POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mt. Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot or group	Area: Total for each day	Spot count	Observatory
1938	h. m.		°	°	°				
Jan. 21	11 28	5736	−64.0	118.2	+21.0	145	-------	1	Mt. Wilson.
		5732	−38.0	144.2	−14.0	24	-------	2	
		5739	−24.0	158.2	+12.0	16	-------	1	
		5734	−23.0	159.2	−20.0	97	-------	11	
		5738	−20.0	162.2	+16.0	24	-------	1	
		5737	−1.5	180.7	−14.0	16	-------	2	
		5733	+1.5	183.7	−10.0	170	-------	14	
		5726	+43.0	225.2	+18.0	2860	-------	44	
		5725	+54.0	236.2	+27.0	24	-------	2	
		5727	+56.0	238.2	+13.0	194	3,570	1	
Jan. 22	11 21	5745	−77.0	92.1	−12.5	36	-------	1	Do.
		5744	−70.5	98.6	−6.5	48	-------	1	
		5740	−66.0	103.1	−14.0	16	-------	1	
		5736	−50.0	119.1	+21.0	194	-------	1	
		5743	−49.0	120.1	−8.0	16	-------	3	
		5732	−26.0	143.1	−13.0	16	-------	1	
		5739	−11.0	158.1	+12.0	97	-------	12	
		5742	−9.0	160.1	+6.0	24	-------	3	
		5734	−8.0	161.1	−19.0	97	-------	17	
		5741	+11.0	180.1	+7.0	73	-------	3	
		5733	+14.0	183.1	−10.0	388	-------	21	
		5726	+57.0	226.1	+17.0	2424	-------	42	
		5727	+71.0	240.1	+13.0	194	3,623	1	
Jan. 23	11 13	5749	−72.0	84.0	+19.0	73	-------	3	Do.
		5744	−56.0	100.0	−7.0	24	-------	2	
		5740	−52.0	104.0	−13.0	24	-------	1	
		5748	−39.0	117.0	−18.0	16	-------	4	
		5743	−37.0	119.0	−8.0	36	-------	2	
		5736	−37.0	119.0	+21.0	194	-------	1	
		5747	−33.0	123.0	+31.0	36	-------	3	
		5739	+2.5	158.5	+11.0	121	-------	12	
		5734	+7.0	163.0	−20.0	97	-------	17	
		5741	+28.0	184.0	+7.0	24	-------	2	
		5733	+29.0	185.0	−10.0	242	-------	17	
		5726	+70.0	226.0	+17.0	1842	-------	32	
		5727	+86.0	242.0	+13.0	97	2,826	1	
Jan. 24	11 15	5749	−59.0	83.9	+19.0	48	-------	5	Do.
		5745	−47.0	95.9	−13.0	85	-------	8	
		5740	−39.0	103.9	−13.0	8	-------	1	
		5743	−23.0	119.9	−8.0	61	-------	8	
		5736	−23.0	119.9	+21.0	194	-------	1	
		5739	+17.0	155.9	+13.0	97	-------	10	
		5734	+19.5	162.4	−20.5	121	-------	15	
		5750	+41.0	183.9	−6.5	24	-------	4	
		5741	+42.0	184.9	+7.0	12	-------	1	
		5733	+42.0	184.9	−11.0	194	-------	14	
		5726	+82.0	224.9	+17.0	1067	1,911	8	
Jan. 25	11 21	5749	−49.0	80.6	+20.5	97	-------	6	Do.
		5752	−48.0	81.6	+28.0	24	-------	4	
		5745	−33.0	96.6	−13.0	48	-------	6	
		5740	−27.5	102.1	−14.0	97	-------	16	
		5751	−13.0	116.6	+15.0	24	-------	3	
		5736	−10.5	119.1	+21.0	206	-------	2	
		5739	+26.0	155.6	+14.0	24	-------	9	
		5739	+37.0	166.6	+12.0	97	-------	-------	
		5734	+32.0	161.6	−22.0	145	-------	12	
		5733	+54.0	183.6	−11.0	121	-------	7	
		5741	+56.0	185.6	+7.0	8	891	1	
Jan. 26	10 59	5749	−35.0	81.7	+20.0	145	-------	12	Do.
		5752	−33.0	83.7	+29.0	97	-------	13	
		5745	−18.0	98.7	−12.5	36	-------	6	
		5740	−13.0	103.7	−15.0	48	-------	3	
		5751	−1.0	115.7	+14.0	48	-------	4	
		5754	+2.0	118.7	+25.0	36	-------	4	
		5736	+2.0	118.7	+20.5	206	-------	2	
		5753	+7.0	123.7	+28.0	24	-------	1	
		5734	+46.0	162.7	−21.0	24	-------	4	
		5739	+49.0	165.7	+11.0	48	-------	12	
		5733	+69.0	185.7	−12.0	73	785	4	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mt. Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot or group	Area: Total for each day	Spot count	Observatory
1938	h. m.		°	°	°				
Jan. 27	11 6	5756	−79.0	24.4	+13.0	242	-------	9	U. S. Naval.
		5752	−23.0	80.4	+27.5	73	-------	5	
		5749	−21.5	81.9	+19.0	97	-------	5	
		5745	−7.0	96.4	−12.0	8	-------	2	
		5740	+2.0	105.4	−15.5	8	-------	1	
		5736	+13.5	116.9	+20.0	194	-------	1	
		5751	+13.5	116.9	+14.0	24	-------	3	
		5755	+25.0	128.4	+12.0	48	-------	6	
		5734	+59.0	162.4	−21.0	24	-------	4	
		5739	+64.0	167.4	+12.0	48	-------	6	
		5733	+80.0	183.4	−11.0	48	814	1	
Jan. 28	11 0	5758	−80.0	10.3	−5.0	48	-------	2	Do.
		5756	−65.0	25.3	+12.0	388	-------	17	
		5757	−1.0	89.3	+15.5	36	-------	4	
		5736	+27.5	117.8	+20.0	194	-------	1	
		5751	+27.5	117.8	+14.0	24	-------	4	
		5755	+38.0	128.3	+11.5	194	-------	15	
		5734	+70.0	160.3	−20.5	12	-------	1	
		5739	+78.0	168.3	+12.0	36	932	1	
Jan. 30	12 47	5760	−79.0	344.0	−11.0	48	-------	2	Do.
		5758	−53.0	10.0	−6.0	73	-------	8	
		5756	−36.0	27.0	+12.5	533	-------	16	
		5759	+7.0	70.0	+26.5	24	-------	3	
		5736	+54.0	117.0	+19.0	194	-------	1	
		5755	+65.0	128.0	+12.0	194	1,066	3	
Jan. 31	14 59	5760	−65.0	343.6	−11.0	97	-------	4	Do.
		5758	−34.0	14.6	−7.0	48	-------	4	
		5756	−24.0	24.6	+12.0	388	-------	1	
		5736	+69.0	117.6	+19.0	145	-------	3	
		5755	+78.0	126.6	+11.0	97	775	3	

