



JULY 2002

LOCAL CLIMATOLOGICAL DATA

NOAA, National Climatic Data Center

DULUTH, MN

INTERNATIONAL AIRPORT (DLH)

Lat: 46° 50' N Long: 92° 11' W Elev (Ground): 1426 Feet

Time Zone: CENTRAL WBAN: 14913 ISSN #:0198-2702

DATE	TEMPERATURE °F						DEG DAYS BASE 65°		WEATHER	SNOW/ICE ON GND (IN)		PRECIPITATION (INCHES)		PRESSURE (INCHES OF HG)		WIND SPEED = MPH DIR = TENS OF DEGREES								DATE									
	MAXIMUM	MINIMUM	AVERAGE	DEP FROM NORMAL	AVERAGE DEW PT	AVERAGE WET BULB	HEATING	COOLING		0600 LST	1200 LST	2400 LST	2400 LST	AVERAGE STATION	AVERAGE SEA LEVEL	RESULTANT SPEED	RES DIR	AVERAGE SPEED	MAXIMUM														
																			5-SEC		2-MIN												
																			SPEED	DIR	SPEED	DIR											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
01	89	62	76	12	66	71	0	11		0		0.0	0.00	28.38	29.85	9.2	21	11.2	35	22	29	22	01										
02	83	61	72	8	61	66	0	7	RA	0		0.0	T	28.45	29.94	5.8	28	8.3	24	25	18	26	02										
03	83	63	73	9	51	61	0	8		0		0.0	0.00	28.49	29.98	7.6	31	8.7	28	31	21	30	03										
04	71	53	62	-2	49	56	3	0		0		0.0	0.00	28.66	30.17	7.9	10	9.3	21	10	17	10	04										
05	69	52	61	-3	53	56	4	0	RA	0		0.0	0.00	28.69	30.21	12.8	12	12.9	24	12	21	12	05										
06	89*	51	70	6	59	63	0	5	TS TSRA RA	0		0.0	0.02	28.64	30.16	6.8	21	10.1	31	30	22	32	06										
07	84	65	75	10	67	69	0	10	TSRA RA BR	0		0.0	1.60	28.64	30.14	4.1	23	7.2	25	28	21	27	07										
08	84	65	75	10	67	69	0	10	TSRA RA BR	0		0.0	1.52	28.52	30.01	3.0	07	5.6	26	08	22	09	08										
09	74	61	68	3	57	62	0	3	RA	0		0.0	0.01	28.66	30.16	12.7	09	13.5	30	10	23	09	09										
10	66	55	61	-4	52	55	4	0	RA	0		0.0	0.18	28.75	30.27	12.2	10	12.4	25	11	21	10	10										
11	74	53	64	-1	48	55	1	0		0		0.0	0.00	28.77	30.29	4.2	12	5.6	16	12	13	12	11										
12	79	53	66	0	54	60	0	1		0		0.0	0.00	28.59	30.10	6.5	30	7.2	18	27	16	26	12										
13	80	58	69	3	58	63	0	4		0		0.0	0.00	28.51	30.01	5.8	29	6.9	16	26	15	26	13										
14	85	62	74	8	62	66	0	9		0		0.0	0.00	28.51	30.00	8.5	29	8.9	17	29	14	28	14										
15	84	64	74	8	64	68	0	9		0		0.0	0.00	28.53	30.02	8.7	25	9.4	22	23	17	23	15										
16	87	66	77	11	66	70	0	12	BR	0		0.0	0.00	28.47	29.96	11.3	24	11.5	25	23	21	23	16										
17	83	68	76	10	69	71	0	11	TS TSRA RA BR HZ	0		0.0	0.08	28.48	29.97	0.4	30	7.9	26	10	20	10	17										
18	71	53	62	-4	54	58	3	0	HZ	0		0.0	0.00	28.52	30.03	10.3	10	10.5	22	10	18	11	18										
19	81	52	67	1	58	62	0	2	MIFG BCFG HZ	0		0.0	0.00	28.47	29.97	3.2	17	4.4	13	17	10	19	19										
20	77	60	69	3			0	4	TS RA BR HZ	0		0.0	T	28.37	29.85	5.5	16	6.3	16	16	15	14	20										
21	84	67	76	10	68	70	0	11	TS TSRA RA BR	0		0.0	0.09	28.29	29.76	6.7	29	9.6	37	33	29	30	21										
22	72	51	62	-4	54	58	3	0		0		0.0	0.00	28.49	29.99	11.1	32	12.3	31	31	24	32	22										
23	70	43*	57*	-9	48	54	8	0	HZ	0		0.0	0.00	28.76	30.28	1.3	24	3.4	15	19	12	22	23										
24	73	55	64	-2	56	59	1	0	TS TSRA RA BR	0		0.0	0.55	28.66	30.18	6.5	17	7.5	21	19	18	19	24										
25	74	58	66	0	62	63	0	1	TS TSRA RA DZ BR	0		0.0	0.47	28.38	29.88	3.0	20	7.7	17	28	14	27	25										
26	84	61	73	7	62	66	0	8		0		0.0	0.00	28.33	29.81	4.2	29	5.3	15	31	12	24	26										
27	80	62	71	5	63	65	0	6	TS TSRA RA BR HZ	0		0.0	0.24	28.20	29.68	2.9	17	6.1	25	24	21	24	27										
28	84	62	73	7	64	67	0	8	RA FG+ BR HZ	0		0.0	0.02	28.22	29.71	5.7	30	6.2	22	30	17	30	28										
29	82	62	72	6	61	65	0	7		0		0.0	0.00	28.28	29.76	7.3	30	7.8	21	30	17	28	29										
30	88	65	77*	11	61	67	0	12	TS TSRA RA	0		0.0	0.01	28.37	29.85	6.7	30	8.5	21	30	16	30	30										
31	75	59	67	1	61	63	0	2	TS TSRA RA FG BR SQ	0		0.0	0.61	28.33	29.82	6.4	12	8.2	44*	26	35*	25	31										
79.3										58.8	69.1	■ ■					0.9	5.2	< MONTHLY AVERAGES		TOTALS->			0.0	5.40	28.50	29.99	0.9	25	8.4	<- MONTHLY AVERAGES		
3.0										4.2	3.6	■ ■	<-----DEPARTURE FROM NORMAL----->										1.20	SUNSHINE, CLOUD, & VISIBILITY TABLES ON PAGE 3									
DEGREE DAYS									GREATEST 24-HR PRECIPITATION: 3.12				DATE: 07-08				SEA LEVEL PRESSURE				DATE				TIME								
MONTHLY									GREATEST 24-HR SNOWFALL: 0.0				DATE:				MAXIMUM				:				11 0755								
TOTAL DEPARTURE									GREATEST SNOW DEPTH: 0				DATE:				MINIMUM				:				27 1555								
HEATING: 27 -42									NUMBER OF DAYS WITH →				MAXIMUM TEMP ≥ 90: 0				MINIMUM TEMP ≤ 32 : 0				PRECIPITATION ≥ 0.01 INCH : 13												
COOLING: 161 79													MAXIMUM TEMP ≤ 32 : 0				MINIMUM TEMP ≤ 0 : 0				PRECIPITATION ≥ 0.10 INCH : 7												
													THUNDERSTORMS : 11				HEAVY FOG : 1				SNOWFALL ≥ 1.0 INCH : 0												

