Atmospheric conditions during solar radiation measurements, Blue Hill Observatory of Harvard University

Date and time from apparent noon	Air temperature	Wind (Beaufort scale)	Visibility; scale, 0–10	Sky blueness	Cloudiness and remarks
September 1934	°C.				
1; 2:54 a. m.	17.8	SE 3	9, se, 5 sw	4	Few Cu, 1 Ci.
1; 3:40 p. m.	17.7	ESE 4	8–9	6	4 Ci.
11; 1:57 a. m.	19.4	WNW 2		4	4 Acu, 1 Cu.
11; 1:58 a. m.	20.6	NW 3	8	5	Few Acu, 6 Cu.
13; 3:01 p. m.	15.4	NE 4		8	5 Ci, few Acu, few Stcu.
13; 4:19 p. m.	14.9	ENE 3			5 Ci, 3 Cu, few Stcu.
25; 1:56 a. m.	19.3	NE 3		7	Few Ci, few Stcu, 1 Cu.
25; 0:56 p. m.	21.0	NNE 1		6	Few Ci, few Cu. (Ci'ds interrupted radiation meas'ts.)
25; 4:00 p. m.	19.8	NE 1	8+	7	Few Ci, few Cu.
26; 4:04 a. m.	18.3	S 2	7	8	Clear, with fog on horizon.
26; 2:37 p. m.	26.1	S 2	8	6	Few Cu.
26; 4:14 p. m.	25.0	SxW 3		6	Few Ci, few Cu.
26; 0:22 a. m.	23.9	S 2		6	Few Cu.
28; 4:00 a. m.	12.2	WNW 2	4, n, 6, w	6	Few Cist, lt. hz, Smk over Boston.
28; 2:00 a. m.	13.9	WNW 2	8 sw, 7 e	6–7	Smk to 5° over Boston.
28; 2:09 p. m.	18.3	WSW 2	7	6	Few Acu, sse horizon.
28; 4:12 p. m.	19.4	WSW 2		5	1 Acu & Cu, west horizon.

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. The difference in longitude is measured from the central meridian, positive west. The 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	°	°	°				
Sept. 1	11	22		No spots					U. S. Naval.
Sept. 2	10	34		No spots					Do.
Sept. 3	11	0		No spots					Mount Wilson.
Sept. 4	13	18		No spots					U. S. Naval.
Sept. 5	13	29		No spots					Do.
Sept. 6				No spots					Harvard.
Sept. 7	9	0		No spots					Mount Wilson.
Sept. 8	9	30		No spots					Do.
Sept. 9				No spots					Harvard.
Sept. 10	13	8		No spots					U. S. Naval.
Sept. 11	13	11		No spots					Do.
Sept. 12	11	40	−1.0	173.8	−30.0		9	9	Mount Wilson.
Sept. 13				No spots					Harvard
Sept. 14	11	45	+25.0	173.4	−30.0		27		Mount Wilson.
			+50.0	198.4	+7.0		8	35	
Sept. 15	12	18	+62.0	196.9	+7.0	46		46	U. S. Naval.
Sept. 16	12	25	+77.0	198.6	+7.0		115	115	Mount Wilson.
Sept. 17	11	14		No spots					U. S. Naval.

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time		Heliographic			Area		Total area for each day	Observatory
			Diff. in longitude	Longitude	Latitude	Spot	Group		
1934	h	m	°	°	°				
Sept. 18	11	26		No spots					U. S. Naval.
Sept. 19	11	30		No spots					Do.
Sept. 20	11	16		No spots					Do.
Sept. 21	9	15		No spots					Mount Wilson.
Sept. 22	11	48		No spots					U. S. Naval.
Sept. 23	12	37		No spots					Do.
Sept. 24	12	41		No spots					Do.
Sept. 25	14	29		No spots					Do.
Sept. 26	11	8		No spots					Do.
Sept. 27	11	49		No spots					Do.
Sept. 28	11	39	+7.0	330.7	+23.0	31		31	Do.
Sept. 29	13	0	−66.0	243.8	−12.0		6		Mount Wilson.
			+7.0	316.8	−2.5		4		
			+21.0	330.8	+22.0		8		
			+50.0	359.8	−29.0		6	24	
Sept. 30	11	30	+34.0	331.4	+23.0		62	62	U. S. Naval.
Mean daily area for 30 days								11	

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR SEPTEMBER 1934

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

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

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

Mean: 29 days=3.9.

