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.	°	°	°				
June 17	12	32	−43.0	201.9	+3.0	------	185	------	U.S. Naval.
			+4.5	249.4	−30.0	------	31	216	
June 18	11	10	−27.0	205.4	+3.0	------	209	------	Mount Wilson.
			+18.0	250.4	−29.0	------	9	218	
June 19	13	12	−15.0	203.1	+2.5	------	170	170	U.S. Naval.
June 20	11	6	−3.0	203.0	+2.5	------	170	170	Do.
June 21	11	14	+14.0	206.7	+2.5	123	------	123	Do.
June 22	13	30	+28.5	206.7	+2.5	100	------	100	Do.
June 23	12	4	+41.0	206.8	+2.5	93	------	93	Do.
June 24	12	6	+54.5	207.0	+2.5	69	------	69	Do.
June 25	13	15	+68.0	206.6	+2.5	46	------	46	Do.
June 26	11	10	+82.0	208.5	+2.5	46	------	46	Do.
June 27	11	8	No spots			------	------	------	Do.
June 28	13	18	Do.			------	------	------	Do.
June 29	11	15	Do.			------	------	------	Do.
June 30	11	11	Do.			------	------	------	Do.
Mean daily area for 30 days						------	------	55	

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR JUNE 1934

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

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

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

Mean: 30 days=6.7.

b=Passage of a large group or spot through the central meridian.
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. T. SAMUELS

Free-air temperatures during June averaged mostly above normal, the largest departures occurring at Omaha. In striking contrast to the large positive departures at this station, those at Pembina to the northward were close to normal, being slightly below in the lower levels and slightly above in the higher levels. At Pensacola and San Diego, representing the Gulf and lower Pacific coast regions, respectively, the free-air temperatures averaged below normal. Relative humidity departures were in general of opposite sign to those of temperature with the largest values occurring at Pensacola and San Diego.

In connection with the difference in temperature departures at Omaha and Pembina as mentioned above, it is interesting to note that the resultant wind directions for the month at Omaha contained an appreciably greater south component than normal between the 1,000- and 4,000-meter levels and that the resultant velocities were considerably above normal at the latter station. Marked southerly components as compared to normal occurred in the resultant winds at a number of southern stations.

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

TEMPERATURES (° C.)

Altitude (meters) m.s.l.	Cleveland, Ohio[1] (246 meters)		Dallas, Tex.[2] (146 meters)		Norfolk, Va.[3] (3 meters)		Omaha, Nebr.[4] (300 meters)		Pembina, N.Dak.[5] (243 meters)		Pensacola, Fla.[3] (2 meters)		San Diego, Calif.[3] (5 meters)		Washington, D.C.[3] (2 meters)	
	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
Surface	18.9	------	24.6	(6)	25.4	+2.2	19.8	(6)	11.9	(6)	25.6	+0.5	18.9	−0.7	21.2	−1.2
500	20.5	------	25.3	(6)	23.3	+1.7	21.7	(6)	13.9	(6)	22.6	−.6	14.6	−1.7	21.7	+1.3
1,000	19.8	+4.0	23.8	+3.5	21.1	+1.8	22.8	+4.8	13.2	−0.9	19.7	−.8	12.8	−4.1	20.1	+1.9
1,500	17.5	+4.5	20.5	+2.5	------	------	20.4	+5.0	11.0	−.7	------	------	------	------	------	------
2,000	15.1	+4.6	17.5	+2.0	14.3	+1.0	17.2	+4.5	9.3	+.5	14.0	−.8	14.0	−2.5	15.9	+3.2
2,500	12.3	+4.5	14.7	+1.8	------	------	13.4	+3.7	6.7	+.7	------	------	------	------	------	------
3,000	9.2	+4.1	12.0	+1.9	8.9	+1.0	9.5	+2.8	3.9	+.8	8.5	−.7	9.4	−1.6	10.3	+3.1
4,000	2.7	+2.9	5.1	+.7	------	------	2.2	+1.9	−2.0	+.1	3.6	−.1	3.2	−1.3	3.3	+2.4
5,000	−3.5	+2.6	−2.4	−.5	------	------	−4.9	+.8	−7.9	+.2	−1.7	+.4	------	------	−3.6	+2.3

RELATIVE HUMIDITY (PERCENT)