JULY 2002
DULUTH, MN

HOURLY PRECIPITATION

(WATER EQUIVALENT IN INCHES)

DULUTH, MN

JULY 2002

DLH

WBAN # 14913

DATE	FOR HOUR (LST) ENDING AT												DATE	FOR HOUR (LST) ENDING AT												DATE	Sum if Different (See Note)	2400 LST
	1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	16	17	18	19	20	21	22	23	24			Water Equiv.
01													01		T										01			0.00
02													02												02			T
03													03												03			0.00
04													04												04			0.00
05													05												05			0.00
06													06					0.04	0.02	0.01					06	0.07		0.02
07													07					T		0.01	0.13	0.19	0.16	0.98	07	1.47		1.60
08	0.12	0.71	0.44	0.25	0.01								08												08	1.53		1.52
09													09												09			0.01
10	0.01				T	T	0.04	0.02	0.06	0.01	0.01	0.03	10	0.01	0.01								0.01		10	0.20		0.18
11													11												11			0.00
12													12												12			0.00
13													13												13			0.00
14													14												14			0.00
15													15												15			0.00
16													16												16			0.00
17													17	T	T										17	T		0.08
18													18												18			0.00
19													19												19			0.00
20												T	20	T		T	T								20			T
21			T							0.05	0.01	0.05	21	T											21	0.11		0.09
22													22												22			0.00
23													23												23			0.00
24													24												24			0.00
25	0.09	0.07	T				0.01		0.16	0.02	T	0.01	25	T				0.14	0.28	0.01	T	0.01	0.01	0.02	25	0.47		0.55
26													26												26			0.00
27											T		27			0.05	0.11	0.04	T	T				27	0.20		0.24	
28													28							T					28			0.02
29					T	0.01							29								0.02	T			29			0.00
30													30												30			0.01
31									0.63	0.12	T		31												31	0.75		0.61

MAXIMUM SHORT DURATION PRECIPITATION (See Note)

Time Period (Minutes)	5	10	15	20	30	45	60	80	100	120	150	180
Precipitation (Inches)	.30	.58	.75	.79	.83	.90	.97	1.02	1.08	1.19	1.49	1.83
Ending Date	31	07	07	07	07	07	07	07	07	08	08	08
Ending Time (Hour/Min)	0843	2307	2311	2315	2326	2340	2356	2356	2356	0306	0126	0157

Date and time are not entered for TRACE amounts.

Note : The sum of the hourly totals is given when it differs from the daily total. NWS does not edit ASOS hourly values but may edit daily and monthly totals. Hourly, daily, and monthly totals are printed as reported by the ASOS site.

* = Extreme for the month (last occurrence if more than one)
T = Trace precipitation amount
+ = also occurs on earlier date
FG+ = Heavy fog, visibility .25 miles or less
BLANK entries denote missing or unreported data

Wind direction is recorded in tens of degrees (2 digits) clockwise from true north. '00' = calm, 'VR' = variable.

Water Equivalent of snow on the ground is reported only when the depth is 2 or more inches.

WEATHER NOTATIONS

**DULUTH, MN
JULY 2002**

Satellite data are used to derive cloudiness above 12,000 feet. Effective Cloud Amount is based on the cloud cover and the transparency of the clouds within the satellite field of view (approx. 31x31 miles).

Sky Condition is based on the sum (not to exceed 8) of the sunrise to sunset cloud cover below and above 12,000 feet. Both ceilometer and satellite data must be present to compute Sky Condition. Clear = 0–2 oktas, Partly Cloudy = 3–6 oktas, Cloudy = 7–8 oktas.

A Heating (Cooling) Degree Day is the difference between the average daily temperature and 65 degrees F. The HDD season begins July 1, the CDD season begins January 1.

Dew Point is the temperature to which the air must be cooled to achieve 100% relative humidity. Wet Bulb is the temperature the air would have if cooled to saturation at constant pressure by evaporation of water into it.

Snow Depth, Snowfall, and Sunshine data may come from nearby sites that the National Weather Service deems Climatologically representative of this site.