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 circle zone.

AEROLOGICAL OBSERVATIONS

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

By L. T. SAMUELS

Free-air temperatures during September averaged lowest over the northwestern section of the country and highest over southern California. (See table 1.) Departures from normal, at those stations with sufficiently long records, were small, and were negative at the lower levels and positive at the upper levels.

Free-air relative humidities averaged lowest over the middle and southern Pacific coast and highest over the middle Atlantic coast, the difference being about 30 percent.

Resultant free-air wind directions over the eastern part of the country contained a greater southerly component than normal. (See table 2.) In most cases the resultant velocities were below normal in this region. Elsewhere resultant directions were close to normal, and velocities generally above normal.

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

TEMPERATURE (° C.)

Station	Altitude (meters) m. s. l.																	
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000	
	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	Mean	Departure from normal
Billings, Mont.[1] (1,090 m.)	9.4						11.1		9.2		6.8		3.3		−3.5		−9.5	
Cheyenne, Wyo.[1] (1,873 m.)	6.2								8.1		9.8		7.1		0.3		−6.9	
Fargo, N. Dak.[1] (274 m.)	8.1		10.6		10.5		8.4		6.9		5.1		2.4		−2.7		−8.4	
Fort Crockett (Galveston), Tex.[2 3] (3 m.)	25.2		23.8		21.0		18.5		16.5		14.2		11.4		5.1		−0.4	
Kelly Field (San Antonio), Tex.[2] (211 m.)	21.9		22.5		21.3		19.1		16.8		14.5		11.9		5.5		−1.2	
Maxwell Field (Montgomery), Ala.[2] (52 m.)	19.2		22.4		19.5		17.0		14.8		12.1		9.4		3.2		−2.9	
Mitchel Field (Hempstead, L. I.), N. Y.[2] (39 m.)	16.8		17.6		15.8		14.5		12.6		10.4		7.5		1.8		−4.0	
Murfreesboro, Tenn.[1] (174 m.)	17.1		19.4		18.0		15.3		12.9		10.1		7.6		2.0		−4.0	
Norfolk, Va.[4] (3 m.)	21.2	−1.3	20.6	−0.6	18.4	−0.5	15.9	−0.2	13.4	0.0	10.8	+0.1	8.5	+0.4	3.0	+0.4	−2.6	+0.4
Oklahoma City, Okla.[1] (391 m.)	16.5		17.1		18.1		17.0		14.6		11.4		8.4		1.5		−4.7	
Omaha, Nebr.[1] (300 m.)	11.9	(6)	13.6	(6)	15.3	−1.0	13.5	−0.6	11.5	+0.1	9.0	+0.7	6.2	+1.0	−0.4	+0.2	−7.1	−1.1
Pearl Harbor, Territory of Hawaii[4] (5 m.)	23.7	−3.6	22.3	−0.5	18.8	+0.1	15.6	−0.1	13.1	+0.3	11.2	+0.1	9.2	0.0	3.5	0.0	−2.3	0.0
Philadelphia, Pa.[4] (3 m.)	19.1		18.1		16.0		13.9		12.1		9.3		6.9		1.1		−5.3	
San Diego, Calif.[4] (10 m.)	18.3	−1.1	19.5	+2.3	20.5	+1.4	20.1	+1.6	17.7	+0.2	15.4	+0.5	12.9	+0.8	7.0	+1.1	0.6	+1.1
Scott Field (Belleville), Ill.[3] (135 m.)	14.8		17.2		15.8		14.2		11.3		8.2		5.2		−0.9		−7.4	
Selfridge Field (Mount Clemens), Mich.[2] (177 m.)	15.7		17.7		15.7		13.1		10.6		8.2		5.6		0.3		−4.9	
Spokane, Wash.[5] (596 m.)	9.1				12.9		10.5		7.2		4.0		1.0		−4.8		−11.0	
Sunnyvale, Calif.[4] (6 m.)	15.3		14.2		18.1		17.7		14.8		11.2		7.6		−0.5			
Washington, D. C.[4] (2 m.)	19.4	−1.0	18.7	−0.5	16.9	−0.6	15.2	−0.1	13.3	+0.3	11.1	+0.4	8.5	+0.3	3.2	+0.6	−3.2	+0.4
Wright Field (Dayton), Ohio[2] (244 m.)	14.8		16.3		16.3		13.7		11.1		8.3		5.7		−0.3		−6.1	

