



NOVEMBER 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	34	20	27	-9	16	24	38	0	SN	0		T	T	28.54	30.12	14.3	28	15.1	28	27	23	26	01	
02	36	24	30	-5	21	26	35	0		0		0.0	0.00	28.50	30.07	1.1	30	6.9	17	36	14	30	02	
03	41	24	33	-2	23	28	32	0	BR HZ	0		0.0	0.00	28.38	29.94	8.0	29	10.9	26	27	22	29	03	
04	32	23	28	-6	18	24	37	0		0		0.0	0.00	28.53	30.11	2.8	31	6.4	21	31	17	31	04	
05	34	24	29	-4	24	27	36	0	SN BR HZ	0		T	T	28.28	29.84	4.0	25	6.9	16	28	13	29	05	
06	39	18	29	-4	16	26	36	0	BR HZ	0		0.0	0.00	28.39	29.95	8.1	30	10.3	26	28	22	29	06	
07	54*	23	39	7	26	35	26	0		0		0.0	0.00	28.08	29.61	12.3	23	13.6	32	23	25	23	07	
08	47	34	41*	9	33	36	24	0	FG+ BR	0		0.0	0.00	28.02	29.54	7.4	07	11.5	31	09	24	09	08	
09	45	35	40	9	38	38	25	0	FG+ BR HZ	0		0.0	0.00	27.83	29.34	9.3	10	10.4	30	09	24	09	09	
10	40	26	33	2	30	33	32	0	FG+ BR	0		0.0	0.00	27.97	29.49	8.9	35	9.6	25	35	20	34	10	
11	33	24	29	-1	17	24	36	0		0		0.0	0.00	28.42	29.99	6.8	31	8.2	20	35	15	34	11	
12	32	14	23	-7	21	24	42	0	SN FZFG BR UP	T		0.6	0.05	28.49	30.06	8.5	27	10.5	24	23	18	28	12	
13	25	9	17	-12	17	18	48	0	SN FZFG BR	2		2.0	0.15	28.37	29.95	0.9	08	5.6	14	10	12	11	13	
14	24	7	16	-13	13	17	49	0		2		0.0	0.00	28.46	30.05	6.7	34	6.9	21	33	16	35	14	
15	25	7	16	-12	11	15	49	0	SN	2		T	T	28.69	30.30	2.6	02	4.2	10	13	9	12	15	
16	26	16	21	-7	16	20	44	0	SN BR	1		T	T	28.69	30.28	3.5	19	4.0	17	21	15	21	16	
17	30	23	27	0	19	24	38	0	BR	1		0.0	0.00	28.48	30.06	7.7	15	8.1	18	13	15	13	17	
18	35	23	29	2	24	28	36	0	HZ	1		0.0	0.00	28.32	29.88	7.0	22	9.2	17	23	15	23	18	
19	38	27	33	7	27	31	32	0	SN	T		T	T	28.32	29.88	10.0	29	10.5	25	31	21	32	19	
20	34	25	30	4	25	28	35	0	SN FG+ FZFG BR	T		0.9	0.06	28.41	29.98	4.0	28	5.8	20	32	15	33	20	
21	33	22	28	3	23	26	37	0	SN BR	T		0.2	0.01	28.49	30.06	8.4	33	8.9	23	34	18	34	21	
22	28	14	21	-4	18	22	44	0	SN BCFG BR	T		0.4	0.05	28.48	30.06	2.1	18	7.2	22	34	17	35	22	
23	35	18	27	3	21	26	38	0	SN BR BLSN	T		T	T	28.29	29.85	15.7	28	16.8	37	28	33*	29	23	
24	25	17	21	-3	14	18	44	0	SN BR	T		T	T	28.64	30.23	11.4	31	11.7	24	31	18	32	24	
25	21	9	15	-8	8	13	50	0	SN BR	T		T	T	28.79	30.40	5.9	33	6.7	22	31	15	30	25	
26	21	3	12	-10	5	11	53	0		T		0.0	0.00	28.90	30.52	6.1	01	6.4	16	01	14	36	26	
27	23	3*	13	-9	11	15	52	0	SN	T		T	T	28.66	30.26	7.9	23	8.0	21	24	17	22	27	
28	37	13	25	4	19	23	40	0	BR	T		0.0	0.00	28.23	29.80	11.6	24	12.6	30	23	25	22	28	
29	41	19	30	9	23	29	35	0	SN BLSN	T		0.2	0.02	27.87	29.40	20.0	30	21.1	40*	28	32	29	29	
30	19	5	12*	-8	-1	10	53	0	SN	T		T	T	28.42	30.02	13.2	31	15.5	36	33	28	34	30	
										< MONTHLY AVERAGES TOTALS->			4.3	0.34	28.40	29.97	4.7	29	9.7	<- MONTHLY AVERAGES				
										<-----DEPARTURE FROM NORMAL----->		-1.78	SUNSHINE, CLOUD, & VISIBILITY TABLES ON PAGE 3											
DEGREE DAYS									GREATEST 24-HR PRECIPITATION: 0.15 DATE :13					SEA LEVEL PRESSURE DATE TIME										
MONTHLY TOTAL DEPARTURE									GREATEST 24-HR SNOWFALL: 2.0 DATE :13					MAXIMUM : 30.58 26 1055										
SEASON TO DATE TOTAL DEPARTURE									GREATEST SNOW DEPTH: 2 DATE :15+					MINIMUM : 29.24 09 1455										
HEATING: 1176 52									NUMBER OF DAYS WITH →					MAXIMUM TEMP ≥ 90: 0					PRECIPITATION ≥ 0.01 INCH : 6					
COOLING: 0 0														MAXIMUM TEMP ≤ 32 :13					PRECIPITATION ≥ 0.10 INCH : 1					
														THUNDERSTORMS : 0					SNOWFALL ≥ 1.0 INCH : 1					