DATE	SUNSHINE		CLOUDINESS (OKTAS)				VISIBILITY (MILES)		RESERVED
	TOTAL MINUTES	PERCENT POSSIBLE	SR-SS		MN-MN		MINIMUM	MAXIMUM	
			CEILOMETER	SATELLITE	CEILOMETER	SATELLITE			
01							10.00	10.00	
02							10.00	10.00	
03							10.00	10.00	
04							10.00	10.00	
05							10.00	10.00	
06							9.00	10.00	
07							1.50	10.00	
08							1.50	10.00	
09							8.00	10.00	
10							8.00	10.00	
11							10.00	10.00	
12							10.00	10.00	
13							10.00	10.00	
14							10.00	10.00	
15							8.00	10.00	
16							6.00	10.00	
17							3.00	10.00	
18							6.00	10.00	
19							5.00	10.00	
20							4.00	9.00	
21							5.00	10.00	
22							10.00	10.00	
23							10.00	10.00	
24							1.00	10.00	
25							.00	10.00	
26							10.00	10.00	
27							2.00	10.00	
28							<.25	10.00	
29							10.00	10.00	
30							10.00	10.00	
31							.50	10.00	
MONTHLY AVGS							6.83	9.97	
<p align="center">SUNSHINE (MINUTES)</p> <p>Total: Possible:</p> <p align="center">Percent Possible:</p>									
<p align="center">NUMBER OF DAYS WITH:</p> <p align="center">SKY CONDITION</p> <p align="center">CLR PTLY CLDY CLOUDY MISSING</p> <p align="center">31</p> <p align="center">MINIMUM VISIBILITY (MILES)</p> <p align="center"><=0.25 <=3.0 >=7.0</p> <p align="center">1 8 18</p>									