Mean daily area for 27 days, 2,102.

NOTE.—Beginning with January 1938 spot counts are furnished with the regular sunspot data. Counts of spots or condensations are made from the original photographs for all regions of activity designated by Mount Wilson group numbers.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR JANUARY 1938

[Dependent alone on observations at Zurich and its station at Arosa]

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

January 1938	Relative numbers	January 1938	Relative numbers	January 1938	Relative numbers
1	*a*	11	*ad* 98	21	*a*
2	*Ec* 109	12	*d*	22	122
3	*Wc* 86	13	106	23	-------
4	76	14	111	24	108
5	*d* 80	15	118	25	94
6	*a*	16	134	26	*a* 76
7	*Ec* 102	17	*b*	27	*Wcd* 67
8	-------	18	*b* 110	28	76
9	59	19	*Ec* 104	29	59
10	92	20	*Mc*	30	*d*
				31	76

Mean, 22 days = 93.8.

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 group developing into a middle sized or large center of activity; *E:* on the eastern part of the sun's disc; *W:* on the western part; *M:* in the central 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 L. P. HARRISON

Mean free-air data based on airplane weather and radiometeorograph observations during the month of January 1938, are given in table 1, which includes the basic elements, barometric pressure, temperature, and relative humidity at various standard geometric heights. Close approximation to the corresponding mean values of auxiliary data, such as equivalent potential temperature, mixing ratio, and potential temperature may be readily computed from these elements if desired. All "means" have been computed by the customary method of differences. "Means" have not been computed where there were less than 15 observations at the surface and less than 5 at the standard levels.

