

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		
Mar. 26 (Naval Observatory).	h m	°	°	°				
		11 47	-80.5	25.4	-4.0	216		
			-45.5	60.4	+9.5	31		
			-32.0	73.9	+8.5		6	
		-21.0	84.9	+10.5	93		346	
Mar. 27 (Naval Observatory).	11 1	-68.5	24.6	-3.0		340		
		-32.5	60.6	+10.5	31			
		-8.0	85.1	+10.5	62		433	
Mar. 28 (Naval Observatory).	11 15	-55.0	24.8	-3.5		340		
		-19.5	60.3	+10.0	34			
		-5.0	74.8	+9.0		6		
		+5.0	84.8	+10.0		34	414	
Mar. 29 (Naval Observatory).	11 4	-41.0	25.7	-4.0	293			
		-7.0	59.7	-17.5		49		
		-6.0	60.7	+9.0		37		
		+18.5	85.2	+10.0	25		404	
Mar. 30 (Naval Observatory).	11 19	-30.0	23.4	-5.0		386		
		+7.0	60.4	-18.0		62		
		+9.0	62.4	+9.5		34		
		+31.5	84.9	+10.0	12		494	
Mar. 31 (Naval Observatory).	11 7	-17.0	23.3	-5.0		509		
		+21.0	61.3	-16.5		43		
		+23.5	63.8	+9.5		56		
							608	
Mean daily area for March							516	

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR MARCH, 1930¹

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

March, 1930	Relative numbers	March, 1930	Relative numbers	March, 1930	Relative numbers
1	a 23	11	17	21	37
2	24	12	30	22	d
3	28	13	26	23	7
4	54	14	17	24	23
5	55	15	Ec 28	25	17
6	50	16	Mc 44	26	d
7	b 50	17	b 49	27	36
8	b 49	18	a 44	28	a 31
9	53	19		29	30
10	28	20	32	30	Mc 52
				31	52

Mean, 28 days=35.0.

¹ Dependent alone on observations at Zurich and its station at Arosa.
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 large or average-sized 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

By RICHMOND T. ZOCH

Except for the levels close to the surface at Ellendale, free-air temperatures were below normal at all levels at all of the aerological stations.

Relative humidity departures were positive in the upper levels at Due West and Groesbeck and in the lower levels at Royal Center. Elsewhere they were negative.

Free-air vapor pressures were mostly below normal.

The resultant winds were variable at the 500 and 1,000 meter levels. At the 1,500 to 3,000 meter levels they were northwesterly throughout the northern and eastern part of the country. Above the 4,000-meter level they were northwesterly over the entire country.

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during March, 1930

Altitude (meters) m. s. l.	TEMPERATURE (° C.)									
	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)	
	Mean	De-parture from normal	Mean	De-parture from normal	Mean	De-parture from normal	Mean	De-parture from normal	Mean	De-parture from normal
Surface	7.7	-2.3	8.5	-3.2	-1.4	+0.6	12.0	-1.3	1.4	-2.9
500	6.6	-1.7	7.0	-2.8	-1.9	+0.3	10.5	-1.1	0.1	-2.0
1,000	4.8	-1.5	4.1	-3.1	-4.0	-0.5	8.8	-1.3	-2.2	-2.4
1,500	3.1	-1.7	1.6	-3.2	-5.9	-1.3	7.0	-1.8	-4.2	-3.0
2,000	0.5	-2.5	-1.1	-3.6	-8.0	-1.6	5.3	-2.0	-5.9	-3.0
2,500	-2.3	-3.0	-3.5	-3.7	-10.6	-1.8	3.1	-2.0	-7.9	-2.7
3,000	-5.2	-3.4	-5.3	-3.4	-12.7	-1.1	0.7	-1.8	-10.3	-2.7
4,000	-10.0	-2.9	-9.1	-2.3	-18.5	-1.5	-4.5	-1.2	-15.2	-2.6
5,000	-16.8	-2.9	-14.4	-1.5	-25.3	-2.4			-22.3	-3.5

RELATIVE HUMIDITY (%)

Surface	58	-6	63	-1	66	-7	71	0	74	+3
500	57	-5	60	-2	66	-6	66	-1	71	+1
1,000	54	-5	59	-2	60	-4	62	+2	68	+4
1,500	47	-5	58	-2	55	-3	55	+4	59	+2
2,000	44	-2	57	+1	50	-6	48	+5	51	-3
2,500	41	-1	54	+3	50	-6	47	+8	46	-6
3,000	40	0	50	+6	47	-10	49	+12	48	-4
4,000	35	-2	46	+5	48	-5	50	+12	39	-10
5,000	25	-2	54	+7	47	-6			39	-15

TABLE 1.—Free-air temperatures, relative humidities, and vapor pressures during March, 1930—Continued

VAPOR PRESSURE (mb.)

