

Positions and areas of sun spots—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longitude	Latitude	Spot	Group	
1931							
Dec. 14 (Naval Observatory)	12 43	+21.0	114.7	+4.0	15		
		+39.0	132.7	+12.0		278	293
Dec. 15 (Naval Observatory)	11 20	+33.0	114.3	+4.0	25		
		+50.0	131.3	+11.0		123	148
Dec. 16 (Naval Observatory)	10 30	+47.0	115.6	+4.0	15		
		+63.0	131.6	+11.0		93	108
Dec. 17 (Naval Observatory)	10 39	+78.0	133.4	+11.0		93	93
Dec. 18 (Naval Observatory)	11 36	+69.0	132.7	+11.0	93		93
Dec. 19 (Naval Observatory)	10 37	+56.0	133.0	+11.5	93		93
Dec. 20 (Naval Observatory)	10 48	+41.5	134.3	+11.0		46	46
Dec. 22 (Yerkes Observatory)	14 23	+12.6	134.9	+12.1	15		15
Dec. 23 (Naval Observatory)	10 37	+4.0	132.3	+11.0		31	
		+46.0	22.3	+14.0	31		62
Dec. 24 (Mount Wilson)	11 0	+80.0	242.9	-2.0		47	
		+90.0	242.9	-12.0	84		
		+5.0	327.9	+9.5		28	
		+59.5	22.4	+11.0		27	186
Dec. 25 (Yerkes Observatory)	13 26	+64.9	243.6	-18.4	284		
		+59.0	249.5	-2.5	19		303
Dec. 26 (Naval Observatory)	11 24	+54.0	242.4	-12.0	108		
		+47.0	249.4	-1.5	15		123
Dec. 27 (Naval Observatory)	14 10	+40.0	241.7	-14.0	139		139
Dec. 29 (Naval Observatory)	15 2	+13.0	241.9	-18.0		139	139
Dec. 30 (Naval Observatory)	12 49	+1.0	241.9	-13.0		139	139
Mean daily area for December							175

PROVISIONAL SUN-SPOT RELATIVE NUMBERS, FOR DECEMBER, 1931

(Data dependent alone on observations at Zurich and its station at Arosa)
 [Data furnished through the courtesy of Prof. W. Brunner, University of Zurich, Switzerland]

December, 1931	Relative numbers	December, 1931	Relative numbers	December, 1931	Relative numbers
1	20	11	a 35	21	8
2	16	12	37	22	16
3	7?	13	a 38	23	17
4		14	37	24	d 23
5	0	15	26	25	31
6	Ec 7	16		26	31
7	12	17	15	27	31
8	13	18	8	28	15
9	24	19	8	29	9
10	Ec —	20	8	30	a 11
				31	9

Mean: 28 days=18.3.

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 center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central zone.
 d= Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[The Aerological Division, W. R. GREGG, in charge]

By L. T. SAMUELS

Free-air temperatures were decidedly above normal and relative humidities were close to normal at all stations for December.

At the 1,000-meter level the resultant wind directions were close to normal at the northern stations but contained a considerably greater south component than normal at most of the southern stations. Resultant velocities were somewhat above normal at most stations.

At 3,000 meters the resultant directions were close to normal except at the extreme southern stations. At Key West a pronounced easterly component persisted to 4,000 meters as compared to the normal westerly direction at that level. Resultant velocities at 3,000 meters exceeded the normal appreciably in New England and at some southern stations.

TABLE 1.—Mean free-air temperatures and humidities obtained by airplanes (or kites) during December, 1931

Altitude (meters) m. s. l.	TEMPERATURE (°C)									
	Chicago, Ill. ¹ (190 meters)	Cleveland, Ohio ¹ (245 meters)	Dallas, Tex. ¹ (149 meters)	Due West, S. C. ² (217 meters)	Ellendale, N. Dak. ¹ (444 meters)	Hampton Roads, Va. ¹ (3 meters)	Omaha, Nebr. ¹ (289 meters)	Pensacola, Fla. ³ (2 meters)	San Diego, Calif. ³ (9 meters)	Washington, D. C. ³ (2 meters)
Surface	1.7	2.3	7.2	9.1	-6.0	8.1	0.1	16.3	12.4	3.2
500	1.7	2.3	8.7	9.8	-5.4	7.2	0.7	15.9	10.8	4.6
1,000	1.3	1.5	8.6	9.9	-1.0	6.1	2.4	15.7	8.7	4.2
1,500	0.9	0.3	8.0	9.5	-0.1		3.0			
2,000	0.0	-0.8	6.7	7.9	-1.9	4.1	1.7	12.1	4.9	1.8
2,500	-1.7	-2.5	4.8	6.0	-4.3		-0.6			
3,000	-4.0	-4.8	2.6	3.4	-6.8	0.6	-3.1	7.0	0.9	-0.4
4,000	-9.4	-9.3	-3.9		-13.7		-9.5		-5.7	
5,000	-16.5	-14.6	-11.0		-19.7		-16.7		-13.6	
6,000			-16.2				-23.9			

Altitude (meters)	RELATIVE HUMIDITY (PER CENT)									
	Chicago, Ill. ¹	Cleveland, Ohio ¹	Dallas, Tex. ¹	Due West, S. C. ²	Ellendale, N. Dak. ¹	Hampton Roads, Va. ¹	Omaha, Nebr. ¹	Pensacola, Fla. ³	San Diego, Calif. ³	Washington, D. C. ³
Surface	85	82	86	87	88	76	86	90	59	77
500	79	78	72	76	85	66	79	82	58	67
1,000	67	72	58	66	60	64	60	73	54	60
1,500	57	63	51	54	52		43			
2,000	49	56	45	53	56	41	37	63	40	46
2,500	45	50	42	42	56		36			
3,000	44	49	37	34	56	32	36	65	34	32
4,000	40	44	35		83		35		36	
5,000	30	39	36		65		32		60	
3,000			10				24			

¹ Airplanes (Weather Bureau).

² Kites.

³ Airplanes (Navy).