PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR JULY, 1932

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

[Data furnished through the courtesy of Prof. W. Brunner, University of Zurich, Switzerland

July, 1932	Relative numbers	July, 1932	Relative numbers	July, 1932	Relative numbers	July, 1932	Relative numbers	July, 1932	Relative numbers	July, 1932	Relative numbers
1	*a* 21	6	*a* 21	11	9	16	0	21	0	26	0
2	Ec 24	7	*a* 14	12	8	17	0	22	7	27	*d* 8
3	26	8		13	9	18	8	23	0	28	8
4	31	9		14	0	19	0	24	0	29	9
5	34	10	10	15	0	20	8	25	0	30	9
										31	9

Mean: 29 days = 9.4.

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 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 averaged-sized center of activity on the limb.

AEROLOGICAL OBSERVATIONS

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

By L. T. SAMUELS

A new airplane observation station was established by the Weather Bureau at Atlanta for the fiscal year 1933 in addition to continuing the four stations already in operation. However, owing to delays in awarding the new contracts, regular flights were not started at the different stations until various times after July 1. In the cases of Atlanta, Chicago, and Omaha, the period of record was too short to provide representative monthly means.

At most stations shown in Table 1 the free-air temperatures were above normal. At San Diego negative departures obtained at all levels. Relative humidities averaged mostly below normal except at Dallas and Ellendale where positive departures predominated.

Free-air resultant wind velocities averaged above normal at most stations with the largest departures in the northern and eastern sections of the country. Resultant wind directions did not differ appreciably from normal.

TABLE 1.—*Free-air temperatures and relative humidities during July, 1932*

[Weather Bureau airplane observations made near 5 A. M. (E. S. T.); Navy observations near 7 A. M. (E. S. T.)]

TEMPERATURE (° C.)

Altitude (meters) m. s. l.	Cleveland, Ohio (246 meters) [1]		Dallas, Tex. (146 meters) [2]		Ellendale, N. Dak. (444 meters)		Norfolk, Va. (3 meters) [3]		Pensacola, Fla. (2 meters) [3]		San Diego, Calif. (9 meters) [3]		Washington, D. C. (2 meters) [3]	
	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	18.0	(4)	25.5	−1.0	21.3	+0.3	25.0	−0.8	26.8	+0.5	19.6	−2.8	24.5	−0.6
500	20.3	−1.9	27.7	+3.4	21.0	+0.4	23.9	−0.7	25.9	+1.3	15.5	−3.7	23.1	+0.6
1,000	18.8	0.0	25.3	+3.3	18.9	+0.9	22.1	−0.4	23.2	+1.1	21.4	−1.5	21.4	+1.1
1,500	16.2	+0.6	21.3	+2.1	16.7	+1.1								
2,000	13.5	+0.8	17.4	+1.0	14.0	+1.1	16.4	+0.1	17.1	+1.1	20.0	−0.8	16.9	+2.4
2,500	10.7	+0.8	14.0	+0.6	11.8	+1.8								
3,000	8.0	+0.8	10.9	+0.5	9.2	+2.1	10.6	−0.2	11.3	+1.3	12.4	−0.4	11.3	+2.5
4,000	1.7	0.0	5.0	+0.6	3.3	+1.9			5.9	+1.5			6.2	+3.0
5,000	−4.9	−1.7	−1.1	−1.0	−3.2	+0.4								

RELATIVE HUMIDITY (PER CENT)

Surface	82	(4)	77	+1	68	−1	74	0	81	−4	76	+4	67	−3
500	68	+5	66	−11	68	0	70	+4	73	−6	86	+8	63	−3
1,000	63	−3	62	−5	64	+2	62	+2	72	−1	42	−4	61	−1
1,500	63	−2	66	+4	60	+2								
2,000	57	−4	69	+10	59	+4	54	−4	68	0	27	−4	56	−6
2,500	49	−6	67	+9	54	+1								
3,000	42	−9	61	+4	53	+2	45	−4	58	−5	29	−9	54	−2
4,000	38	−3	57	−2	49	−1			53	−4			45	−4
5,000	33	−16	56	+20	49	+5								

[1] Covers period July 12 to 31, inclusive, only. Temperature and humidity departures based on normals of Royal Center, Ind.
[2] Covers period July 11 to 31, inclusive, only. Temperature departures based on normals determined by interpolating latitudinally between those of Groesbeck, Tex., and Broken Arrow, Okla. Humidity departures based on normals of Groesbeck, Tex.
[3] Naval air stations.
[4] Surface departures omitted because of difference in time 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. (E. S. T.) during July, 1932*

[Wind from North=360°; East=90°; etc.]