Altitude (meters) m. s. l.	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)	
	Mean	De-parture from normal	Mean	De-parture from normal	Mean	De-parture from normal	Mean	De-parture from normal	Mean	De-parture from normal
Surface	6.49	-1.73	7.48	-1.87	3.71	-0.23	10.25	-1.32	5.13	-1.21
500	6.03	-1.19	6.52	-1.66	3.59	-0.24	8.87	-1.07	4.57	-0.84
1,000	4.95	-0.98	5.32	-1.50	2.72	-0.30	7.28	-0.74	3.76	-0.59
1,500	3.82	-0.95	4.33	-1.24	2.15	-0.40	5.79	-0.30	2.80	-0.71
2,000	2.91	-0.79	3.56	-0.80	1.69	-0.46	4.62	+0.22	2.16	-0.80
2,500	2.06	-0.88	2.66	-0.64	1.34	-0.44	3.92	+0.52	1.60	-0.86
3,000	1.69	-0.68	2.02	-0.27	1.05	-0.39	3.40	+0.70	1.43	-0.70
4,000	1.10	-0.36	1.51	+0.17	0.71	-0.16	1.63	-0.23	0.81	-0.56
5,000	0.98	-0.36	1.42	+0.30	0.33	-0.23			0.59	-0.47

TABLE 2.—Free-air data determined at Naval air stations during March, 1930

Altitude (meters) m. s. l.	Temperature (° C.)			Relative humidity (%)		
	Pensa-cola, Fla.	San Diego, Calif.	Wash-ington, D. C.	Pensa-cola, Fla.	San Diego, Calif.	Wash-ington, D. C.
Surface	9.6	16.4	4.4	73	64	64
500	8.6	15.4	3.4	59	59	56
1,000	6.3	13.9	1.2	46	51	55
2,000	1.6	7.9	-4.1	41	42	58
3,000	-1.3	1.3	-7.9	32	34	46
4,000						
5,000						

TABLE 3.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a. m. (E. S. T.) during March, 1930

Altitude (meters) m. s. l.	Broken Arrow, Okla. (233 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,868 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Havra, Mont. (762 meters)		Jacksonville, Fla. (65 meters)		Key West, Fla. (11 meters)		Los Angeles, Calif. (40 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface.....	N 63 W	1.5	S 55 W	1.2	N 71 W	4.8	S 81 W	1.9	N 40 W	3.2	S 29 W	0.9	S 80 W	1.3	N 63 W	1.6	S 66 E	1.1	N 71 W	1.0
500.....	S 39 W	2.5	S 71 W	4.6	.....	.....	N 83 W	5.9	N 44 W	3.8	S 60 W	2.2	.....	.....	N 61 W	4.0	S 28 E	2.3	S 83 E	1.9
1,000.....	N 80 W	5.6	S 87 W	6.3	.....	.....	N 87 W	6.8	N 44 W	6.8	N 76 W	3.9	S 78 W	4.3	N 79 W	7.1	S 12 W	3.3	E	3.0
1,500.....	N 61 W	6.1	N 74 W	9.6	.....	.....	N 79 W	8.1	N 39 W	8.8	N 57 W	6.1	N 81 W	7.6	S 86 W	9.2	S 42 W	5.6	N 75 E	2.5
2,000.....	N 60 W	7.0	N 68 W	11.3	N 70 W	7.7	N 77 W	10.0	N 41 W	9.4	N 64 W	7.8	N 63 W	7.9	S 88 W	11.7	S 65 W	7.0	N 56 E	2.1
2,500.....	N 58 W	9.2	N 70 W	14.4	N 56 W	12.0	N 81 W	10.4	N 41 W	11.0	N 64 W	8.2	N 61 W	8.2	S 84 W	14.1	S 67 W	8.4	N 42 E	2.5
3,000.....	N 56 W	10.6	N 78 W	14.5	N 51 W	11.6	N 77 W	11.8	N 40 W	9.2	N 72 W	9.8	N 56 W	9.3	S 82 W	17.8	S 81 W	8.4	N 13 E	1.2
4,000.....	N 72 W	9.1	S 87 W	12.8	N 50 W	6.9	N 87 W	18.5	N 40 W	12.8	.....	.....	N 33 W	7.8	.....	.....	N 83 W	11.4	N 17 W	3.2
5,000.....	.....	.....	.....	.....	.....	.....	N 88 W	18.6	N 30 W	9.4	.....	.....	.....	.....	.....	.....	N 74 W	11.6	.....	.....