HOURLY PRECIPITATION

(WATER EQUIVALENT IN INCHES)

DULUTH, MN

NOVEMBER 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	T	T	T	T									01												01		T	
02													02												02		0.00	
03													03												03		0.00	
04													04	T	T										04		0.00	
05													05												05		T	
06													06												06		0.00	
07													07												07		0.00	
08													08												08		0.00	
09													09												09		0.00	
10													10												10		0.00	
11													11												11	0.00		
12													12	T	T		T								12	T		
13	T	T											13	T	T		T	T	T	T	T				13	T		
14													14	0.01	0.01										14	0.02		
15				T	T	T	T	T	T	T	T		15	0.03	0.05										15	0.08		
16	T	T	T	T	T	T	T	T	T			T	16	T	T	T	T								16	T		
17													17												17	0.00		
18													18												18	0.00		
19				T	T			T	T	T			19												19	T		
20										0.01	0.05		20											T	20	0.06		
21	T	T	T	T	T					T		T	21	T	T	T	T								21	T		
22													22											T	22	T		
23													23	T	T	T	T		T	T	T	T	T	T	23	T		
24													24	T	T	T	T							T	24	T		
25	T	T	T	T	T	T	T	T	T	T	T		25						T	T	T	T			25	T		
26													26												26			
27													27												27			
28													28												28			
29													29												29			
30	T	T	T	T	T	T	T						30												30	T		

MAXIMUM SHORT DURATION PRECIPITATION (See Note)

Time Period (Minutes)	5	10	15	20	30	45	60	80	100	120	150	180
Precipitation (Inches)												
Ending Date												
Ending Time (Hour/Min)												

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
NOVEMBER 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).

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							9.00	10.00	
02							10.00	10.00	
03							6.00	10.00	
04							10.00	10.00	
05							2.50	10.00	
06							5.00	10.00	
07							9.00	10.00	
08							.25	10.00	
09							< .25	5.00	
10							.25	10.00	
11							10.00	10.00	
12							.00	10.00	
13							.50	10.00	
14							10.00	10.00	
15							5.00	10.00	
16							5.00	10.00	
17							6.00	10.00	
18							5.00	10.00	
19							10.00	10.00	
20							.25	10.00	
21							.75	10.00	
22							.50	10.00	
23							1.50	10.00	
24							5.00	10.00	
25							4.00	10.00	
26							10.00	10.00	
27							8.00	10.00	
28							4.00	10.00	
29							1.00	10.00	
30							4.00	10.00	
MONTHLY AVGS							5.05	9.83	

SUNSHINE (MINUTES)

Total: Possible:

Percent Possible:

NUMBER OF DAYS WITH:

SKY CONDITION

CLR PTLY CLDY CLOUDY MISSING

30

MINIMUM VISIBILITY (MILES)