Altitude (meters) m.s.l.	Cleveland, Ohio[1] Mean	Departure from normal	Dallas, Tex.[2] Mean	Departure from normal	Norfolk, Va.[3] Mean	Departure from normal	Omaha, Nebr.[4] Mean	Departure from normal	Pembina, N.Dak.[5] Mean	Departure from normal	Pensacola, Fla.[3] Mean	Departure from normal	San Diego, Calif.[3] Mean	Departure from normal	Washington, D.C.[3] Mean	Departure from normal
Surface	76	------	74	(6)	75	+1	79	(6)	86	(6)	85	+5	70	+1	79	+11
500	65	------	69	(6)	68	+1	67	(6)	74	(6)	81	+7	80	+3	69	+6
1,000	57	−10	63	−6	64	+1	53	−11	66	+1	78	+10	76	+18	66	+6
1,500	56	−10	63	+4	------	------	50	−11	60	−2	------	------	------	------	------	------
2,000	52	−10	58	+7	63	+3	47	−11	54	−6	77	+14	38	+13	65	+5
2,500	52	−5	48	+1	------	------	49	−7	53	−5	------	------	------	------	------	------
3,000	49	−4	41	−2	49	−3	50	−4	56	+1	70	+17	29	+12	53	0
4,000	50	+4	40	+1	------	------	52	0	54	+6	64	+18	25	+10	53	+5
5,000	47	+7	39	−4	------	------	47	−5	49	0	56	+17	------	------	40	+5

Times of observations: Weather Bureau, 5 a.m.; Navy, 7 a.m.; E. S. T.

[1] Temperature departures based on normals determined by extrapolating latitudinally those of Royal Center, Ind., and Due West, S.C. Humidity departures based on normals of Royal Center, Ind.
[2] Temperature departures based on normals determined by interpolating latitudinally those of Groesbeck, Tex., and Broken Arrow, Okla. Humidity departures based on normals of Groesbeck, Tex.
[3] Naval air stations.
[4] Temperature and humidity departures based on normals of Drexel, Nebr.
[5] Temperature departures based on normals determined by extrapolating latitudinally those of Ellendale, N.Dak., and Drexel, Nebr. Humidity departures based on normals of Ellendale, N.Dak.
[6] Surface and 500-meter departures omitted because of difference in time of day 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. (eastern standard time) during June, 1934*

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m.s.l.	Albuquerque, N. Mex. (1,554 meters)		Atlanta, Ga. (309 meters)		Bismarck, N. Dak. (518 meters)		Brownsville, Tex. (7 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (192 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	339	1.6	268	1.1	351	1.3	135	1.4	199	1.9	298	2.2	214	0.4	192	1.3	153	2.7	263	0.7	211	0.5	140	2.6
500	----	----	249	2.9	----	----	153	7.5	224	3.5	----	----	237	2.5	218	3.0	200	9.3	----	----	222	5.1	150	5.2
1,000	----	----	254	3.9	315	2.1	157	7.7	290	4.5	----	----	275	5.4	266	5.6	196	9.2	270	1.9	217	4.0	159	4.8
1,500	----	----	261	2.9	294	3.2	160	5.8	295	6.8	----	----	269	6.7	284	6.6	187	6.6	293	3.7	224	2.9	163	4.2
2,000	358	1.6	270	1.3	278	5.0	153	4.7	291	10.3	287	2.1	265	7.2	290	7.9	189	5.2	290	4.8	206	2.6	155	3.8
2,500	295	2.8	298	1.4	282	7.6	136	3.6	298	10.9	256	3.0	275	8.0	296	8.5	175	4.2	271	5.3	189	1.9	160	3.1
3,000	259	3.4	314	1.7	277	8.6	90	3.1	301	10.9	241	5.3	276	7.6	295	7.6	160	2.8	251	6.6	182	1.8	171	2.7
4,000	223	6.8	289	2.3	273	10.8	56	4.1	306	13.2	247	7.1	282	8.4	286	7.6	84	2.4	250	9.0	185	2.2	190	0.7
5,000	230	9.3	294	1.6	268	12.2	32	3.1	----	----	241	9.7	282	10.4	292	7.9	56	3.5	262	11.5	177	0.4	99	1.2

