

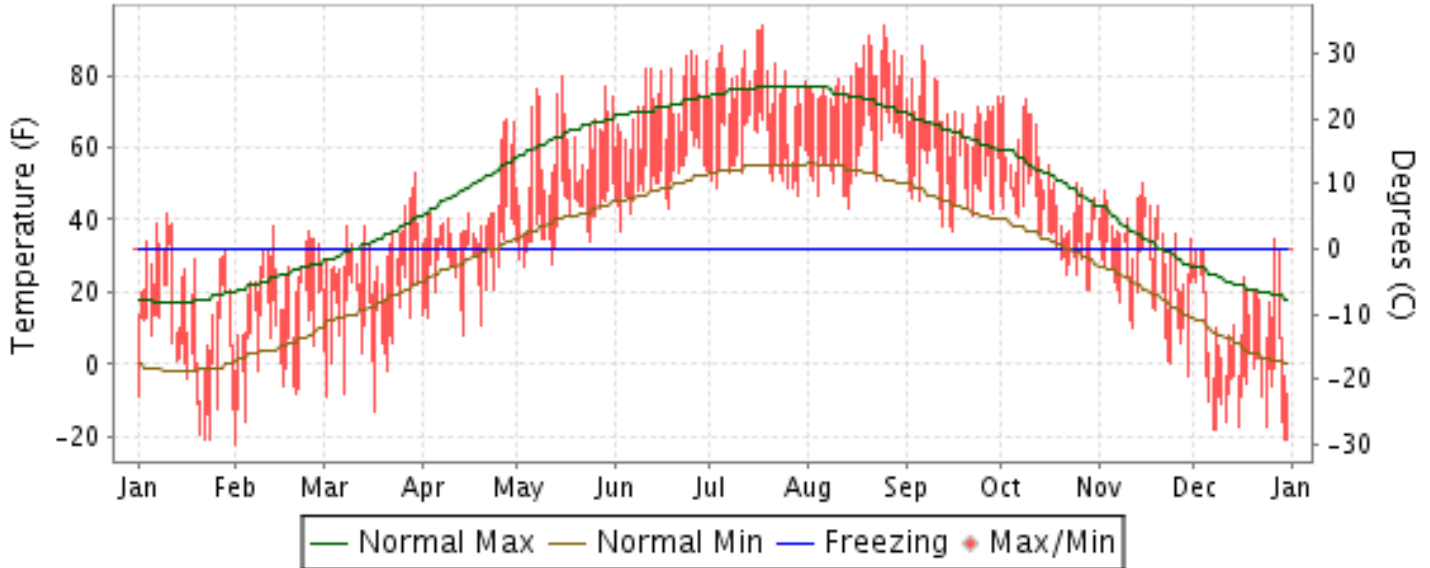


# 2013 LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA

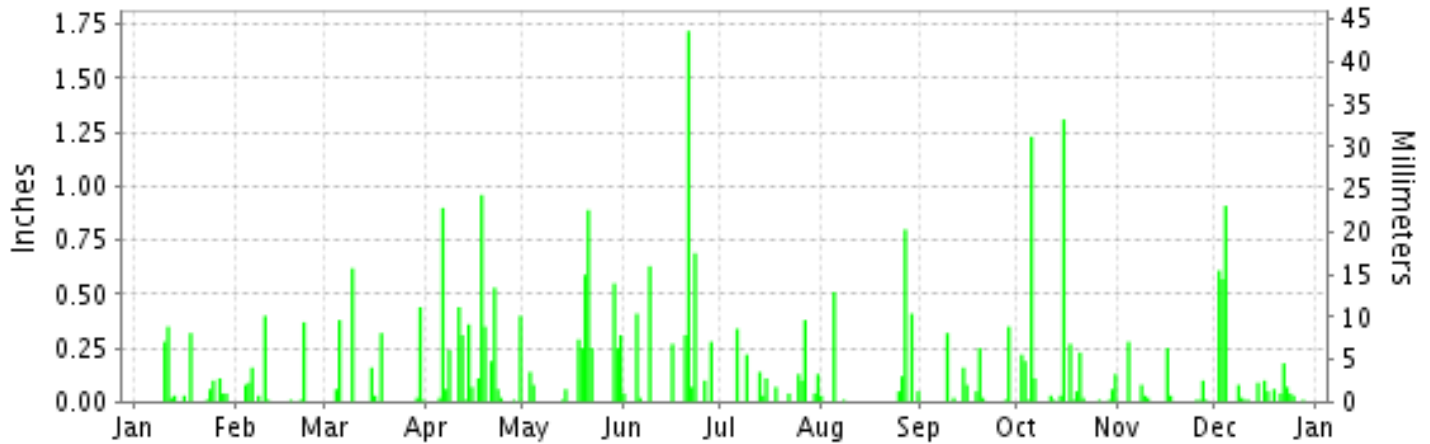
ISSN 0198-2699

## DULUTH, MINNESOTA (KDLH)

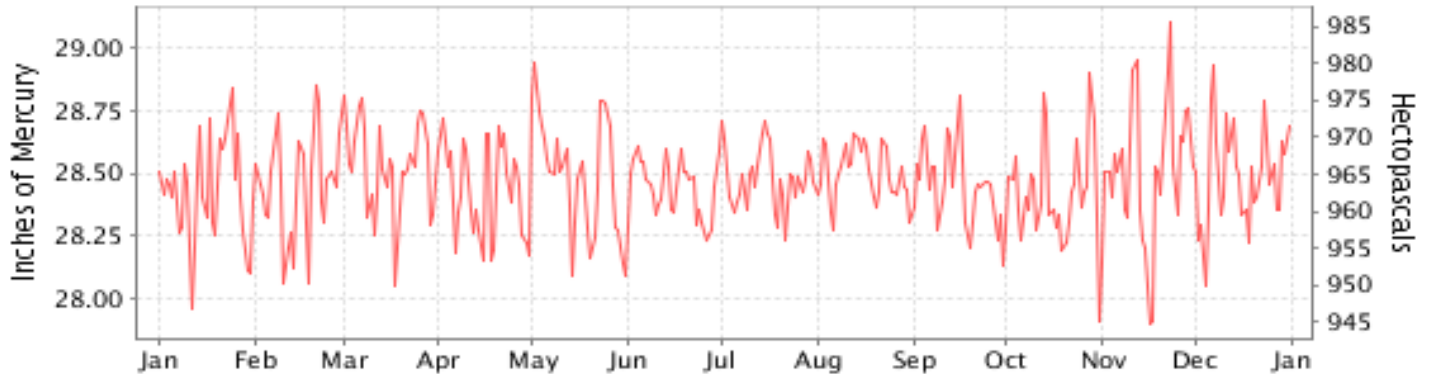
### Daily Max/Min Temperature



### Daily Precipitation



### Daily Station Pressure



I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER.

NATIONAL  
OCEANIC AND  
ATMOSPHERIC ADMINISTRATION

NATIONAL  
ENVIRONMENTAL SATELLITE, DATA  
AND INFORMATION SERVICE

NATIONAL  
CLIMATIC DATA CENTER  
ASHEVILLE, NORTH CAROLINA

*Thomas R. Karl*  
DIRECTOR  
NATIONAL CLIMATIC DATA CENTER

# METEOROLOGICAL DATA FOR 2013

## DULUTH (KDLH)

LATITUDE: 46° 50'N      LONGITUDE: 92° 10'W      ELEVATION (FT): GRND: 1433 BARO: 1429      TIME ZONE: CENTRAL (UTC -6)      WBAN: 14913