Readings of the hair hygrometric apparatus used as the basis for the relative humidities have been discarded when the air temperature has been lower than −40° C. and the air pressure at the same time has been less than 600 mb.

"Departures from normal" are not published here as in the past, owing to the shortness of the periods of record and the different periods over which the records extend.

For the first time in this summary, results of radiometeorograph observations are published, including those for two stations, viz: Boston, Mass., and Burbank, Calif.

Chart I indicates that the mean *surface* temperatures during January were above normal practically throughout the country. However, very slight negative departures from normal occurred over a relatively small area near the Great Lakes, as well as parts of the northeastern States and Florida.

Table 1 shows that the minimum mean free-air temperatures over the country occurred near the Great Lakes and to a lesser extent over the area immediately to the west.

The mean relative humidities over this region were high in comparison to those which prevailed to the south and southwest. In the stratum 2.5 to 5 km, the humidities over the central portion of the country appeared deficient with respect to the values obtaining over surrounding areas.

The isobaric charts constructed on the basis of the mean free-air barometric pressures for the month indicated the statistical center of minimum pressure over the country to be located near Sault Ste. Marie, Mich., or somewhat to the north. In the stratum 2.5 to 5 km, the mean isobaric configuration over the southern portion of the country was nearly symmetrical with the circles of latitude.

Table 2 shows the free-air resultant winds based on pilot-balloon observations made near 5 a. m. (75th meridian time) during January. The resultant wind directions were generally close to normal over the country with a few minor exceptions, viz: Key West, Fla., and some of the west coast stations. At the former place, the resultant directions were oriented from 55° to 105° clockwise from normal in the stratum 1 to 2 km, but the resultant velocities were slight (1.2 to 2.7 m. p. s.). At Medford, Oreg., the departures at 3 km appeared more significant: monthly resultant direction and velocity—233°, 9.0 m. p. s.; normal—282°, 5.0 m. p. s. At 1.5 km over Oakland, Calif., the resultant was oriented about 50° clockwise from normal, with slight velocity.

Departures of resultant velocity from normal were mostly within the range ±2 m. p. s., except at Key West (2.5 km, +3.0 m. p. s.), Sault Ste. Marie, Mich. (2.5 km, −4.3), Detroit, Mich. (2 km, −4.1; 2.5 km, −4.8) and Chicago, Ill. (1 km, −3.2).

Table 3 shows the maximum free-air wind velocities and their directions for various sections of the United States during January as determined by pilot balloon observations. The extreme maximum was 74.6 m. p. s. from the NNW at 4,590 m. above sea level over Abilene, Tex., on January 25th.

TABLE 1.—*Mean free-air, barometric pressures (P) in mb., temperatures (T) in °C., and relative humidities (R. H.) in percent, obtained by airplanes or radiometeorographs during January 1938*