<=0.25 <=3.0 >=7.0

2 10 9

OBSERVATIONS AT 3-HOURLY INTERVALS

DULUTH, MN

NOVEMBER 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 Oktas		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 Oktas		VISIBILITY (MILES)	DRY BULB	DEW POINT	WET BULB		SPEED (MPH)	DIRECTION TENS OF DEG	STATION	SEA LEVEL
				SUNRISE: 0651		NOV 01	SUNSET: 1653										SUNRISE: 0660		NOV 07	SUNSET: 1645											
03	BKN	025			9.00	-SN	22	17	20	82	14	30	28.62	30.19	03	SCT	NC			10.00	27	10	22	49	8	19	28.39	29.95			
06	CLR	NC			10.00		21	17	20	85	13	29	28.62	30.21	06	OVC	080			10.00	29	20	26	69	15	18	28.25	29.80			
09	SCT	NC			10.00		24	18	22	77	16	29	28.63	30.22	09	SCT	NC			9.00	37	29	34	73	22	22	28.10	29.64			
12	BKN	095			10.00		31	16	26	54	17	28	28.57	30.15	12	FEW	NC			10.00	48	31	41	52	21	24	28.00	29.52			
15	OVC	100			10.00		31	13	25	47	17	25	28.51	30.08	15	CLR	NC			10.00	53	31	43	43	12	27	27.94	29.46			
18	OVC	100			10.00		31	14	25	49	17	25	28.48	30.05	18	CLR	NC			10.00	51	31	42	46	13	24	27.94	29.45			
21	CLR	NC			10.00		32	17	27	54	18	27	28.42	29.99	21	CLR	NC			10.00	46	33	40	61	9	25	27.92	29.44			
24	CLR	NC			10.00		28	19	25	69	12	27	28.43	29.99	24	CLR	NC			10.00	38	33	36	83	10	27	27.91	29.43			
				SUNRISE: 0653		NOV 02	SUNSET: 1652										SUNRISE: 0701		NOV 08	SUNSET: 1643											
03	CLR	NC			10.00		29	20	26	69	13	29	28.45	30.01	03	CLR	NC			10.00	38	31	35	76	8	30	27.93	29.44			
06	CLR	NC			10.00		25	20	23	81	10	31	28.49	30.06	06	CLR	NC			10.00	36	30	34	79	3	03	27.99	29.50			
09	CLR	NC			10.00		29	20	26	69	8	36	28.52	30.09	09	CLR	NC			10.00	38	32	35	79	8	01	28.03	29.55			
12	CLR	NC			10.00		33	20	28	59	6	04	28.53	30.10	12	CLR	NC			10.00	45	34	40	66	5	14	28.05	29.57			
15	CLR	NC			10.00		33	22	29	64	5	15	28.51	30.08	15	CLR	NC			10.00	44	33	39	65	13	08	28.06	29.58			
18	CLR	NC			10.00		26	21	24	81	6	14	28.51	30.09	18	OVC	005			8.00	36	35	36	97	15	09	28.07	29.61			
21	BKN	110			10.00		26	22	25	84	6	12	28.50	30.08	21	VV	001			0.75 BR	35	35	35	100	21	09	28.06	29.59			
24	OVC	100			10.00		28	21	26	75	6	14	28.48	30.04	24	VV	001			0.25 FG	35	35	35	100	23	09	28.02	29.54			
				SUNRISE: 0654		NOV 03	SUNSET: 1650										SUNRISE: 0703		NOV 09	SUNSET: 1642											
03	BKN	110			10.00		27	21	25	78	3	13	28.42	29.98	03	VV	001			0.25 FG	36	36	36	100	17	09	27.95	29.47			
06	CLR	NC			10.00		25	21	24	85	3	18	28.36	29.93	06	VV	001			<.25 FG	36	36	36	100	16	09	27.88	29.41			
09	CLR	NC			6.00	HZ	29	24	27	82	13	25	28.32	29.88	09	VV	001			0.25 FG	38	38	38	100	14	11	27.82	29.34			
12	CLR	NC			10.00		39	25	34	57	18	30	28.29	29.84	12	OVC	001			0.75 BR	40	40	40	100	9	11	27.77	29.28			
15	OVC	032			10.00		34	23	30	64	21	30	28.32	29.88	15	CLR	NC			4.00 HZ	44	39	42	83	8	12	27.75	29.25			
18	OVC	038			10.00		30	23	28	75	13	30	28.39	29.95	18	OVC	100			4.00 BR	39	37	38	93	9	12	27.77	29.28			
21	OVC	026			10.00		29	22	26	75	12	31	28.45	30.01	21	OVC	100			2.50 BR	38	37	38	97	3	29	27.79	29.31			
24	OVC	023			10.00		28	19	25	69	16	31	28.49	30.05	24	OVC	001			0.25 FG	36	36	36	100	6	31	27.79	29.31			
				SUNRISE: 0656		NOV 04	SUNSET: 1649										SUNRISE: 0704		NOV 10	SUNSET: 1641											
03	OVC	019			10.00		26	19	24	75	12	31	28.51	30.08	03	SCT	NC			1.50 BR	37	36	37	96	5	33	27.80	29.31			
06	OVC	019			10.00		25	18	23	75	10	30	28.56	30.14	06	SCT	NC			5.00 BR	36	35	36	97	3	04	27.84	29.36			
09	OVC	021			10.00		26	17	23	69	5	32	28.60	30.18	09	OVC	010			5.00 BR	39	36	38	89	5	33	27.89	29.41			
12	BKN	025			10.00		30	18	26	61	5	VR	28.58	30.15	12	OVC	004			10.00	37	35	36	93	8	34	27.93	29.46			
15	CLR	NC			10.00		32	18	27	56	3	28	28.54	30.12	15	OVC	008			10.00	33	29	31	85	17	33	27.98	29.51			
18	CLR	NC			10.00		27	18	24	69	0	00	28.51	30.09	18	OVC	012			10.00	28	24	27	85	12	35	28.08	29.62			
21	CLR	NC			10.00		23	19	22	85	6	12	28.48	30.05	21	OVC	018			10.00	27	21	25	78	13	35	28.16	29.70			
24	CLR	NC			10.00		25	19	23	78	7	16	28.47	30.04	24	OVC	025			10.00	26	20	24	78	9	36	28.19	29.74			
				SUNRISE: 0657		NOV 05	SUNSET: 1647										SUNRISE: 0706		NOV 11	SUNSET: 1640											
03	CLR	NC			10.00		25	20	23	81	6	15	28.40	29.97	03	OVC	014			10.00	25	20	23	81	10	33	28.26	29.82			
06	CLR	NC			10.00		25	21	24	85	6	12	28.32	29.88	06	OVC	013			10.00	24	20	23	84	7	34	28.33	29.90			
09	SCT	NC			7.00		28	23	26	81	6	18	28.28	29.85	09	OVC	100			10.00	25	16	22	69	8	35	28.39	29.96			
12	BKN	045			4.00	HZ	31	24	28	76	8	24	28.25	29.80	12	FEW	NC			10.00	31	16	26	54	6	35	28.45	30.01			
15	OVC	060			7.00		33	24	30	70	6	26	28.21	29.76	15	OVC	075			10.00	32	14	26	47	7	26	28.48	30.04			
18	SCT	NC			7.00		29	24	27	82	6	27	28.22	29.77	18	OVC	070			10.00	30	16	25	56	5	27	28.52	30.10			
21	OVC	050			6.00	BR	31	27	29	85	12	29	28.24	29.79	21	OVC	039			10.00	30	16	25	56	12	26	28.52	30.10			
24	OVC	017			5.00	BR	31	28	30	89	12	28	28.24	29.79	24	OVC	037			10.00	28	16	24	61	9	27	28.53	30.10			
				SUNRISE: 0658		NOV 06	SUNSET: 1646										SUNRISE: 0707		NOV 12	SUNSET: 1638											
03	OVC	011			7.00		31	27	29	85	15	28	28.24	29.78	03	OVC	024			10.00	28	21	26	75	10	24	28.51	30.08			
06	OVC	013			9.00		31	27	29	85	13	27	28.26	29.80	06	OVC	080			10.00	27	22	25	81	10	22	28.48	30.05			
09	OVC	017			5.00	HZ	33	28	31	82	14	29	28.32	29.88	09	BKN	031			8.00	29	23	27	78	14	22	28.43	29.99			
12	BKN	029			10.00		36	21	31	55	12	33	28.39	29.94	12	OVC	011			1.00	31										