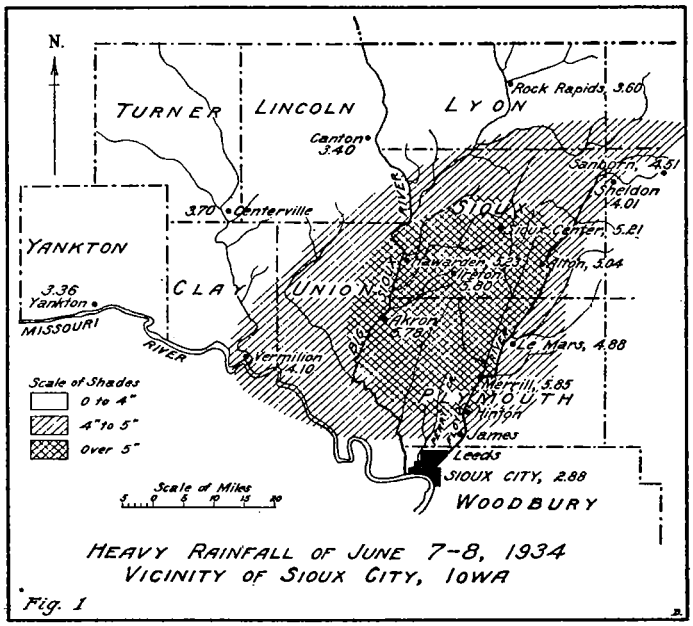
Altitude (meters) m.s.l.	Los Angeles, Calif. 217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (83 meters)		New Orleans, La. (19 meters)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (402 meters)		Omaha, Nebr. (306 meters)		Phoenix, Ariz. (338 meters)		Salt Lake City, Utah (1,294 meters)		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	165	0.2	303	0.7	180	0.8	202	1.1	259	0.9	167	3.7	144	1.1	99	1.4	158	2.6	35	0.2	129	1.0	262	0.4
500	143	1.5	295	1.4	225	4.8	225	2.4	282	3.1	180	7.0	182	3.2	246	1.1	----	----	352	1.2	40	0.9	272	4.5
1,000	12	0.8	316	1.7	246	3.2	161	2.1	337	5.3	202	13.1	217	7.1	263	2.8	----	----	310	2.9	359	1.5	290	5.9
1,500	332	2.5	350	1.0	271	2.5	154	3.3	338	4.4	209	9.9	230	7.9	234	2.6	169	3.6	293	6.2	343	2.6	286	6.4
2,000	299	2.3	12	1.4	265	1.9	147	3.6	340	2.1	212	7.1	238	7.4	204	2.9	178	3.5	292	7.2	344	3.0	281	7.0
2,500	289	2.6	311	1.0	315	2.0	130	4.2	308	1.8	210	5.3	237	7.6	191	5.9	213	2.4	290	7.5	308	2.5	274	7.9
3,000	273	3.2	283	2.1	349	1.6	134	3.2	----	----	209	3.1	241	8.1	198	8.5	241	3.1	297	7.7	286	3.2	277	9.1
4,000	243	3.2	296	4.5	17	3.6	72	3.2	----	----	245	1.8	231	7.1	200	10.8	237	6.0	288	8.2	292	3.9	274	7.3
5,000	----	----	----	----	----	----	50	3.9	----	----	----	----	298	5.8	216	8.6	222	8.3	290	8.4	263	4.9	----	----

RIVERS AND FLOODS

By RICHMOND T. ZOCH

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

In June there was a number of overflows in the Southeastern States as well as some in Iowa, Kansas, and in Washington. Those in the Southeastern States were of minor importance.



HEAVY RAINFALL OF JUNE 7-8, 1934
VICINITY OF SIOUX CITY, IOWA
Fig. 1

In June there was a number of overflows in the Southeastern States as well as some in Iowa, Kansas, and in Washington. Those in the Southeastern States were of minor importance.

Heavy general rains over the Floyd River watershed on the afternoon of June 7, 1934, and continuing during the night of the 7th and 8th, caused the greatest flood in that stream since May 1892. At Sioux City the crest stage was 0.8 foot higher than in the destructive flood of September 1926. The rainfall was much heavier in 1926 in Sioux County, Iowa, and consequently the damage in that county was much less in 1934. The area of heavy rainfall (see fig. 1) was more widespread in 1934, when it extended over the entire watershed. At most stations well over half of the precipitation occurred within a 15-hour period, beginning on the afternoon of June 7, and in several instances half of the rain fell in one or two heavy thunderstorms that lasted about an hour each.

The progress of the 1934 flood is shown in figure 2. The flood crest moved much faster in 1934 than in 1926, thus it moved from Merrill to the Missouri River, a distance of 22.8 miles in 25 hours in 1926, while in 1934 the same distance was covered in 18 hours. This difference was no doubt in part due to the retarding influence of the more advanced vegetation in 1926.

The same storm which caused the flood in the Floyd River also caused floods in the Big Sioux River and Perry Creek. The flood in Perry Creek was the highest and most destructive since 1909.

While the flood in the Big Sioux was a damaging one it was not as destructive as those in Perry Creek and the Floyd River.