Stations	Altitude (meters) m. s. l.																												
	Surface				500			1,000			1,500			2,000			2,500			3,000			4,000			5,000		
	Number of obs.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.
Barksdale Field,[1] La. (52 m)	29	1,014	7.9	79	960	8.8	66	904	7.1	59	850	5.8	53	799	4.1	49	751	2.5	44	706	0.0	42	623	−5.6	32			
Billings, Mont.[2] (1,090 m)	31	891	−1.9	64							846	−0.6	54	795	−3.5	53	745	−6.3	55	699	−9.2	57	613	−15.5	55	536	−22.2	58
Boston, Mass.* (5 m)	28	1,017	−3.6	77	954	−5.5	82	896	−7.2	82	839	−7.9	80	788	−9.4	78	736	−10.9	79	691	−12.3	77	605	−17.4	74	528	−23.8	72
Burbank, Calif.* (220 m)	31	992	7.0	67	959	13.3	49	905	12.0	45	850	9.2	41	802	7.1	38	752	4.4	36	710	1.7	35	624	−4.9	35	548	−11.5	33
Cheyenne, Wyo.[2] (1,873 m)	30	809	−3.4	63										796	−1.6	58	747	−3.1	54	702	−6.3	54	615	−13.2	52	539	−19.6	50
Chicago, Ill.[2] (187 m)	31	993	−4.8	84	954	−5.7	83	895	−6.0	80	840	−6.6	75	788	−7.5	66	738	−8.8	54	692	−11.1	52	606	−15.5	49	531	−21.6	51
Coco Solo, C. Z.[3] (15 m)	30	1,009	24.7	86	955	22.8	88	902	19.7	84	851	16.8	77	802	14.3	72	755	12.6	52	712	10.8	36	630	5.4	24	557	0.3	22
El Paso, Tex.[2] (1,194 m)	31	884	4.6	63							851	6.5	48	801	4.4	49	752	2.2	47	707	−0.4	47	623	−6.0	40	548	−12.3	37
Fargo, N. Dak.[2] (274 m)	31	984	−15.1	79	955	−13.6	78	894	−10.5	74	838	−9.5	68	785	−10.3	63	735	−12.0	62	689	−13.8	62	603	−19.1	60	526	−25.0	60
Kelly Field, Tex.[1] (206 m)	18	996	8.7	80	961	12.0	59	905	11.0	51	852	9.5	46	802	7.4	39	754	5.0	36	709	2.0	34	625	−2.9	29	552	−10.1	25
Lakehurst, N. J.[3] (39 m)	20	1,014	−4.1	73	956	−3.0	61	897	−6.0	55	841	−6.3	52	790	−7.8	52	740	−9.4	47	694	−11.9	46	606	−18.1	44			
Maxwell Field, Ala.[1] (52 m)	23	1,015	7.2	71	961	6.1	67	904	4.2	60	850	2.8	50	799	1.1	48	750	−0.2	42	704	−2.0	39	620	−6.6	34	545	−12.3	30
Mitchel Field, N. Y.[1] (29 m)	25	1,016	−3.7	80	957	−3.3	70	898	−5.5	71	842	−6.8	66	790	−7.6	58	740	−8.4	54	694	−10.1	54	609	−14.7	52			
Nashville, Tenn.[2] (180 m)	31	998	2.3	81	959	2.3	74	901	1.0	69	846	−0.2	63	795	−1.2	58	746	−3.4	59	701	−5.9	58	615	−11.5	55	539	−18.2	55
Norfolk, Va.[3] (10 m)	15	1,020	0.3	67	959	−0.3	61	901	−1.8	55	846	−3.4	52	794	−4.0	50	744	−5.3	47	698	−6.9	47	613	−10.8	45	539	−16.0	47
Oakland, Calif.[3] (2 m)	31	1,021	8.0	85	962	10.2	63	906	9.4	53	852	7.7	50	802	5.4	43	753	2.6	41	708	−0.5	38	623	−7.4	38	548	−14.0	38
Oklahoma City,[2] Okla. (391 m)	31	972	2.2	72	960	3.8	65	903	4.9	55	848	3.9	51	797	1.5	51	749	−1.2	52	703	−3.5	47	618	−9.3	50	543	−15.4	46
Omaha, Nebr.[2] (300 m)	29	982	−6.1	81	957	−4.9	75	898	−2.8	64	844	−2.8	59	792	−4.1	53	742	−6.0	48	697	−8.6	48	611	−14.1	43	535	−21.2	42
Pearl Harbor, T. H.[3] (6 m)	31	1,016	20.2	81	960	20.2	72	905	16.7	79	853	14.5	72	804	13.5	51	757	12.0	34	712	9.5	30	631	3.5	26	557	−2.3	22
Pensacola, Fla.[3] (13 m)	21	1,022	8.3	81	963	8.3	73	906	7.5	64	852	6.2	55	802	5.1	50	753	3.8	41	708	2.0	32	625	−2.3	28	551	−7.8	27
Salt Lake City, Utah[2] (1,288 m)	31	875	−0.6	78							852	1.0	68	800	−0.8	64	751	−3.2	65	705	−5.4	62	619	−10.9	62	543	−17.2	62
San Diego, Calif.[3] (10 m)	31	1,018	9.1	82	960	14.0	63	904	11.8	53	851	9.7	45	801	7.2	43	753	4.6	39	708	1.8	38	624	−4.6	33	551	−12.4	31
Sault Ste. Marie, Mich.[2] (221 m)	29	989	−12.5	81	953	−12.7	79	893	−13.4	76	836	−14.2	71	782	−15.1	67	732	−16.8	66	685	−18.8	69	598	−22.7	67	521	−29.0	71
Scott Field, Ill.[1] (135 m)	17	1,005	−4.3	79	959	−3.4	69	900	−2.1	57	845	−3.1	54	793	−3.9	50	744	−5.5	49	698	−7.6	48	612	−12.9	45	537	−18.3	42
Seattle, Wash.[3] (10 m)	17	1,019	5.0	85	959	4.5	73	902	3.1	69	847	1.3	61	796	−1.3	59	747	−4.1	56	701	−7.0	46	616	−14.0	48			
Selfridge Field, Mich.[1] (177 m)	28	994	−6.3	81	954	−7.1	80	894	−8.2	78	839	−9.6	74	786	−10.2	69	736	−11.9	67	689	−13.7	63	603	−18.8	58	527	−25.1	55
Spokane, Wash.[3] (597 m)	31	951	−1.0	89				904	−2.4	88	849	−3.4	80	796	−3.6	70	747	−5.8	66	701	−8.6	63	614	−15.4	66	538	−21.8	63
Washington, D. C.[3] (13 m)	31	1,018	0.6	78	958	0.8	70	900	−0.7	66	845	−2.6	66	793	−4.2	64	744	−5.7	65	698	−7.6	62	612	−13.0	50	537	−19.5	48
Wright Field, Ohio[1] (244 m)	19	988	−3.4	84	956	−2.8	79	898	−4.0	77	843	−4.3	62	790	−5.2	52	741	−6.5	48	695	−8.3	42	610	−13.3	50	535	−19.6	56

