsewhere the temperature departures were positive. Relative humidity departures for the month were mostly negative, the largest positive departures occurring at Pensacola.

Free-air resultant wind directions were practically normal over the entire country with some excess of southerly components along the middle Pacific coast (table 2). Resultant velocities were mostly below normal over the southern half of the country and above normal over the northern half.

TABLE 1.—*Free-air temperatures and relative humidities obtained by airplanes during March 1934*

TEMPERATURE (°C.)

Altitude (meters) m.s.l.	Boston, Mass.[1] (6 meters)		Cleveland, Ohio[2] (246 meters)		Dallas, Tex.[3] (146 meters)		Omaha, Nebr.[4] (300 meters)		Pembina, N. Dak.[5] (243 meters)		Pensacola, Fla.[6] (2 meters)		San Diego, Calif.[6] (5 meters)		Washington, D.C.[6] (2 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
Surface	1.1	(7)	−2.8	(7)	8.3	(7)	−2.0	(7)	−10.4	(7)	11.9	+0.3	17.3	+1.8	0.8	−4.3
500	−1.7	(7)	−1.7	(7)	9.3	(7)	−1.3	(7)	−9.8	(7)	12.1	+1.4	15.4	+1.5	.6	−2.7
1,000	−3.3	+1.4	−2.2	−1.2	9.8	+1.1	−.7	−1.6	−10.6	−3.5	10.8	+1.9	17.3	+3.9	−.1	−1.5
1,500	−4.5	+2.1	−2.5	−.1	9.5	+2.2	−.9	−1.2	−11.3	−3.0						
2,000	−5.7	+2.0	−3.8	+.2	7.6	+1.9	−2.1	−.7	−12.0	−1.8	6.4	+1.2	12.6	+3.8	−4.0	−1.1
2,500	−7.3	+1.8	−5.6	+.6	5.0	+1.6	−4.4	−.5	−14.0	−1.5						
3,000	−8.4	+3.3	−7.8	+.9	2.0	+1.1	−6.9	−.4	−16.7	−1.4	.9	.0	6.4	+3.3	−6.5	+.3
4,000	−13.2		−12.9	+.9	−5.3	−.5	−13.0	−1.2	−21.7	−1.1	−5.9	−.7	−1.7	+3.3		
5,000	−18.4		−18.5	+1.5	−13.4	−2.8	−19.5	−1.1	−27.9	−1.5	−12.9	−1.2				

RELATIVE HUMIDITY (PERCENT)

Altitude (meters) m.s.l.	Boston, Mass. Mean	Departure from normal	Cleveland, Ohio Mean	Departure from normal	Dallas, Tex. Mean	Departure from normal	Omaha, Nebr. Mean	Departure from normal	Pembina, N. Dak. Mean	Departure from normal	Pensacola, Fla. Mean	Departure from normal	San Diego, Calif. Mean	Departure from normal	Washington, D.C. Mean	Departure from normal
Surface	70	(7)	76	(7)	81	(7)	75	(7)	87	(7)	82	+8	74	+6	67	+1
500	71	(7)	71	(7)	71	(7)	70	(7)	75	(7)	74	+8	72	+6	61	−2
1,000	68	−4	65	−1	60	0	59	−2	67	+2	69	+9	45	−7	56	−4
1,500	62	−8	57	−2	53	+2	55	+3	63	+4						
2,000	59	−9	52	−3	46	+3	54	+4	56	−1	62	+10	30	−7	48	−7
2,500	57	−13	50	−3	42	+3	54	+4	53	−4						
3,000	51	−21	53	0	38	+1	53	+2	53	−5	57	+10	23	−7	56	+8
4,000	51		57	+7	37	−2	54	+4	52	−4	54	+11	20	−7		
5,000	52		57	+3	36	−3	56	+6	52	−3	48	+4				

Times of observations: Weather Bureau, 5 a.m.; Navy, 7 a.m.; and Massachusetts Institute of Technology, 8 a.m. (eastern standard time).

[1] Airplane observations made by Massachusetts Institute of Technology; departures based on normals obtained from 264 kite observations made at Blue Hill Meteorological Observatory (1896–1903).