OBSERVATIONS AT 3-HOURLY INTERVALS

DULUTH, MN

NOVEMBER 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 Oktas		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 Oktas	VISIBILITY (MILES)	DRY BULB		DEW POINT	WET BULB	SPEED (MPH)	DIRECTION TENS OF DEG	STATION	SEA LEVEL
SUNRISE: 0709 NOV 13 SUNSET: 1637						SUNRISE: 0717 NOV 19 SUNSET: 1631																							
03	CLR	NC			10.00	11	8	10	88	3	26	28.51	30.11	03	OVC	080			10.00	32	28	30	85	6	30	28.24	29.78		
06	CLR	NC			10.00	10	7	9	87	0	00	28.49	30.08	06	CLR	NC			10.00	34	27	31	76	13	29	28.24	29.78		
09	OVC	070			7.00	18	14	17	84	7	20	28.44	30.03	09	FEW	NC			10.00	34	28	32	79	18	30	28.28	29.83		
12	VV	010			0.75	21	18	20	88	7	17	28.35	29.94	12	BKN	015			10.00	37	29	34	73	14	30	28.32	29.87		
15	OVC	006			1.50	24	23	24	96	7	10	28.25	29.83	15	BKN	023			10.00	36	28	33	73	15	30	28.37	29.92		
18	VV	008			0.50	25	24	25	96	6	35	28.25	29.82	18	FEW	NC			10.00	30	25	28	82	7	29	28.40	29.96		
21	OVC	025			10.00	23	21	22	92	8	01	28.26	29.83	21	BKN	022			10.00	30	24	28	79	7	31	28.41	29.96		
24	CLR	NC			10.00	20	18	19	92	7	33	28.32	29.90	24	BKN	022			10.00	29	25	28	85	5	31	28.42	29.97		
SUNRISE: 0710 NOV 14 SUNSET: 1636						SUNRISE: 0719 NOV 20 SUNSET: 1630																							
03	OVC	012			10.00	20	17	19	89	10	34	28.37	29.95	03	OVC	110			10.00	27	25	26	92	3	23	28.40	29.96		
06	OVC	012			10.00	18	14	17	84	8	34	28.42	30.00	06	OVC	060			10.00	29	26	28	89	5	23	28.40	29.96		
09	OVC	014			10.00	19	14	18	81	7	31	28.47	30.05	09	OVC	024		-SN BR	3.00	30	28	29	92	0	00	28.41	29.97		
12	BKN	018			10.00	22	14	20	71	8	36	28.48	30.06	12	OVC	020			10.00	34	31	33	89	6	31	28.41	29.97		
15	OVC	020			10.00	23	15	21	72	7	34	28.47	30.04	15	BKN	021			10.00	32	25	29	75	13	34	28.44	30.00		
18	CLR	NC			10.00	16	12	15	84	6	35	28.50	30.08	18	BKN	040			10.00	26	21	24	81	3	25	28.46	30.03		
21	CLR	NC			10.00	12	10	12	92	6	01	28.51	30.11	21	BKN	044			10.00	29	23	27	78	6	24	28.42	29.98		
24	CLR	NC			10.00	8	6	8	92	6	35	28.54	30.14	24	OVC	055		-SN	10.00	29	23	27	78	8	27	28.38	29.94		
SUNRISE: 0712 NOV 15 SUNSET: 1635						SUNRISE: 0720 NOV 21 SUNSET: 1629																							
03	FEW	NC			10.00	8	6	8	92	7	35	28.58	30.18	03	OVC	038		-SN BR	6.00	28	27	28	96	5	29	28.39	29.95		
06	BKN	017			9.00	13	9	12	84	8	01	28.62	30.23	06	OVC	031			10.00	29	27	28	92	10	31	28.42	29.98		
09	OVC	028			5.00	14	8	13	77	7	02	28.69	30.30	09	OVC	005			10.00	30	29	30	96	8	31	28.46	30.02		
12	CLR	NC			10.00	20	11	17	68	6	03	28.72	30.33	12	OVC	022		-SN	2.00	30	27	29	88	12	35	28.48	30.04		
15	OVC	027			10.00	22	15	20	75	9	12	28.73	30.34	15	OVC	034			10.00	29	22	26	75	14	34	28.51	30.09		
18	OVC	027			10.00	22	15	20	75	3	16	28.75	30.36	18	OVC	044			10.00	26	15	23	63	7	32	28.57	30.14		