		Altitude (meters) m. s. l.																										
		6,000			7,000			8,000			9,000			10,000			11,000			12,000			13,000			14,000		
		P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.	P	T	R. H.
Boston, Mass.	28	459	−30.5	71	399	−37.1	70	345	−44.2																			
Burbank, Calif.	31	481	−17.9	34	420	−24.5	34	366	−30.8	34	317	−36.9	33	274	−43.2		235	−48.8		202	−53.9							

[1] Army. [2] Weather Bureau. [3] Navy.

*Observations by radiometeorograph. Stations not so marked have observations by airplane. Number of observations at Boston at standard levels 6,000 m and higher were: 20, 14, and 8, respectively; at Burbank: 28, 25, 22, 20, 17, 12, and 8.

Observations taken about 4 a. m. 75th meridian time, except by Navy stations along the Pacific coast and Hawaii where they are taken at dawn.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during January 1938*

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio (153 m)		Detroit, Mich. (204 m)		Fargo, N. Dak. (283 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Nashville, Tenn. (194 m)	
	Direction	Velocity	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	337	1.1	293	2.5	264	4.6	280	2.5	283	4.9	270	1.3	258	1.0	262	2.4	234	1.2	81	0.8	15	1.2	88	0.8	214	1.6
500	-----	-----	284	4.9	-----	-----	294	5.7	-----	-----	262	3.3	251	5.3	259	3.4	329	3.9	163	1.4	94	1.8	45	0.4	244	4.5
1,000	-----	-----	279	7.8	-----	-----	281	6.7	-----	-----	287	5.6	257	8.9	277	6.6	331	6.8	294	3.1	169	1.2	152	3.3	264	7.0
1,500	-----	-----	275	9.2	276	10.3	268	10.7	-----	-----	287	8.0	273	10.6	273	7.7	312	8.8	282	5.0	245	1.8	199	3.9	272	8.6
2,000	274	2.3	278	9.2	297	9.8	276	13.0	281	7.9	295	10.3	268	12.9	293	6.3	314	12.6	282	8.9	250	2.7	220	6.1	276	11.0
2,500	287	4.5	272	9.8	300	10.3	277	14.9	292	12.6	298	12.3	269	9.3	292	7.2	314	14.6	291	8.6	251	5.0	236	7.0	286	14.0
3,000	296	7.5	276	13.1	303	11.8	291	13.0	305	11.4	-----	-----	-----	-----	-----	-----	313	14.2	284	9.2	236	4.7	233	9.0	-----	-----
4,000	302	12.1	-----	-----	303	11.2	-----	-----	305	11.5	-----	-----	-----	-----	-----	-----	-----	-----	276	9.5	-----	-----	-----	-----	-----	-----
5,000	300	9.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	271	12.2	-----	-----	-----	-----	-----	-----