OBSERVATIONS AT 3-HOURLY INTERVALS

DULUTH, MN

JULY 2002

DLH

WBAN # 14913

HOUR (LST)				SATELLITE		WEATHER	TEMPERATURE °F				RELATIVE HUMIDITY (PCT)	WIND		PRESSURE (INCHES,HG)		HOUR (LST)				SATELLITE		WEATHER	TEMPERATURE °F				RELATIVE HUMIDITY (PCT)	WIND		PRESSURE (INCHES,HG)	
	SKY COVER	CEILING 100'S OF FT	OBSERVATION TIME (LST)	EFF CLD AMT <small>Okta</small>	VISIBILITY (MILES)		DRY BULB	DEW POINT	WET BULB	SPEED (MPH)		DIRECTION TENS OF DEG	STATION	SEA LEVEL	SKY COVER		CEILING 100'S OF FT	OBSERVATION TIME (LST)	EFF CLD AMT <small>Okta</small>	VISIBILITY (MILES)	DRY BULB		DEW POINT	WET BULB	STATION	SEA LEVEL					
					SUNRISE: 0419	JUL 01			SUNSET: 2007										SUNRISE: 0423	JUL 07											
03	CLR	NC			10.00		67	62	64	84	0	00	28.44	29.92	03	CLR	NC			10.00		66	64	65	93	3	13	28.65	30.14		
06	CLR	NC			10.00		69	64	66	84	0	00	28.46	29.94	06	OVC	047			10.00		67	65	66	93	6	24	28.69	30.19		
09	CLR	NC			10.00		81	63	69	54	12	19	28.43	29.90	09	OVC	039			10.00		73	66	68	79	9	25	28.69	30.19		
12	FEW	NC			10.00		85	71	75	63	10	16	28.38	29.86	12	BKN	055			10.00		81	65	70	58	9	24	28.67	30.17		
15	FEW	NC			10.00		89	69	75	52	17	20	28.32	29.80	15	SCT	NC			10.00		81	69	73	67	8	21	28.62	30.12		
18	CLR	NC			10.00		87	70	75	57	21	23	28.31	29.79	18	FEW	NC			10.00		77	70	72	79	7	23	28.59	30.09		
21	FEW	NC			10.00		82	68	73	63	15	23	28.32	29.80	21	OVC	019			2.00	TSRA BR	69	69	69	100	5	12	28.60	30.10		
24	CLR	NC			10.00		79	69	72	72	14	25	28.32	29.80	24	OVC	027			2.50	TSRA BR	67	67	67	100	13	13	28.54	30.03		
					SUNRISE: 0419	JUL 02			SUNSET: 2006										SUNRISE: 0423	JUL 08											
03	CLR	NC			10.00		71	61	65	71	10	33	28.41	29.89	03	OVC	032			3.00	+TSRA BR	65	65	65	100	10	16	28.49	29.98		
06	CLR	NC			10.00		69	62	65	78	9	32	28.47	29.95	06	BKN	005			10.00		67	66	66	97	6	02	28.48	29.97		
09	FEW	NC			10.00		79	54	64	42	5	36	28.49	29.96	09	OVC	009			10.00		69	67	68	93	7	08	28.51	30.01		
12	BKN	100			10.00		82	61	68	49	15	23	28.49	29.97	12	OVC	045			10.00		77	69	72	77	7	03	28.52	30.01		
15	BKN	100			10.00		81	63	69	54	9	26	28.48	29.96	15	OVC	070			10.00		79	69	72	72	5	03	28.52	30.02		
18	FEW	NC			10.00		80	56	65	44	8	25	28.44	29.93	18	BKN	075			10.00		79	71	74	77	5	15	28.53	30.02		
21	BKN	055			10.00		72	63	66	73	8	27	28.45	29.93	21	FEW	NC			10.00		74	67	69	79	6	36	28.54	30.04		
24	BKN	120			10.00		69	63	65	81	7	33	28.45	29.94	24	CLR	NC			10.00		71	64	67	79	6	01	28.54	30.03		
					SUNRISE: 0420	JUL 03			SUNSET: 2006										SUNRISE: 0424	JUL 09											
03	BKN	110			10.00		66	61	63	84	5	35	28.46	29.95	03	CLR	NC			10.00		67	60	63	79	5	05	28.58	30.08		
06	FEW	NC			10.00		67	59	62	76	3	31	28.49	29.97	06	CLR	NC			10.00		68	58	62	70	16	11	28.62	30.11		
09	CLR	NC			10.00		77	50	61	39	10	29	28.50	29.99	09	SCT	NC			10.00		70	59	63	68	17	09	28.66	30.16		
12	FEW	NC			10.00		81	48	62	32	15	30	28.49	29.98	12	FEW	NC			10.00		71	59	64	66	17	08	28.67	30.16		
15	CLR	NC			10.00		82	47	62	29	21	27	28.48	29.96	15	BKN	120			10.00		72	58	63	61	10	08	28.69	30.19		
18	CLR	NC			10.00		80	45	60	29	18	31	28.48	29.96	18	FEW	NC			10.00		70	57	62	64	15	11	28.68	30.19		
21	CLR	NC			10.00		70	46	57	42	5	33	28.50	30.00	21	SCT	NC			10.00		63	51	56	65	12	10	28.69	30.20		
24	CLR	NC			10.00		63	45	53	52	6	34	28.56	30.06	24	BKN	070			8.00	RA	62	53	57	73	9	11	28.72	30.23		
					SUNRISE: 0420	JUL 04			SUNSET: 2006										SUNRISE: 0425	JUL 10											
03	CLR	NC			10.00		57	49	53	75	0	00	28.61	30.11	03	OVC	100			10.00		61	52	56	72	16	09	28.69	30.20		
06	CLR	NC			10.00		60	51	55	72	5	06	28.65	30.15	06	OVC	090			10.00	-RA	59	52	55	78	14	11	28.73	30.25		
09	FEW	NC			10.00		66	50	57	56	15	10	28.67	30.18	09	OVC	022			9.00	-RA	57	54	55	90	13	11	28.74	30.27		
12	FEW	NC			10.00		69	50	58	51	12	12	28.68	30.19	12	OVC	024			9.00	-RA	59	55	57	87	14	10	28.74	30.27		
15	FEW	NC			10.00		70	53	60	55	9	10	28.70	30.21	15	BKN	110			10.00		65	52	58	63	16	10	28.76	30.29		
18	FEW	NC			10.00		66	47	56	50	12	11	28.67	30.18	18	BKN	120			10.00		64	49	56	58	13	09	28.76	30.29		
21	FEW	NC			10.00		58	49	53	72	10	11	28.69	30.20	21	BKN	120			10.00		59	49	54	69	8	08	28.78	30.32		
24	SCT	NC			10.00		56	49	52	77	7	11	28.69	30.21	24	CLR	NC			10.00		56	47	51	72	6	09	28.81	30.34		
					SUNRISE: 0421	JUL 05			SUNSET: 2006										SUNRISE: 0426	JUL 11											
03	CLR	NC			10.00		55	50	52	83	12	11	28.69	30.20	03	CLR	NC			10.00		54	47	50	77	7	09	28.79	30.32		
06	BKN	095			10.00		57	52	54	83	14	12	28.71	30.22	06	CLR	NC			10.00		59	48	53	67	7	09	28.82	30.35		
09	OVC	043			10.00		58	54	56	87	14	11	28.71	30.23	09	CLR	NC			10.00		68	48	57	49	12	12	28.84	30.36		
12	OVC	030			10.00		62	53	57	73	17	12	28.70	30.22	12	CLR	NC			10.00		72	46	58	40	6	15	28.80	30.33		
15	SCT	NC			10.00		68	55	60	63	16	14	28.68	30.20	15	CLR	NC			10.00		74	45	58	36	6	VR	28.74	30.27		
18	FEW	NC			10.00		64	55	59	73	16	13	28.66	30.18	18	CLR	NC			10.00		72	48	58	43	5	12	28.71	30.22		
21	CLR	NC			10.00		55	50	52	83	9	12	28.68	30.21	21	CLR	NC			10.00		61	51	56	70	0	00	28.69	30.20		
24	CLR	NC			10.00		53	50	51	89	8	13	28.68	30.21	24	CLR	NC			10.00		57	46	51	67	0	00	28.68	30.19		
					SUNRISE: 0422	JUL 06			SUNSET: 2005										SUNRISE: 0427	JUL 12											
03	SCT	NC			10.00		52	32	43	47	5	14	28.67	30.19	03	CLR	NC			10.00		57	50	53	78	5	35	28.66	30.17		
06	SCT	NC			10.00		56	31	45	39	8	14	28.67	30.19	06	CLR	NC			10.00		61	54	57	78	5	34	28.65	30.16		
09	CLR	NC			10.00		70	62	65	77	7	18	28.67	30.18	09	CLR	NC			10.00		72	52	60	50						