ELEMENT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	20.4	23.3	31.5	42.1	59.6	72.0	78.0	80.2	69.8	52.1	35.6	13.0	48.1	
	HIGHEST DAILY MAXIMUM	42	38	53	68	80	87	94	94	88	74	50	35	94	
	DATE OF OCCURRENCE	10	13	30	28	15	25	18	25	06	02	15	27	AUG 25	
	MEAN DAILY MINIMUM	3.8	5.9	12.0	26.7	39.5	51.2	57.6	57.8	50.0	37.8	20.3	-3.9	29.9	
	LOWEST DAILY MINIMUM	-21	-22	-13	8	27	37	47	43	37	21	-3	-21	-22	
	DATE OF OCCURRENCE	24+	01	17	14	03	03	29	14	16	29+	29	31+	FEB 01	
	AVERAGE DRY BULB	12.1	14.6	21.8	34.4	49.5	61.6	67.8	69.0	59.9	45.0	27.9	4.6	39.0	
	MEAN WET BULB	11.6	14.2	19.8	30.7	43.3	54.7	60.4	61.4	54.9	40.7	25.8	4.8	35.2	
	MEAN DEW POINT	6.3	8.4	13.3	23.2	35.9	48.5	55.0	56.1	50.8	35.9	19.6	-0.2	29.4	
	NUMBER OF DAYS WITH:														
	MAXIMUM >= 90°	0	0	0	0	0	0	0	3	3	0	0	0	0	6
	MAXIMUM <= 32°	25	22	18	2	0	0	0	0	0	0	10	30	107	
MINIMUM <= 32°	30	28	30	23	5	0	0	0	0	10	25	31	182		
MINIMUM <= 0°	12	11	5	0	0	0	0	0	0	0	2	23	53		
H/C	HEATING DEGREE DAYS	1631	1405	1333	908	471	146	47	27	168	610	1105	1866	9717	
	COOLING DEGREE DAYS	0	0	0	0	1	53	141	156	24	0	0	0	375	
RH	MEAN (PERCENT)	73	72	68	65	64	64	66	66	73	73	69	74	69	
	HOUR 00 LST	77	75	72	72	71	72	74	77	79	78	73	76	75	
	HOUR 06 LST	79	80	77	76	73	75	77	82	83	80	75	77	78	
	HOUR 12 LST	69	67	59	56	56	58	56	50	62	63	62	71	61	
	HOUR 18 LST	68	67	62	58	55	53	56	54	69	71	66	74	63	
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG(VISBY <= 1/4 MI)	3	2	3	5	7	9	6	5	7	2	3	4	56	
	THUNDERSTORMS	0	0	0	1	2	7	6	5	1	1	0	0	23	
PR	MEAN STATION PRESS. (IN.)	28.44	28.44	28.54	28.43	28.49	28.44	28.49	28.50	28.46	28.42	28.51	28.50	28.47	
	MEAN SEA-LEVEL PRESS. (IN.)	30.04	30.04	30.12	29.99	30.03	29.95	29.99	30.00	29.98	29.96	30.08	30.12	30.03	
WINDS	RESULTANT SPEED (MPH)	5.1	2.5	2.4	2.6	6.0	3.1	1.9	2.3	1.7	1.3	4.3	3.9	0.8	
	RES. DIR. (TENS OF DEGS.)	28	01	36	04	08	08	21	25	17	34	27	31	34	
	MEAN SPEED (MPH)	10.4	9.3	8.8	10.7	10.2	8.0	8.2	6.8	8.7	9.9	10.2	9.5	9.2	
	PREVAIL.DIR.(TENS OF DEGS.)	30	33	33	30	07	09	18	22	11	31	31	28	07	
	MAXIMUM 2-MINUTE WIND														
	SPEED (MPH)	38	33	30	38	38	44	26	31	33	33	30	32	44	
	DIR. (TENS OF DEGS.)	27	33	30	07	08	10	24	32	27	09	30	09	10	
	DATE OF OCCURRENCE	09	19	19	11	19	21	18	29	28	05	17	04	JUN 21	
	MAXIMUM 3-SECOND WIND:														
	SPEED (MPH)	47	44	40	48	45	54	35	43	44	46	40	46	54	
DIR. (TENS OF DEGS.)	26	34	30	08	07	10	23	31	23	07	29	09	10		
DATE OF OCCURRENCE	09	19	19	11	20	21	18	29	28	05	17	04	JUN 21		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	1.39	1.16	2.04	5.04	3.67	4.54	1.73	1.98	1.26	3.93	0.82	2.88	30.44	
	GREATEST 24-HOUR (IN.)	0.55	0.41	0.62	1.12	1.12	2.03	0.38	0.90	0.35	1.31	0.28	1.01	2.03	
	DATE OF OCCURRENCE	10-11	10-11	09	18-19	20-21	20-21	27	26-27	28	15	04	03-04	JUN 20-21	
	NUMBER OF DAYS WITH:														
PRECIPITATION 0.01	12	9	9	18	12	11	12	8	9	18	10	17	145		
PRECIPITATION 0.10	5	3	5	11	9	8	8	4	4	8	3	5	73		
PRECIPITATION 1.00	0	0	0	0	0	1	0	0	0	2	0	0	3		
SNOWFALL	SNOW,ICE PELLETS,HAIL	9.2	19.1	25.8	50.8	T	T	0.0	0.0	0.0	0.3	4.7	39.9	149.8	
	TOTAL (IN.)	3.0	5.9	7.6	11.2	T	T	0.0	0.0	0.0	0.2	2.7	10.6	11.2	
	GREATEST 24-HOUR (IN.)	18	10	05	18	11+	16				21	27	04	APR 18	
	DATE OF OCCURRENCE	9	16	23	28	T	0	0	0	0	3	21	23	APR 19	
	MAXIMUM SNOW DEPTH (IN.)	30+	23	19+	19	06+									
	DATE OF OCCURRENCE														
	NUMBER OF DAYS WITH:														
SNOWFALL >= 1.0	3	5	6	9	0	0	0	0	0	0	1	9	33		

# NORMALS, MEANS, AND EXTREMES DULUTH (KDLH)

**LATITUDE:** 46° 50'N      **LONGITUDE:** 92° 10'W      **ELEVATION (FT):** GRND: 1433 BARO: 1429      **TIME ZONE:** CENTRAL (UTC -6)      **WBAN: 14913**