Altitude (meters) m. s. l.	Albuquerque N. Mex. (1,528 meters)		Atlanta, Ga. (309 meters)		Bismark, N. Dak. (518 meters)		Brownsville, Tex. (12 meters)		Burlington, Vt. (132 meters		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (198 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	55	0.6	299	1.0	81	0.6	152	1.5	213	1.6	283	2.9	219	1.0	223	1.8	167	1.9	7	0.3	238	1.6	122	1.9
500	------	------	311	3.3	------	------	170	9.0	248	3.7	------	------	273	5.2	273	5.6	209	9.4	------	------	263	7.3	120	3.6
1,000	------	------	316	3.9	203	4.3	168	9.2	288	4.8	------	------	301	5.8	291	7.6	206	8.2	239	1.1	265	6.0	126	4.2
1,500	------	------	306	3.9	241	3.8	161	8.0	287	7.4	------	------	305	6.4	295	8.8	200	6.2	272	2.7	271	4.2	118	4.0
2,000	145	0.8	302	3.4	273	5.1	152	7.0	284	8.6	273	3.6	312	7.5	296	9.7	193	4.7	272	4.4	268	3.5	114	4.5
2,500	207	1.7	295	3.9	275	6.0	138	6.4	288	9.2	255	4.0	314	8.0	298	11.2	188	3.7	261	5.6	263	3.1	110	4.4
3,000	228	1.9	296	4.4	279	7.5	126	5.8	289	10.7	266	5.0	310	9.9	297	12.3	172	2.9	255	6.6	254	2.7	105	4.6
4,000	247	0.9	314	3.2	288	11.6	115	5.7	305	15.0	273	5.8	306	10.5	299	13.4	143	2.5	252	10.6	277	2.2	96	4.4
5,000	25	0.9	354	3.2	------	------	103	6.4	------	------	269	7.9	------	------	308	17.8	68	1.2	251	13.0	353	1.0	94	5.2

	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (85 meters)		New Orleans, La. (25 meters)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (402 meters)		Omaha, Nebr. (306 meters)		Phoenix, Ariz. (356 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	44	0.3	307	0.7	210	0.5	242	0.9	251	1.4	180	4.2	150	1.3	110	0.6	149	2.8	328	0.8	173	1.3	307	0.9
500	124	0.9	300	1.3	271	2.7	235	3.1	296	3.6	195	6.8	188	4.1	220	1.3	------	------	320	1.9	192	1.9	309	6.3
1,000	99	1.1	296	1.9	272	3.4	204	3.2	319	7.2	218	11.6	234	5.8	268	2.2	------	------	326	3.9	217	2.5	316	8.0
1,500	194	0.8	265	0.7	285	3.6	193	2.3	312	4.8	221	8.1	252	4.8	276	2.2	161	5.0	319	6.8	217	2.8	307	9.6
2,000	179	2.9	259	0.8	281	2.7	169	1.4	291	4.6	212	6.0	262	5.9	265	2.6	181	5.0	315	9.7	234	3.9	302	11.5
2,500	190	3.5	232	4.4	296	3.1	127	1.3	244	6.2	213	4.1	269	6.3	214	1.4	206	4.1	316	11.1	267	4.4	298	11.0
3,000	212	4.2	232	6.6	308	3.0	114	1.0	------	------	190	2.0	273	6.1	192	2.5	230	4.6	317	11.8	265	7.3	291	12.8
4,000	------	------	229	7.7	275	3.3	70	1.6	------	------	159	2.8	290	6.6	162	2.4	248	5.7	325	10.4	------	------	303	10.9
5,000	------	------	------	------	------	------	------	------	------	------	------	------	276	6.1	------	------	231	4.2	------	------	------	------	------	------