OBSERVATIONS AT 3-HOURLY INTERVALS

DULUTH, MN

JULY 2002

DLH

WBAN # 14913

HOUR (LST)			SATELLITE		WEATHER	TEMPERATURE °F			RELATIVE HUMIDITY (PCT)	WIND		PRESSURE (INCHES,HG)		HOUR (LST)			SATELLITE		WEATHER	TEMPERATURE °F			RELATIVE HUMIDITY (PCT)	WIND		PRESSURE (INCHES,HG)			
	SKY COVER	CEILING 100'S OF FT	OBSERVATION TIME (LST)	EFF CLD AMT <small>Okta</small>		VISIBILITY (MILES)	DRY BULB	DEW POINT		WET BULB	SPEED (MPH)	DIRECTION TENS OF DEG	STATION		SEA LEVEL	SKY COVER	CEILING 100'S OF FT	OBSERVATION TIME (LST)		EFF CLD AMT <small>Okta</small>	VISIBILITY (MILES)	DRY BULB		DEW POINT	WET BULB	SPEED (MPH)	DIRECTION TENS OF DEG	STATION	SEA LEVEL
					SUNRISE: 0428	JUL 13			SUNSET: 2001										SUNRISE: 0434	JUL 19									
03	CLR	NC			10.00		60	57	58	90	3	34	28.52	30.03	03	CLR	NC			10.00		54	53	53	97	5	11	28.47	29.98
06	CLR	NC			10.00		62	58	60	86	0	00	28.55	30.05	06	CLR	NC			8.00	MIFG	56	54	55	93	0	00	28.49	30.00
09	FEW	NC			10.00		75	58	64	55	9	28	28.53	30.03	09	CLR	NC			6.00	HZ	73	62	66	69	3	34	28.50	30.00
12	BKN	055			10.00		77	59	66	54	10	31	28.52	30.02	12	CLR	NC			6.00	HZ	77	61	67	58	8	17	28.48	29.98
15	SCT	NC			10.00		78	58	66	50	9	27	28.50	30.00	15	CLR	NC			7.00		80	64	70	58	6	20	28.46	29.96
18	FEW	NC			10.00		78	57	65	48	10	26	28.46	29.95	18	CLR	NC			7.00		80	65	70	60	7	18	28.45	29.94
21	CLR	NC			10.00		69	59	63	70	6	25	28.49	29.97	21	CLR	NC			7.00		67	62	64	84	6	12	28.46	29.95
24	CLR	NC			10.00		64	59	61	84	7	29	28.49	29.98	24	CLR	NC			8.00		67	32	50	27	3	16	28.46	29.95
					SUNRISE: 0429	JUL 14			SUNSET: 2001										SUNRISE: 0435	JUL 20									
03	CLR	NC			10.00		63	60	61	90	9	29	28.49	29.98	03	CLR	NC			6.00	HZ	61	30	47	31	5	14	28.44	29.93
06	CLR	NC			10.00		67	61	63	81	12	31	28.50	30.00	06	OVC	026			5.00	HZ					6	13	28.42	29.91
09	CLR	NC			10.00		76	63	68	64	12	30	28.52	30.01	09	OVC	005			4.00	HZ	71	66	68	84	8	17	28.42	29.92
12	FEW	NC			10.00		81	63	69	54	9	27	28.51	30.01	12	OVC	007			4.00	-RA BR	72	69	70	91	13	13	28.32	29.80
15	CLR	NC			10.00		84	63	70	49	7	26	28.50	29.99	15	CLR	NC			5.00	HZ	76	70	72	83	9	19	28.34	29.83
18	CLR	NC			10.00		82	64	70	55	8	29	28.50	29.99	18	CLR	NC			8.00		76	73	74	89	6	16	28.31	29.80
21	CLR	NC			10.00		71	63	66	76	7	29	28.52	30.01	21	BKN	044			6.00	HZ	73	67	69	82	7	14	28.31	29.79
24	CLR	NC			10.00		66	62	64	87	7	27	28.52	30.02	24	SCT	NC			8.00	TS	71	68	69	89	3	20	28.26	29.74
					SUNRISE: 0430	JUL 15			SUNSET: 1960										SUNRISE: 0436	JUL 21									
03	CLR	NC			10.00		67	63	64	87	7	28	28.52	30.01	03	SCT	NC			8.00		70	68	69	93	3	35	28.25	29.73
06	CLR	NC			10.00		68	64	66	87	7	29	28.57	30.06	06	FEW	NC			10.00		71	68	69	89	8	26	28.27	29.75