RELATIVE HUMIDITY (PERCENT)

Station	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000	
Billings, Mont.[1] (1,090 m)	66						57		55		52		54		60		51	
Cheyenne, Wyo.[1] (1,873 m)	67								62		49		47		46		47	
Fargo, N. Dak.[1] (274 m)	83		73		67		62		57		53		52		43		44	
Fort Crockett (Galveston), Tex.[2 3] (3 m)	84		80		72		65		58		54		54		53		47	
Kelly Field (San Antonio), Tex.[2] (211 m)	93		89		80		74		67		59		53		45		43	
Maxwell Field (Montgomery), Ala.[2] (52 m)	94		64		66		60		49		45		42		46		39	
Mitchel Field (Hempstead, L. I.), N. Y.[2] (39 m)	93		80		75		66		61		56		57		52		48	
Murfreesboro, Tenn.[1] (174 m)	90		74		72		71		66		62		57		49		41	
Norfolk, Va.[4] (3 m)	87	+9	81	+11	81	+14	79	+14	75	+12	71	+12	64	+10	57	+10	53	+10
Oklahoma City, Okla.[1] (391 m)	85		79		63		56		53		53		50		47		40	
Omaha, Nebr.[1] (300 m)	87	(6)	77	(6)	63	+4	59	+3	54	0	47	−8	45	−9	45	−6	42	−7
Pearl Harbor, Territory of Hawaii[4] (5 m)	85	+17	80	+6	83	+4	80	+5	71	+2	53	−1	42	+1	34	+1	33	+1
Philadelphia, Pa.[4] (3 m)	86		79		78		65		61		60		54		48		39	
San Diego, Calif.[4] (10 m)	83	+7	70	−9	55	−2	42	−2	39	+7	35	+6	34	+7	33	+8	31	+8
Scott Field (Belleville), Ill.[3] (135 m)	92		70		67		55		50		52		47		45		38	
Selfridge Field (Mount Clemens), Mich.[2] (177 m)	90		71		68		66		62		58		55		49		43	
Spokane, Wash.[5] (596 m)	68				48		47		50		55		55		48		45	
Sunnyvale, Calif.[4] (6 m)	75		74		47		36		33		30		27		25			
Washington, D. C.[4] (2 m)	81	+5	75	+6	75	+10	66	+3	58	−3	53	−5	51	−3	46	−4	31	−4
Wright Field (Dayton), Ohio[2] (244 m)	92		79		67		66		59		53		49		46		38	

[1] Weather Bureau.
[2] Army.
[3] June to November, inclusive, only.
[4] Navy.
[5] National Guard.
[6] 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.

Observations taken about 5 a. m., 75th meridian time, except along the Pacific coast and Hawaii where they are taken about 5 a. m., local standard time.

LATE REPORTS FOR AUGUST, 1934

TEMPERATURE (°C.)

Station	Altitude (meters) m. s. l.																	
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000	
	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	Mean	Departure from normal
Philadelphia, Pa.[1] (3 m)	20.3		19.6		17.4		14.6		10.8		8.1		5.8		0.2		−6.1	
Washington, D. C.[1] (2 m)	18.5	−4.2	18.9	−2.6	17.5	−2.0	15.4	−1.3	12.9	−0.9	10.5	−0.5	8.1	−0.1	2.8	+0.1	−3.8	0.0

RELATIVE HUMIDITY (PERCENT)

Philadelphia, Pa.[1] (3 m)	82		73		66		65		67		60		55		41		35	
Washington, D. C.[1] (2 m)	85	+9	74	+5	73	+8	74	+8	72	+5	66	+3	57	−2	48	−6	47	−5

[1] Navy.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 7 a. m. (E. S. T.) during September 1934*