Altitude (meters) m. s. l.	Medford, Oreg. (446 meters)		Memphis, Tenn. (145 meters)		New Orleans, La. (25 meters)		Omaha, Nebr. (313 meters)		Royal Center, Ind. (225 meters)		Salt Lake City, Utah (1,280 meters)		San Francisco, Calif. (60 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D. C. (5 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
500.....	S 26 E	0.5	S 72 W	2.0	N 11 E	1.0	N 36 W	1.8	N 88 W	1.5	S 20 E	1.1	S 59 E	1.3	N 20 W	0.8	S 63 E	0.9	N 85 W	2.0
1,000.....	S 38 W	0.4	N 86 W	6.6	N 41 W	4.0	N 47 W	3.8	N 87 W	5.5	.....	.....	N 19 W	0.9	N 11 W	2.2	S 67 W	1.2	S 88 W	6.7
1,500.....	S 4 E	0.6	N 72 W	8.4	N 43 W	6.0	N 51 W	7.8	N 73 W	6.5	.....	.....	N 19 E	2.0	N 33 W	5.8	N 22 W	1.4	N 85 W	8.1
2,000.....	N 83 E	0.5	N 67 W	9.9	N 57 W	7.3	N 45 W	7.9	N 76 W	9.1	S 3 E	1.8	N 19 E	3.7	N 39 W	7.3	N 49 W	1.0	N 81 W	10.5
2,500.....	N 24 W	1.2	N 59 W	11.5	N 75 W	8.5	N 41 W	9.2	N 79 W	11.1	S 70 W	1.8	N 26 E	3.9	N 28 W	6.4	N 36 W	1.0	N 80 W	10.7
3,000.....	N 29 W	3.2	N 54 W	11.7	N 81 W	11.8	N 49 W	11.4	N 76 W	13.8	N 88 W	3.4	N 35 E	1.8	N 30 W	5.6	N 13 W	2.0	N 84 W	11.0
4,000.....	N 23 W	4.7	N 67 W	9.3	N 82 W	11.6	N 52 W	11.1	N 79 W	13.7	N 69 W	5.1	N 44 W	1.4	N 29 W	8.2	N 29 W	2.0	S 77 W	12.5
.....	N 25 W	9.6	.....	.....	.....	.....	N 52 W	8.8	N 74 W	15.9	N 59 W	5.8	.....	.....	.....	.....	.....	.....	.....	.....

TABLE 4.—Observations by means of kites, captive and limited-height sounding balloons during March, 1930

	Broken Arrow, Okla.	Due West, S. C.	Ellendale, N. Dak.	Groesbeck, Tex.	Royal Center, Ind.
Mean altitudes (meters) m. s. l., reached during month.....	3, 133	2, 644	3, 207	2, 946	2, 092
Maximum altitude (meters) m. s. l., reached and date.....	1 5, 031	2 5, 369	3 5, 385	4 4, 485	1 5, 924
Number of flights made.....	35	37	36	32	32
Number of days on which flights were made.....	31	29	31	26	31

1 9th. 2 31st. 3 19th. 4 17th.
 In addition to the above there were approximately 125 pilot balloon observations made daily at 53 Weather Bureau stations in the United States.

WEATHER IN THE UNITED STATES

THE WEATHER ELEMENTS

By M. C. BENNETT

GENERAL SUMMARY

The weather for March, 1930, was warm for the season during the first half, but the latter half in many portions was decidedly cold; and while March is normally much warmer than February, this year the month, as a whole, in many interior and southern sections was actually colder than February, which had been abnormally warm.

The precipitation for the month was unevenly distributed. From two to more than four times the normal was received in portions of the Southeast, while more than normal amounts fell in portions of Texas, the far Southwest, and the northeast section; but only scanty falls were received in most interior valley sections, the northern Great Plains, the mid-West, and the Pacific Northwest.

PRESSURE AND WINDS

At the beginning of the month a low-pressure area was central over the upper Lake region, accompanied by

moderate precipitation throughout that region, and also over the northern portion of the Mississippi Valley, the same being largely in the form of snow. Light rain also prevailed over much of the South Atlantic and portions of the east Gulf States. During the next few days these precipitation areas moved off the northeast coast, and were followed by generally fair and moderately cool weather over most of the country, except in portions of the central and southern Pacific coast areas, where rain occurred almost daily.

On the 6th a rather extensive low-pressure area extended over the Great Plains region from western Texas to the northern border States, and precipitation prevailed over most sections to the westward of the Rocky Mountains and from the lower Lakes northeastward. By the next day this storm had moved to the southern Ohio Valley, and widespread precipitation prevailed from the central Mississippi Valley southward, also to the Atlantic, and was accompanied by heavy thunderstorms in many localities. Light precipitation prevailed also over much of the region from the northern portions of New Mexico and Arizona to the northern border States, and likewise in the western portion of Washington. During the next