AEROLOGICAL OBSERVATIONS

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

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August free-air temperatures were moderately below normal at the coast and border stations and moderately above at the interior stations. (See table 1.) At most places the relative humidity departures were of opposite sign to those of temperature.

Resultant free-air wind directions for the month did not deviate greatly from the normals. (See table 2.) Resultant free-air wind velocities generally were below normal at the northern stations and above normal at the southern.

TABLE 1.—*Free-air temperatures and relative humidities obtained by airplanes during August 1933*

TEMPERATURE (°C.)

Altitude (meters) m.s.l.	Cleveland, Ohio (246 meters)[1]		Dallas, Tex. (146 meters)[2]		Norfolk, Va. (3 meters)[3]		Omaha, Nebr. (300 meters)[4]		Pembina, N.Dak. (254 meters)[5]		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	Mean	Departure from normal
Surface	17.7	(6)	24.1	(6)	24.5	−0.2	18.4	(6)	14.8	(6)	25.7	+0.1	20.6	−1.3	22.5	−0.9
500	20.3	(6)	25.4	(6)	22.2	−1.0	19.6	(6)	17.3	(6)	23.5	−0.5	17.3	−2.5	21.9	0.0
1,000	18.3	+0.3	23.5	+1.0	19.6	−1.3	20.6	+0.3	16.0	−1.0	20.6	−0.7	21.1	−2.1	20.2	+0.4
1,500	15.3	+0.3	20.3	+0.6			17.9	+0.1	13.0	−1.5						
2,000	12.3	+0.2	17.4	+0.8	13.7	−0.8	14.6	−0.2	10.1	−1.8	14.2	−0.9	20.0	−0.8	13.9	0.0
2,500	9.7	+0.4	14.5	+1.0			12.2	+0.6	7.1	−1.9						
3,000	7.9	+1.5	11.7	+1.0	9.2	+0.2	9.4	+1.2	4.7	−1.5	7.9	−1.4	13.3	−0.8	9.4	+1.2
4,000	3.4	+2.1	6.0	+0.7			2.7	+1.1	−1.1	−1.9	1.7	−1.7	6.4	−0.8	4.8	+2.2
5,000	−1.8	+1.9	0.5	+0.9			−3.6	+0.9	−7.6	−3.1	−3.9	−1.7				

RELATIVE HUMIDITY (PERCENT)

Altitude (meters) m.s.l.	Cleveland, Ohio (246 meters)[1] Mean	Departure from normal	Dallas, Tex. (146 meters)[2] Mean	Departure from normal	Norfolk, Va. (3 meters)[3] Mean	Departure from normal	Omaha, Nebr. (300 meters)[4] Mean	Departure from normal	Pembina, N.Dak. (254 meters)[5] Mean	Departure from normal	Pensacola, Fla. (2 meters)[3] Mean	Departure from normal	San Diego, Calif. (9 meters)[3] Mean	Departure from normal	Washington, D.C. (2 meters)[3] Mean	Departure from normal
Surface	81	(6)	86	(6)	81	+5	85	(6)	74	(6)	85	0	76	+1	84	+10
500	65	(6)	70	(6)	76	+9	73	(6)	68	(6)	78	+1	84	+9	73	+6
1,000	64	−1	67	+7	69	+6	57	−3	66	+8	76	+1	57	+11	69	+6
1,500	67	+3	70	+12			58	0	66	+10						
2,000	65	+4	68	+10	64	+1	60	+2	66	+12	70	+1	36	+2	75	+9
2,500	57	0	61	+5			52	−5	64	+11						
3,000	47	−7	55	+3	52	−7	47	−10	57	+4	66	+3	39	+4	59	0
4,000	38	−8	57	+18			46	−6	52	+3	65	+2	40	+4	53	−3
5,000	33	+1	64	+35			43	−10	42	−4	57	+1				

Weather Bureau observations made near 5 a.m.; Navy observations near 7 a.m., E.S.T.

[1] Temperature and humidity departures based on normals of Royal Center, Ind.

[2] 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] 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 those of Ellendale, N.Dak.

[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.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 7 a.m. (E.S.T.) during August 1933*

[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. (12 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	11	1.6	1	0.3	91	0.2	95	0.6	165	1.6	278	2.6	12	0.2	139	0.8	159	1.7	145	0.1	286	0.5	131	3.0
500			337	1.1			145	6.4	205	2.5			197	1.1	83	.3	203	6.6			263	2.4	136	5.6
1,000			306	1.7	197	3.4	146	6.4	257	3.4			274	.9	321	1.8	202	5.9	146	.6	233	2.1	136	6.0
1,500			290	2.7	215	2.2	137	5.0	271	4.3			281	1.6	290	3.4	192	3.6	259	1.0	219	2.2	136	5.3
2,000	132	1.3	275	2.8	281	2.9	125	4.6	282	5.2	267	3.1	295	3.3	288	4.2	216	1.3	276	3.2	225	2.4	132	4.4
2,500	218	1.7	275	2.6	297	5.4	107	4.0	272	6.6	250	3.6	293	3.9	269	4.8	327	1.6	253	3.1	230	2.8	129	4.1
3,000	253	2.1	278	2.6	293	6.7	98	3.9	274	6.4	260	4.1	283	4.7	268	6.0	17	1.8	254	3.9	221	3.1	129	4.1
4,000	275	2.9	280	2.3	302	9.5	77	3.0	276	8.0	274	5.0	293	3.4	259	6.6	23	2.6	250	5.5	234	3.5	121	3.6
5,000	271	2.4	283	1.1			68	3.0	286	3.1	292	7.5			268	6.5	336	3.6	255	9.0	252	3.3	123	2.6

Altitude (meters) m.s.l.	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (83 meters)		New Orleans, La. (2 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	147	0.4	232	0.5	141	0.3	51	0.6	333	0.4	172	1.4	113	0.5	79	1.1	155	4.3	318	0.5	117	1.2	246	0.6
500	115	0.8	260	0.8	172	2.4	184	1.6	275	1.9	187	4.1	138	2.6	92	1.2			250	1.9	54	1.4	292	2.3
1,000	341	2.8	270	1.2	213	2.1	164	2.1	321	3.1	212	7.9	187	3.1	80	1.0			248	4.4	22	2.3	277	3.2
1,500	332	2.9	78	0.4	237	2.6	162	2.3	286	1.7	234	5.5	270	1.9	170	0.2	163	5.8	264	4.8	24	1.8	278	3.5
2,000	257	1.6	101	0.7	259	2.7	178	2.3	252	2.5	249	3.9	299	4.1	176	0.2	184	4.1	287	4.4	106	1.2	282	3.9
2,500	190	2.6	214	1.5	267	1.9	180	1.7	226	3.5	267	2.7	298	5.8	172	0.7	231	3.3	295	3.7	181	1.5	282	3.7
3,000	165	3.5	226	2.4	233	0.2	175	1.0	228	4.8	290	1.9	303	6.4	190	1.6	248	4.4	300	4.5	273	2.1	274	4.7
4,000	160	4.8	235	3.9	307	1.4	237	2.0			352	2.0	308	6.1	176	2.0	253	6.1	289	5.6	246	2.4	258	5.9
5,000			258	3.6	283	2.3	260	2.9			285	2.9	272	4.2	189	0.8	255	5.5	302	5.6	244	4.1	289	8.2