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Bismarck, N. Dak. (518 m)		Brownsville, Tex. (7 m)		Burlington, Vt. (132 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cleveland, Ohio (245 m)		Dallas, Tex. (154 m)		Havre, Mont. (762 m)		Jacksonville, Fla. (14 m)		Key West, Fla. (11 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
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	39	1.2	350	0.6	345	0.9	100	1.2	170	3.0	279	3.0	227	1.2	180	2.4	155	1.9	276	1.1	316	1.3	99	1.9
500			3	0.3			143	7.1	190	7.3			238	5.2	222	5.6	192	6.1			45	0.6	102	4.3
1,000			248	1.9	264	3.5	160	7.4	222	5.5			243	5.7	249	5.7	203	6.3	272	2.6	79	1.0	107	4.2
1,500			235	2.5	277	4.1	161	6.5	239	5.2			248	7.2	243	6.4	214	3.7	292	6.1	66	0.5	113	3.1
2,000	229	0.3	242	2.7	286	4.4	160	5.3	250	4.8	277	4.6	256	7.4	237	6.9	249	2.7	292	7.4	84	0.7	128	2.6
2,500	272	3.6	242	3.7	287	6.1	150	4.6	237	5.6	291	6.7	253	7.3	238	7.2	285	3.0	284	7.8	122	0.3	122	2.5
3,000	271	6.3	245	3.9	284	9.0	138	3.8	238	5.3	292	8.4	248	7.6	239	7.0	325	3.5	288	10.1	198	0.8	137	1.4
4,000	273	6.2	244	4.2	296	11.6	126	2.4	225	5.9	293	10.4			245	8.6	312	2.4	288	12.6	222	1.2	54	0.7
5,000	269	6.6	240	3.2			102	0.9			293	9.0			252	9.8	284	4.6			241	2.7		

Altitude (m) m. s. l.	Los Angeles, Calif. (217 m)		Medford, Oreg. (410 m)		Memphis, Tenn. (83 m)		New Orleans, La. (19 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Phoenix, Ariz. (338 m)		Salt Lake City, Utah (1,294 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 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
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	348	0.4	186	0.4	188	0.7	97	2.0	260	0.5	140	1.0	142	0.7	89	1.6	147	2.7	24	0.2	123	1.1	320	0.9
500	0	0	298	0.6	216	6.4	142	4.0	246	1.8	169	4.5	205	2.4	182	0.6			171	2.3	178	0.1	344	2.3
1,000	360	0.2	308	1.2	229	7.0	155	4.7	344	2.8	211	9.1	246	4.5	270	2.4			229	4.7	10	1.4	314	4.2
1,500	7	0.7	22	0.4	231	6.5	170	3.3	3	2.0	227	8.0	256	5.5	267	2.8	154	2.7	231	3.9	340	2.3	260	4.8
2,000	249	0.7	7	0.8	243	5.0	161	2.4	343	2.3	243	6.9	279	5.4	236	2.8	230	1.4	244	6.5	338	2.6	277	5.8
2,500	211	1.7	276	2.2	237	4.0	174	1.8	191	0.2	248	5.3	291	7.4	220	3.5	272	2.6	252	8.8	329	4.5	263	6.7
3,000	210	2.5	266	4.4	229	4.3	117	0.7	148	1.6	291	5.6	306	7.3	218	4.3	284	4.5	257	7.2	307	4.9	251	8.3
4,000	187	3.4	281	5.9			325	2.6			330	5.8	293	5.8	235	6.1	291	8.9	249	3.6	343	6.6		
5,000	214	3.3	282	6.3											252	8.4	290	11.7						

RIVERS AND FLOODS

By RICHMOND T. ZOCH

[River and Flood Division, Montrose W. Hayes, in charge]

The table shows the places at which flood stages were reached during September. The overflows in the Roanoke, Wisconsin, Bourbeuse, Meramec, and Purgatoire Rivers caused slight damage; elsewhere no damage resulted.

In addition to the above floods, heavy rains near Hartford, Conn., caused the small streams to overflow, and there was considerable damage. High water broke a dam on Middle Creek in Snyder County, Pa. The entire damage for this Middle Creek flood was estimated at slightly less than $70,000.