21	BKN	041			9.00	16	14	15	92	0	00	28.76	30.37	21	OVC	024			10.00	26	19	24	75	7	35	28.58	30.16		
24	OVC	039			7.00	17	15	16	92	3	01	28.75	30.36	24	FEW	NC			10.00	22	16	20	78	8	33	28.60	30.18		
SUNRISE: 0713 NOV 16 SUNSET: 1634						SUNRISE: 0721 NOV 22 SUNSET: 1628																							
03	OVC	041			5.00	17	15	16	92	3	01	28.74	30.35	03	CLR	NC			10.00	19	15	18	85	12	34	28.59	30.18		
06	OVC	043			9.00	18	16	17	92	0	00	28.73	30.34	06	SCT	NC			10.00	18	14	17	84	6	33	28.60	30.19		
09	OVC	040			10.00	20	18	19	92	0	00	28.73	30.33	09	OVC	012			10.00	21	16	19	81	3	VR	28.58	30.16		
12	BKN	030			9.00	25	15	22	66	10	20	28.70	30.29	12	FEW	NC			10.00	25	18	23	75	3	20	28.52	30.10		
15	OVC	032			9.00	26	15	23	63	9	21	28.66	30.25	15	CLR	NC			10.00	27	18	24	69	9	14	28.45	30.03		
18	OVC	032			10.00	25	15	22	66	5	20	28.65	30.24	18	OVC	070			10.00	27	19	24	72	9	17	28.40	29.97		
21	OVC	050			10.00	24	16	22	71	5	18	28.62	30.22	21	OVC	060			10.00	26	19	24	75	9	19	28.36	29.93		
24	OVC	040			10.00	24	16	22	71	6	17	28.60	30.19	24	OVC	005		BR	5.00	26	25	26	96	8	20	28.26	29.82		
SUNRISE: 0714 NOV 17 SUNSET: 1633						SUNRISE: 0723 NOV 23 SUNSET: 1627																							
03	OVC	028			10.00	24	17	22	75	6	17	28.57	30.16	03	OVC	015		BR	6.00	28	26	27	92	13	25	28.23	29.78		
06	OVC	028			10.00	24	18	22	77	5	14	28.55	30.14	06	OVC	050			7.00	30	28	29	92	14	27	28.20	29.75		
09	OVC	026			6.00	24	20	23	84	8	16	28.53	30.11	09	OVC	060			10.00	32	27	30	82	16	27	28.20	29.75		
12	FEW	NC			10.00	29	19	26	66	8	17	28.50	30.07	12	BKN	037		-SN	8.00	34	23	30	64	25	28	28.20	29.75		
15	CLR	NC			10.00	30	19	26	64	9	15	28.45	30.01	15	OVC	035			10.00	31	18	27	59	25	30	28.27	29.83		
18	BKN	100			10.00	29	19	26	66	9	14	28.43	29.99	18	OVC	026			10.00	27	18	24	69	16	31	28.36	29.92		
21	CLR	NC			10.00	27	19	24	72	10	14	28.40	29.97	21	OVC	035			10.00	23	14	20	68	18	31	28.42	29.99		
24	OVC	034			10.00	27	19	24	72	8	14	28.37	29.94	24	BKN	022			10.00	18	12	16	77	16	29	28.50	30.08		
SUNRISE: 0716 NOV 18 SUNSET: 1632						SUNRISE: 0724 NOV 24 SUNSET: 1627																							
03	OVC	034			10.00	27	20	25	75	7	14	28.33	29.89	03	BKN	037			10.00	17	14	16	88	10	29	28.52	30.11		
06	OVC	090			10.00	27	19	24	72	6	16	28.31	29.87	06	OVC	035		-SN	8.00	18	14	17	84	15	30	28.57	30.15		
09	FEW	NC			8.00	26	20	24	78	9	19	28.32	29.88	09	OVC	016		-SN	10.00	20	15	19	81	13	31	28.62	30.21		
12	BKN	014			5.00	33	26	30	75	9	27	28.32	29.88	12	OVC	031		-SN	9.00	24	13	21	62	14	32	28.66	30.26		
15	BKN	110			6.00	34	28	32	79	12	26	28.32	29.88	15	BKN	032		-SN	9.00	24	13	21	62	10	32	28.65	30.25		
18	CLR	NC			7.00	31	27	29	85	7	23	28.35	29.91	18	OVC	029			9.00	20	13	18	74	13	32	28.70	30.30		
21	BKN	110			7.00	32	28	30	85	8	22	28.31	29.87	21	OVC	016		-SN	9.00	19	13	17	77	9	32	28.72	30.32		
24	CLR																												