09	CLR	NC			10.00		78	63	68	60	9	25	28.57	30.06	09	SCT	NC			10.00		77	73	74	88	12	30	28.33	29.82
12	CLR	NC			10.00		81	64	70	57	12	22	28.54	30.03	12	BKN	110			6.00	-RA BR	73	70	71	90	10	19	28.26	29.75
15	CLR	NC			10.00		83	66	72	57	14	24	28.53	30.02	15	CLR	NC			10.00		83	71	75	67	16	29	28.25	29.72
18	CLR	NC			10.00		80	65	70	60	14	23	28.50	29.99	18	FEW	NC			10.00		78	66	70	67	8	33	28.26	29.74
21	CLR	NC			10.00		72	65	67	79	8	23	28.51	30.01	21	SCT	NC			10.00		76	66	69	72	9	31	28.33	29.81
24	CLR	NC			10.00		67	63	64	87	8	23	28.50	29.98	24	CLR	NC			10.00		67	59	62	76	10	31	28.35	29.83
					SUNRISE: 0431	JUL 16			SUNSET: 1959										SUNRISE: 0437	JUL 22									
03	CLR	NC			10.00		67	63	64	87	9	25	28.49	29.97	03	CLR	NC			10.00		65	58	61	78	15	30	28.34	29.82
06	CLR	NC			6.00	BR	67	65	66	93	12	25	28.50	29.99	06	CLR	NC			10.00		64	57	60	78	12	31	28.36	29.85
09	CLR	NC			10.00		78	67	71	69	12	26	28.50	29.99	09	SCT	NC			10.00		69	54	60	59	23	30	28.40	29.89
12	CLR	NC			10.00		85	67	73	55	17	23	28.47	29.95	12	BKN	050			10.00		70	55	61	59	16	32	28.46	29.95
15	CLR	NC			10.00		87	68	74	53	16	24	28.46	29.94	15	BKN	050			10.00		65	59	61	81	15	32	28.52	30.03
18	CLR	NC			10.00		83	68	73	61	13	24	28.45	29.93	18	SCT	NC			10.00		67	50	57	55	13	33	28.58	30.09
21	SCT	NC			9.00		76	68	71	77	7	23	28.47	29.95	21	CLR	NC			10.00		56	50	53	81	5	12	28.66	30.17
24	SCT	NC			7.00		74	69	71	85	9	26	28.46	29.94	24	CLR	NC			10.00		51	47	49	86	6	04	28.70	30.22
					SUNRISE: 0432	JUL 17			SUNSET: 1958										SUNRISE: 0438	JUL 23									
03	CLR	NC			5.00	BR	72	70	71	94	7	28	28.45	29.93	03	CLR	NC			10.00		46	44	45	93	3	36	28.73	30.26
06	FEW	NC			4.00	HZ	73	70	71	90	6	29	28.46	29.94	06	CLR	NC			10.00		51	48	50	89	3	31	28.77	30.30
09	CLR	NC			6.00	HZ	81	73	75	77	7	36	28.48	29.96	09	CLR	NC			10.00		66	46	55	49	5	32	28.79	30.32
12	BKN	045			5.00	HZ	83	75	77	77	9	14	28.47	29.95	12	BKN	055			10.00		68	46	56	45	5	VR	28.79	30.32
15	SCT	NC			10.00		73	69	70	87	3	21	28.49	29.98	15	FEW	NC			10.00		69	46	56	44	8	20	28.75	30.28
18	FEW	NC			10.00		79	70	73	74	9	28	28.48	29.97	18	FEW	NC			10.00		68	49	57	51	6	22	28.74	30.27
21	CLR	NC			6.00	HZ	69	64	66	84	14	08	28.51	30.00	21	CLR	NC			10.00		62	52	56	70	3	19	28.74	30.26
24	BKN	120			3.00	HZ	68	55	60	63	14	09	28.52	30.01	24	CLR	NC			10.00		55	52	53	90	0	00	28.73	30.26
					SUNRISE: 0433	JUL 18			SUNSET: 1958										SUNRISE: 0439	JUL 24									
03	BKN	100			10.00		63	54	58	73	12	09	28.51	30.02	03	BKN	110			10.00		58	53	55	84	0	00	28.74	30.27
06	OVC	095			10.00		61	54	57	78	10	10	28.55	30.05	06	CLR	NC			10.00		57	54	55	90	6	13	28.73	30.25
09	SCT	NC			10.00		65	57	60	76	13	09	28.56	30.06	09	FEW	NC			10.00		67	56	60	68	9	15	28.71	30.22
12	CLR	NC			10.00																								