Altitude (meters) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Harbor, Territory of Hawaii[1] (68 m)		Pensacola, Fla.[1] (24 m)		St. Louis, Mo. (170 m)		Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washington, D. C. (10 m)	
	Direction	Velocity	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	295	1.8	104	0.5	327	1.1	332	1.4	44	3.3	353	1.9	258	2.8	152	1.8	22	0.8	88	0.8	147	1.9	196	0.7	296	0.7
500	283	5.1	51	2.1	276	1.1	284	2.9	75	5.3	293	1.5	270	7.5	-----	-----	21	0.6	127	1.2	187	3.5	-----	-----	272	4.9
1,000	279	8.2	25	3.2	281	6.2	277	8.4	82	5.6	274	6.1	285	11.9	-----	-----	16	1.5	299	4.9	208	4.5	177	1.4	277	7.8
1,500	253	11.0	19	1.5	288	7.8	287	10.5	86	4.2	272	7.1	289	12.5	168	2.2	353	2.0	297	4.3	221	4.3	225	3.5	277	8.5
2,000	262	12.3	347	2.0	286	8.2	288	12.0	65	3.2	273	8.3	295	13.4	224	2.8	352	3.3	292	6.1	227	6.7	258	4.1	271	9.9
2,500	271	10.9	350	2.9	292	11.3	292	12.1	62	3.2	270	11.7	289	14.2	274	3.8	339	4.1	290	5.4	246	7.5	285	6.0	263	13.6
3,000	-----	-----	334	3.3	282	11.9	296	13.6	45	3.2	271	14.2	292	14.5	287	4.5	333	4.2	-----	-----	-----	-----	297	7.0	268	15.3
4,000	-----	-----	311	4.6	-----	-----	-----	-----	22	4.3	-----	-----	287	16.7	302	9.9	357	6.9	-----	-----	-----	-----	261	10.6	-----	-----
5,000	-----	-----	-----	-----	-----	-----	-----	-----	3	2.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

[1] Navy stations.

TABLE 3.—*Maximum free-air wind velocities (meters per second) for different sections of the United States, based on pilot-balloon observations during January 1938*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m), m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m), m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m), m. s. l.	Date	Station
Northeast [1]	50.1	SSW	1,240	24	Cleveland	37.1	NNW	4,300	28	Cleveland	43.2	W	6,280	20	Cleveland.
East Central [2]	39.0	SW	1,650	30	Knoxville	38.4	NW	4,320	28	Greensboro	44.0	W	9,030	5	Knoxville.
Southeast [3]	38.2	WSW	2,080	25	Jacksonville	37.8	W	2,980	26	Jacksonville	34.4	W	6,780	5	Charleston.
North Central [4]	38.4	S	1,190	24	Detroit	40.3	NW	5,000	22	Minneapolis	46.7	NW	5,830	22	Bismarck.
Central [5]	37.2	SW	1,050	29	Indianapolis	45.4	NNW	4,720	27	Omaha	51.2	NNW	6,160	14	Omaha.
South Central [6]	49.6	SW	1,930	28	Oklahoma City	74.6	NNW	4,590	25	Abilene	38.0	NW	8,750	2	Houston.
Northwest [7]	34.9	SSW	1,550	31	Portland	55.8	S	2,840	30	Medford	53.6	NNW	5,410	11	Missoula.
West Central [8]	36.6	WNW	2,090	10	Cheyenne	50.3	NW	5,000	23	Modena	73.6	NW	7,000	23	Modena.
Southwest [9]	28.8	SSE	2,500	14	San Diego	59.0	NNW	4,160	25	Albuquerque	53.0	WNW	6,140	17	Albuquerque.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.