OBSERVATIONS AT 3-HOURLY INTERVALS

DULUTH, MN

NOVEMBER 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 OFFT	OBSERVATION TIME (LST)	EFF CLD AMT Oktas		DRY BULB	DEW POINT	WET BULB		SPEED (MPH)	DIRECTION TENS OF DEG	STATION	SEA LEVEL		SKY COVER	CEILING 100'S OFFT	OBSERVATION TIME (LST)	EFF CLD AMT Oktas		DRY BULB	DEW POINT	WET BULB		SPEED (MPH)	DIRECTION TENS OF DEG	STATION	SEA LEVEL
					SUNRISE: 0726	NOV 25		SUNSET: 1626																			
03	OVC	018			5.00 -SN	15	9	14	77	10	32	28.73	30.34														
06	CLR	NC			9.00 -SN	12	7	11	80	10	31	28.73	30.34														
09	SCT	NC			10.00	13	7	11	77	10	32	28.76	30.38														
12	FEW	NC			10.00	19	9	16	65	5	VR	28.78	30.39														
15	FEW	NC			10.00	20	9	17	62	8	02	28.78	30.39														
18	CLR	NC			10.00	15	9	14	77	3	34	28.82	30.44														
21	CLR	NC			10.00	13	8	12	81	7	35	28.86	30.48														
24	OVC	019			10.00	12	9	11	87	7	36	28.90	30.51														
					SUNRISE: 0727	NOV 26		SUNSET: 1625																			
03	CLR	NC			10.00	12	9	11	87	7	01	28.91	30.53														
06	CLR	NC			10.00	9	6	8	88	7	36	28.92	30.54														
09	SCT	NC			10.00	12	5	10	73	7	01	28.95	30.58														
12	BKN	024			10.00	18	6	15	60	7	36	28.94	30.56														
15	FEW	NC			10.00	20	5	16	52	7	02	28.89	30.50														
18	CLR	NC			10.00	14	4	12	64	6	35	28.88	30.51														
21	SCT	NC			10.00	10	2	8	69	6	03	28.84	30.47														
24	CLR	NC			10.00	4	0	3	83	0	00	28.80	30.43														
					SUNRISE: 0728	NOV 27		SUNSET: 1625																			
03	CLR	NC			10.00	6	1	5	80	3	20	28.76	30.38														
06	OVC	024			9.00 -SN	13	9	12	84	5	24	28.73	30.35														
09	SCT	NC			10.00	16	11	15	80	9	22	28.70	30.31														
12	SCT	NC			10.00	22	13	19	68	15	23	28.66	30.27														
15	OVC	024			10.00	23	14	20	68	10	23	28.59	30.20														
18	OVC	065			10.00	22	14	20	71	9	22	28.60	30.20														
21	OVC	090			10.00	22	14	20	71	10	23	28.57	30.17														
24	CLR	NC			8.00	19	13	17	77	8	24	28.52	30.11														
					SUNRISE: 0729	NOV 28		SUNSET: 1624																			
03	CLR	NC			6.00 BR	16	13	15	88	8	25	28.50	30.08														
06	CLR	NC			5.00 BR	14	12	13	92	8	28	28.46	30.05														
09	CLR	NC			4.00 BR	19	17	18	92	8	27	28.41	29.99														
12	FEW	NC			9.00	26	19	24	75	14	24	28.33	29.91														
15	CLR	NC			10.00	31	21	27	67	16	22	28.18	29.74														
18	FEW	NC			10.00	30	21	27	69	24	22	28.03	29.58														
21	SCT	NC			10.00	33	25	30	72	17	23	27.87	29.41														
24	CLR	NC			10.00	37	31	35	79	15	28	27.81	29.34														
					SUNRISE: 0731	NOV 29		SUNSET: 1623																			
03	CLR	NC			10.00	37	29	34	73	20	28	27.80	29.33														
06	FEW	NC			10.00	36	26	32	67	20	28	27.78	29.30														
09	SCT	NC			10.00	37	26	33	65	26	29	27.76	29.27														
12	BKN	034			10.00	40	25	34	55	23	30	27.77	29.27														
15	OVC	039			10.00	38	25	33	60	28	28	27.78	29.29														
18	OVC	032			10.00 -SN	27	19	24	72	20	31	27.91	29.44														
21	OVC	036			9.00 -SN	20	11	17	68	18	33	28.07	29.62														
24	OVC	035			8.00 -SN	19	11	17	71	21	33	28.18	29.73														
					SUNRISE: 0732	NOV 30		SUNSET: 1623																			
03	OVC	030			9.00 -SN	17	6	14	62	18	33	28.26	29.81														
06	OVC	035			5.00 -SN	12	4	10	70	16	33	28.36	29.94														
09	FEW	NC			10.00	5	-6	3	60	16	33	28.49	30.09														
12	CLR	NC			10.00	12	-4	9	48	18	32	28.50	30.10														
15	CLR	NC			10.00	15	-7	11	36	16	32	28.51	30.11														
18	BKN	090			10.00	12	-4	9	48	7	26	28.51	30.12														
21	OVC	050			10.00	14	-2	11	49	17	26	28.45	30.06														
24	OVC	025			10.00	15	1	12	53	14	25	28.36	29.95														