OBSERVATIONS AT 3-HOURLY INTERVALS

DULUTH, MN

JULY 2002

DLH

WBAN # 14913

HOUR (LST)	SKY COVER		CEILING 100'S OF FT	SATELLITE		OBSERVATION TIME (LST)	EFF CLD AMT Okta	VISIBILITY (MILES)	WEATHER	TEMPERATURE °F			RELATIVE HUMIDITY (PCT)	WIND		PRESSURE (INCHES, HG)		HOUR (LST)	SKY COVER		CEILING 100'S OF FT	SATELLITE		OBSERVATION TIME (LST)	EFF CLD AMT Okta	VISIBILITY (MILES)	WEATHER	TEMPERATURE °F			RELATIVE HUMIDITY (PCT)	WIND		PRESSURE (INCHES, HG)												
				DRY BULB	DEW POINT					WET BULB	SPEED (MPH)	DIRECTION TENS OF DEG		STATION	SEA LEVEL	DRY BULB	DEW POINT					WET BULB	SPEED (MPH)					DIRECTION TENS OF DEG	STATION	SEA LEVEL																
				SUNRISE: 0440		JUL 25		SUNSET: 1951																																						
03	BKN	095			10.00			10.00	TSRA -DZ BR	59	58	58	96	8	14	28.47	29.97	03	CLR	NC					10.00			TSRA BR	61	54	57	78	5	11	28.41	29.90										
06	OVC	060			10.00			10.00		59	58	58	96	12	13	28.42	29.93	06	BKN	041					10.00				65	54	59	68	10	14	28.38	29.86										
09	OVC	010								60	60	60	100	8	14	28.39	29.90	09	OVC	025					2.00		62		62	62	100	10	07	28.39	29.89											
12	OVC	004			0.75					63	63	63	100	6	25	28.36	29.87	12	BKN	120					10.00				64	61	62	90	10	13	28.32	29.82										
15	BKN	027			10.00					69	64	66	84	12	27	28.33	29.83	15	BKN	022					10.00				73	64	67	74	8	15	28.30	29.79										
18	SCT	NC			10.00				72	64	67	76	7	31	28.31	29.81	18	SCT	NC					10.00			74	68	70	82	0	00	28.28	29.77												
21	CLR	NC			10.00				68	65	66	90	7	24	28.35	29.85	21	FEW	NC					10.00			65	64	64	97	8	11	28.27	29.77												
24	CLR	NC			10.00				64	62	63	93	8	25	28.32	29.82	24	VV	001					0.50	FG	66	66	66	100	13	13	28.16	29.64													
				SUNRISE: 0441		JUL 26		SUNSET: 1949										3—HOURLY OBSERVATION NOTES																												
03	CLR	NC			10.00			10.00		62	61	61	96	8	29	28.31	29.81	Sky Cover is the amount of the sky obscured. CLR or SKC = 0, FEW = 1/8–2/8, SCT = 3/8–4/8, BKN = 5/8–7/8, OVC = 8/8, VV = Vertical Visibilty = 8/8. Ceiling is reported in hundreds of feet above ground level for clouds at or below 12,000 feet. NC = No ceiling detected. & = Original observation contained additional weather elements. See page 3 for additional notes.																												
06	CLR	NC			10.00			10.00		64	62	63	93	7	30	28.34	29.84																													
09	CLR	NC			10.00			10.00		74	66	69	76	6	32	28.35	29.83																													
12	FEW	NC			10.00			10.00		80	64	70	58	6	VR	28.34	29.82																													
15	FEW	NC			10.00			10.00		83	59	68	44	3	VR	28.33	29.81																													
18	FEW	NC			10.00			10.00		81	59	67	47	7	28	28.31	29.80																													
21	CLR	NC			10.00			10.00		70	62	65	76	0	00	28.31	29.80																													
24	CLR	NC			10.00					65	61	63	87	0	00	28.30	29.78																													
				SUNRISE: 0443		JUL 27		SUNSET: 1948										SUMMARY BY HOUR																												
03	CLR	NC			10.00			10.00		65	59	61	81	3	15	28.26	29.73	AVERAGES										RESULTANT WIND (MPH)																		
06	BKN	047			10.00			10.00		66	61	63	84	7	14	28.25	29.72	HOUR (LST)										CEILOMETER	EFF CLD AMT	DRY BULB	DEW POINT	WET BULB	RELATIVE HUMIDITY	PRESSURE (INCHES, HG)		VISIBILITY (MILES)	WIND SPEED (MPH)	SPEED	DIRECTION							
09	OVC	013			10.00			10.00		69	63	65	81	5	09	28.23	29.70	STATION										SEA LEVEL																		
12	SCT	NC			10.00			10.00		76	68	71	77	9	14	28.17	29.65																													
15	OVC	045			6.00			-TSRA		65	63	64	93	0	00	28.15	29.63																													
18	BKN	110			10.00			-RA		66	65	65	96	8	25	28.14	29.62																													
21	SCT	NC			10.00					63	63	63	100	6	25	28.16	29.64																													
24	FEW	NC			6.00			BR		62	62	62	100	6	28	28.17	29.65																													
				SUNRISE: 0444		JUL 28		SUNSET: 1947										HOUR (LST)										CEILOMETER	EFF CLD AMT	DRY BULB	DEW POINT	WET BULB	RELATIVE HUMIDITY	PRESSURE (INCHES, HG)		VISIBILITY (MILES)	WIND SPEED (MPH)	SPEED	DIRECTION							
03	OVC	001			< .25			FG		64	64	64	100	0	00	28.18	29.66	01												63	57	60	81	28.50	29.99	8.79	7	1	26							
06	BKN	001			0.50			FG		63	63	63	100	0	00	28.21	29.70	02												63	56	59	80	28.49	29.99	9.02	7	1	32							
09	FEW	NC			10.00					74	69	71	85	8	29	28.22	29.70	03												62	56	59	83	28.49	29.99	9.10	6	0	0							
12	CLR	NC			10.00					80	64	70	58	12	31	28.25	29.72	04												61	57	59	86	28.50	29.99	9.16	6	1	2							
15	CLR	NC			10.00					84	61	69	46	13	28	28.24	29.72	05												62	57	59	87	28.50	30.00	8.91	6	1	12							
18	FEW	NC			10.00					76	63	68	64	7	30	28.24	29.72	06												63	58	60	83	28.51	30.01	9.15	7	1	13							
21	BKN	110			10.00					68	65	66	90	5	32	28.25	29.73	07												67	60	62	79	28.51	30.01	9.48	8	1	7							
24	BKN	120			10.00					67	63	64	87	0	00	28.24	29.71	08												70	60	64	73	28.52	30.01	9.58	8	0	0							
				SUNRISE: 0445		JUL 29		SUNSET: 1946										09												71	60	64	71	28.52	30.01	9.23	10	1	28							
03	CLR	NC			10.00					64	61	62	90	3	32	28.22	29.69	10												73	60	65	68	28.51	30.00	9.00	9	1	3							
06	FEW	NC			10.00					63	62	62	97	7	29	28.25	29.72	11												74	61	66	65	28.51	30.00	9.29	10	2	21							
09	CLR	NC			10.00					74	63	67	69	6	31	28.25	29.73	12												75	61	66	63	28.50	30.00	9.06	11	3	20							
12	SCT	NC			10.00					80	61	68	52	10	30	28.27	29.75	13												76	60	66	61	28.50	29.99	9.08	10	3	19							
15	FEW	NC			10.00					81	58	66	46	12	31	28.27	29.75	14												77	61	67	59	28.49	29.99	9.48	10	3	22							
18	CLR	NC			10.00					77	59	66	54	10	28	28.30	29.79	15												77	61	67	59	28.49	29.98	9.58	10	4	23							
21	CLR	NC			10.00					70	61	64	73	9	26	28.33	29.82	16												77	61	67	58	28.48	29.98	9.61	10	3	23							
24	CLR	NC			10.00					66	61	63	84	6	27	28.36	29.84	17												76	60	66	58	28.48	29.98	9.81	10	4	24							
				SUNRISE: 0446		JUL 30		SUNSET: 1945										18												75	60	66	63	28.48	29.97	9.55										

3-HOURLY OBSERVATION NOTES

Sky Cover is the amount of the sky obscured. CLR or SKC = 0, FEW = 1/8-2/8,

SCT = 3/8-4/8, BKN = 5/8-7/8, OVC = 8/8, VV = Vertical Visibility = 8/8.

Ceiling is reported in hundreds of feet above ground level for clouds at or below 12,000 feet.