[2] Temperature departures based on normals determined by extrapolating latitudinally those of Royal Center, Ind., and Due West, S.C. Humidity departures based on normals of Royal Center, Ind.

[3] Temperature departures based on normals determined by interpolating latitudinally those of Groesbeck, Tex., and Broken Arrow, Okla. Humidity departures based on normals of Groesbeck, Tex.

[4] Temperature and humidity departures based on normals of Drexel, Nebr.

[5] Temperature departures based on nomrals determined by extrapolating latitudinally those of Ellendale, N.Dak., and Drexel, Nebr. Humidity departures based on normals of Ellendale, N.Dak.

[6] Naval air stations.

[7] Surface and 500 meter level departures omitted because of difference in time of day between airplane observations and those of kites upon which the normals are based.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a.m. (eastern standard time) during March 1934*

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m.s.l.	Albuquerque, N.Mex. (1,554 meters)		Atlanta, Ga. (309 meters)		Bismarck, N.Dak. (518 meters)		Brownsville, Tex. (7 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (192 meters)		Cleveland, Ohio (245 meters)		Dallas, Tex. (154 meters)		Havre, Mont. (762 meters)		Jacksonville, Fla. (14 meters)		Key West, Fla. (11 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	347	1.1	312	1.7	343	0.8	192	0.4	200	1.5	274	5.3	282	1.5	171	1.2	173	0.3	244	1.7	295	0.3	57	2.7
500			281	2.4			162	5.4	226	3.5			258	3.1	318	3.5	236	3.3			190	2.5	78	5.1
1,000			313	3.2	295	5.4	186	4.7	253	6.0			272	4.4	260	5.2	240	4.0	266	4.4	206	3.1	104	3.6
1,500			293	4.0	295	8.5	201	3.7	263	7.9			280	7.6	259	6.3	263	4.3	299	9.4	234	4.2	128	1.3
2,000	304	1.6	298	4.6	300	11.7	238	2.0	271	9.7	273	8.4	280	9.2	265	9.1	285	6.2	302	10.9	255	5.0	215	0.7
2,500	314	4.9	288	6.5	313	15.2	301	1.7	274	12.6	296	15.3	270	12.5	268	10.8	314	6.6	300	11.1	269	5.8	187	1.0
3,000	310	7.4	288	8.8	316	15.1	337	3.4	283	13.1	303	13.8	300	14.3	272	10.5	315	8.1	295	14.6	286	6.8	258	2.5
4,000	307	9.0	289	10.2			326	5.0			301	13.9					310	6.9	296	17.1				
5,000	324	10.7																						

Altitude (meters) m.s.l.	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (83 meters)		New Orleans, La. (1 meter)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (402 meters)		Omaha, Nebr. (306 meters)		Phoenix, Ariz. (338 meters)		Salt Lake, City, Utah (1,294 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D.C. (10 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	357	1.1	238	0.1	5	0.9	60	1.6	54	0.6	33	1.1	20	0.7	86	2.0	148	2.1	325	0.6	182	0.9	351	1.3
500	20	0.9	304	0.3	240	5.4	140	2.5	323	1.1	151	0.7	269	1.4	91	2.5			312	1.0	208	1.9	303	1.8
1,000	25	1.4	198	0.9	243	6.3	225	1.9	330	1.7	238	3.4	305	4.9	333	1.6			297	3.7	198	3.7	297	4.2
1,500	357	1.2	195	2.2	252	5.6	262	2.8	76	0.3	285	4.5	305	6.6	317	2.8	160	2.1	296	6.7	230	3.8	297	7.4
2,000	339	1.0	205	3.4	256	8.0	301	5.2	307	0.6	298	6.2	299	9.2	326	3.0	278	2.0	307	8.3	251	5.2	279	10.1
2,500	305	1.2	231	3.5	270	8.3	302	6.6	193	1.6	305	7.6	302	10.9	323	2.7	294	4.8	305	9.2	257	6.7	279	13.2
3,000	292	2.3	243	4.4	292	7.3	282	7.7	244	1.8	304	9.6	306	13.8	305	2.2	301	6.9	293	8.6	266	5.5	273	15.9
4,000	289	3.3	257	7.5					227	4.2	297	10.3	311	13.6	310	4.4	311	8.8			278	6.8		
5,000															294	7.4	306	10.7						