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								RESULTANT WIND (MPH)			
	CEILOMETER	EFF CLD AMT	DRY BULB	DEW POINT	WET BULB	RELATIVE HUMIDITY	PRESSURE (INCHES,HG)				VISIBILITY (MILES)	WIND SPEED (MPH)
							STATION	SEA LEVEL				
01			24	19	22	82	28.40	29.97	8.66	9	4	30
02			24	19	22	82	28.40	29.96	8.61	9	4	30
03			24	19	22	82	28.40	29.97	8.49	9	5	30
04			24	19	22	81	28.39	29.96	8.74	10	5	29
05			24	19	22	81	28.39	29.96	8.91	9	5	29
06			23	19	22	83	28.40	29.97	8.84	9	4	29
07			23	19	22	84	28.40	29.97	8.38	9	5	29
08			24	19	22	83	28.40	29.97	7.84	9	5	29
09			26	20	24	80	28.40	29.98	8.11	10	5	28
10			27	21	25	77	28.41	29.97	8.13	10	6	29
11			29	21	26	72	28.40	29.97	8.69	12	8	29
12			30	21	27	69	28.40	29.96	8.28	11	6	29
13			31	20	27	66	28.39	29.95	8.93	10	6	29
14			31	20	27	65	28.38	29.95	8.67	10	5	28
15			31	19	27	65	28.38	29.95	9.22	12	6	29
16			29	19	26	67	28.39	29.96	9.19	10	4	29
17			28	18	25	70	28.40	29.97	9.19	9	4	28
18			27	18	24	72	28.40	29.97	9.18	9	4	28
19			26	18	24	73	28.40	29.98	8.83	9	4	29
20			25	18	23	75	28.40	29.98	8.67	9	3	28
21			25	18	23	76	28.40	29.97	9.11	10	4	29
22			25	18	23	77	28.40	29.97	8.72	9	4	29
23			24	18	22	79	28.40	29.96	8.67	8	3	28
24			24	18	22	80	28.40	29.96	8.68	9	4	29

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.

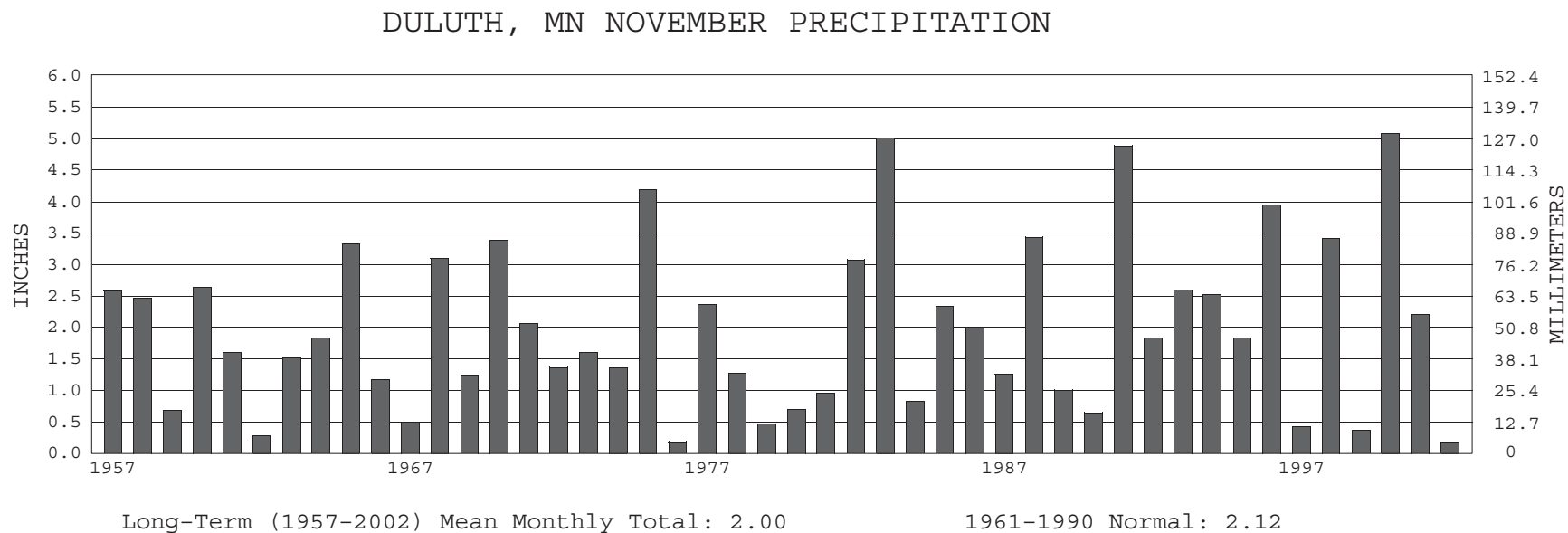
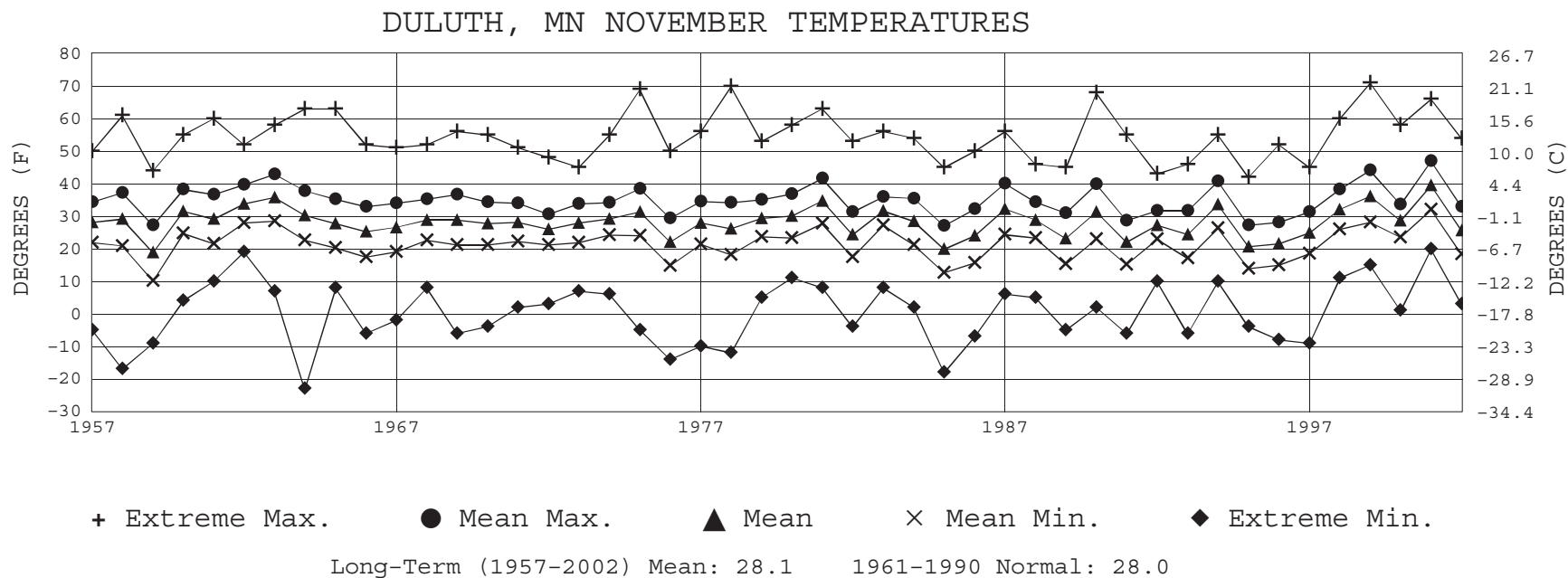
NC= No ceiling detected.