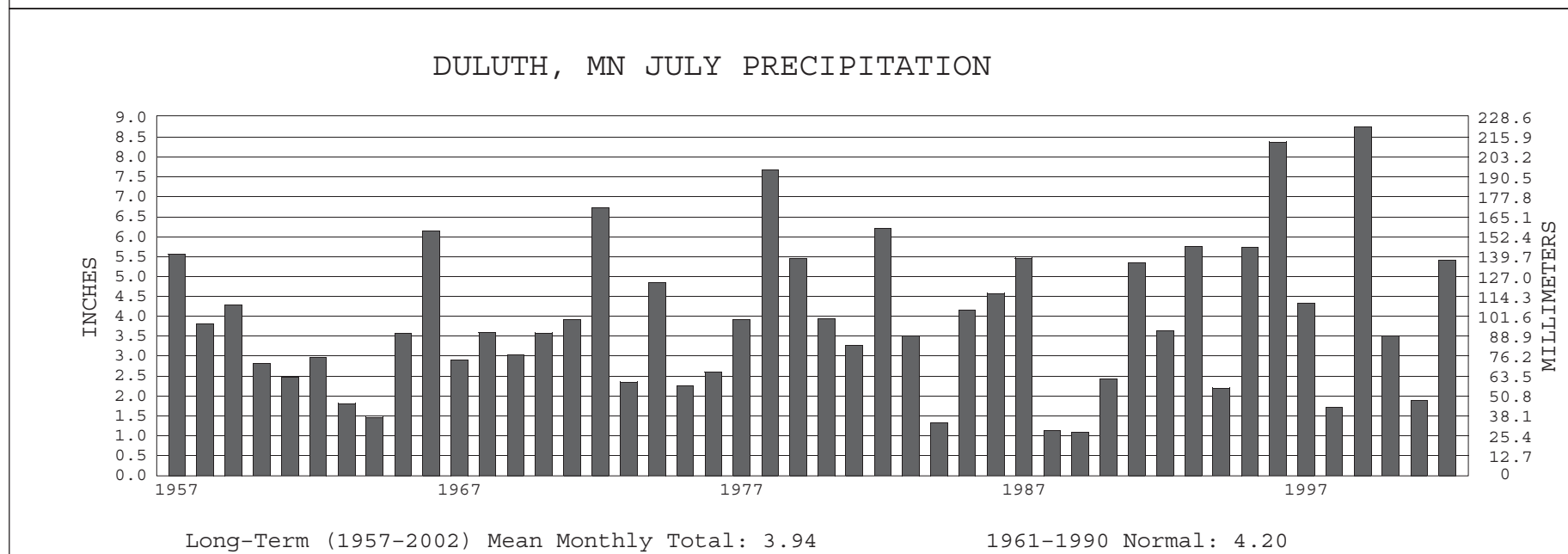
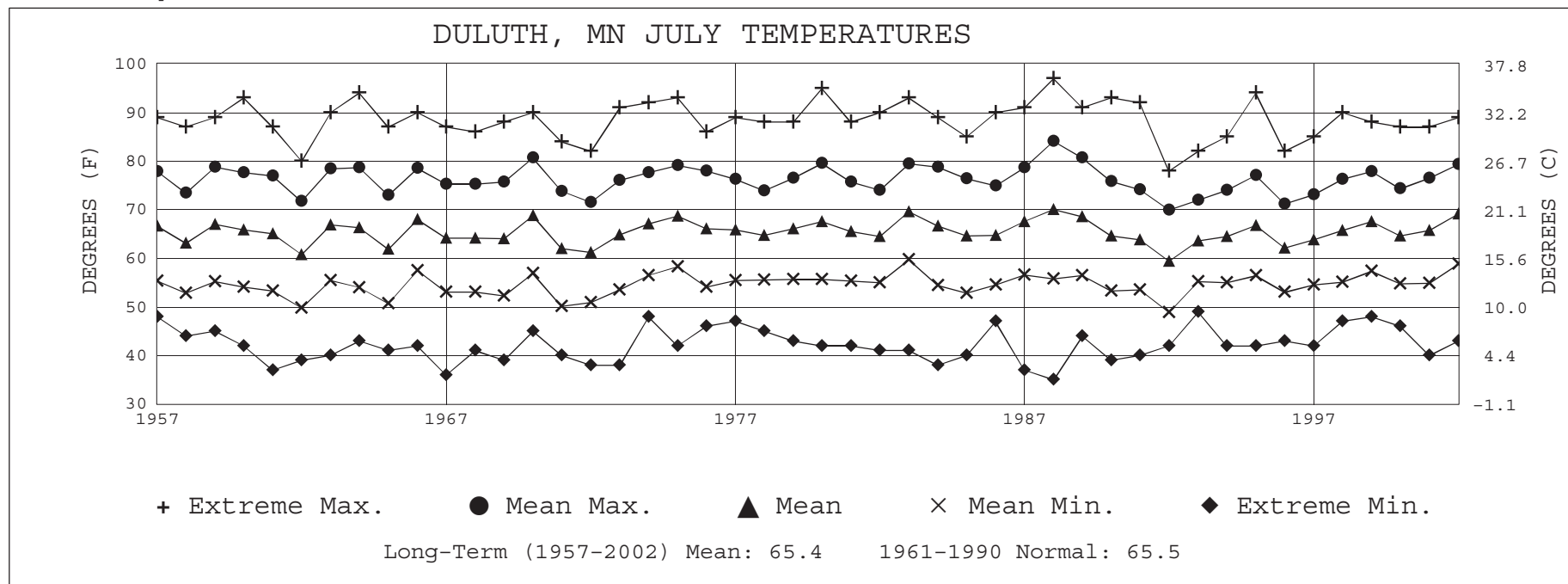
NC = No ceiling detected.

& = Original observation contained additional weather elements.

See page 3 for additional notes.

SUMMARY BY HOUR

HOUR (LST)	AVERAGES
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JULY 2002

DULUTH, MN

LOCAL CLIMATOLOGICAL DATA

NOAA, National Climatic Data Center

I certify that this is an official publication of the National Oceanic and Atmospheric Administration (NOAA). It is compiled using information from weather observing sites operated by NOAA – National Weather Service / Department Of Transportation – Federal Aviation Administration and received at the National Climatic Data Center (NCDC), Asheville, North Carolina 28801.

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