& = Original observation contained additional weather elements.

See page 3 for additional notes.

SUMMARY BY HOUR

HOUR (LST)	AVERAGES										RESULTANT WIND (MPH)	
	CEILOMETER	EFF CLD AMT	DRY BULB	DEW POINT	WET BULB	RELATIVE HUMIDITY	PRESSURE (INCHES, HG)		VISIBILITY (MILES)	WIND SPEED (MPH)	SPEED	DIRECTION
							STATION	SEA LEVEL				
01			24	19	22	82	28.40	29.97	8.66	9	4	30
02			24	19	22	82	28.40	29.96	8.61	9	4	30
03			24	19	22	82	28.40	29.97	8.49	9	5	30
04			24	19	22	81	28.39	29.96	8.74	10	5	29
05			24	19	22	81	28.39	29.96	8.91	9	5	29
06			23	19	22	83	28.40	29.97	8.84	9	4	29
07			23	19	22	84	28.40	29.97	8.38	9	5	29
08			24	19	22	83	28.40	29.97	7.84	9	5	29
09			26	20	24	80	28.40	29.98	8.11	10	5	28
10			27	21	25	77	28.41	29.97	8.13	10	6	29
11			29	21	26	72	28.40	29.97	8.69	12	8	29
12			30	21	27	69	28.40	29.96	8.28	11	6	29
13			31	20	27	66	28.39	29.95	8.93	10	6	29
14			31	20	27	65	28.38	29.95	8.67	10	5	28
15			31	19	27	65	28.38	29.95	9.22	12	6	29
16			29	19	26	67	28.39	29.96	9.19	10	4	29
17			28	18	25	70	28.40	29.97	9.19	9	4	28
18			27	18	24	72	28.40	29.97	9.18	9	4	28
19			26	18	24	73	28.40	29.98	8.83	9	4	29
20			25	18	23	75	28.40	29.98	8.67	9	3	28
21			25	18	23	76	28.40	29.97	9.11	10	4	29
22			25	18	23	77	28.40	29.97	8.72	9	4	29
23			24	18	22	79	28.40	29.96	8.67	8	3	28
24			24	18	22	80	28.40	29.96	8.68	9	4	29





NOVEMBER 2002

DULUTH, MN

LOCAL CLIMATOLOGICAL DATA

NOAA, National Climatic Data Center

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