	ELEMENT	POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<b>TEMPERATURE °F</b>	NORMAL DAILY MAXIMUM	30	18.9	24.0	34.4	49.2	62.2	70.8	76.3	74.3	65.0	51.5	35.6	22.3	48.7
	MEAN DAILY MAXIMUM	86	17.8	22.3	33.2	47.5	61.1	69.6	76.5	74.2	64.1	52.7	35.2	22.4	48.1
	HIGHEST DAILY MAXIMUM	72	52	55	78	88	90	94	97	97	95	86	71	55	97
	YEAR OF OCCURRENCE		1942	2000	1946	1952	1986	1995	2006	1947	1976	1953	1999	1962	JUL 2006
	MEAN OF EXTREME MAXS.	86	36.7	41.3	52.2	70.9	81.4	85.7	88.8	87.3	81.8	73.2	55.0	39.4	66.1
	NORMAL DAILY MINIMUM	30	1.5	6.1	17.5	30.0	40.6	49.3	55.4	54.4	46.1	34.8	21.9	7.3	30.4
	MEAN DAILY MINIMUM	86	0.6	4.3	15.9	29.2	39.9	48.3	55.3	54.3	45.3	35.6	21.5	7.3	29.8
	LOWEST DAILY MINIMUM	72	-39	-39	-29	-5	17	27	35	32	22	8	-23	-34	-39
	YEAR OF OCCURRENCE		1972	1996	1989	1975	1967	1972	1988	1986	1942	1976	1964	1983	FEB 1996
	MEAN OF EXTREME MINS.	86	-24.3	-19.1	-9.3	12.9	27.0	36.2	43.4	41.2	30.2	20.5	0.7	-15.6	12.0
	NORMAL DRY BULB	30	10.2	15.1	25.9	39.6	51.4	60.1	65.8	64.3	55.6	43.2	28.8	14.8	39.6
	MEAN DRY BULB	86	9.2	13.3	24.6	38.4	50.5	59.1	65.9	64.3	54.7	44.2	28.4	14.9	39.0
	MEAN WET BULB	30	8.8	12.4	22.1	32.2	43.3	53.3	58.9	58.1	50.1	37.9	25.2	13.2	34.6
	MEAN DEW POINT	30	7.3	10.1	19.1	28.5	39.9	51.3	57.4	56.8	48.4	35.6	23.4	11.6	32.5
	NORMAL NO. DAYS WITH: MAXIMUM >= 90	30	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.9	0.3	0.0	0.0	0.0	1.5
	MAXIMUM <= 32	30	27.2	20.7	12.3	1.5	0.0	0.0	0.0	0.0	0.0	0.6	11.5	24.5	98.3
MINIMUM <= 32	30	30.9	27.2	28.0	17.8	4.2	0.2	0.0	0.0	1.3	11.6	24.9	30.5	176.6	
MINIMUM <= 0	30	14.2	10.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	10.3	39.0	
<b>H/C</b>	NORMAL HEATING DEG. DAYS	30	1699	1399	1210	762	426	179	63	86	298	678	1088	1556	9444
	NORMAL COOLING DEG. DAYS	30	0	0	0	0	4	30	90	66	14	0	0	0	204
<b>RH</b>	NORMAL (PERCENT)	30	75	73	71	63	63	71	73	76	77	73	77	78	73
	HOURLY 00 LST	30	77	75	75	70	72	81	84	86	85	78	79	80	79
	HOURLY 06 LST	30	79	79	80	76	76	83	87	90	89	83	82	81	82
	HOURLY 12 LST	30	71	67	64	55	53	60	61	64	64	63	71	74	64
	HOURLY 18 LST	30	71	67	64	54	52	59	61	65	69	67	73	75	65
<b>S</b>	PERCENT POSSIBLE SUNSHINE	47	48	53	55	56	57	58	65	61	52	46	35	39	52
<b>W/O</b>	MEAN NO. DAYS WITH: HEAVY FOG(VISBY <= 1/4 MI)	50	2.4	2.3	4.3	3.6	4.9	5.9	4.8	5.6	5.3	4.3	3.5	3.6	50.5
	THUNDERSTORMS	66	0.1	0.0	0.5	1.6	3.7	6.4	7.8	6.6	3.8	1.3	0.3	0.1	32.2
<b>CLOUDINESS</b>	MEAN: SUNRISE-SUNSET (OKTAS)	48	5.4	5.2	5.4	5.4	5.3	5.3	4.7	4.7	5.2	5.3	6.0	5.6	5.3
	MIDNIGHT-MIDNIGHT (OKTAS)	32	5.0	5.0	5.2	5.0	4.8	4.8	4.3	4.3	4.7	5.0	5.7	5.4	4.9
	MEAN NO. DAYS WITH: CLEAR	48	7.4	7.3	7.0	6.2	6.2	5.1	6.7	7.2	6.3	6.4	4.4	6.0	76.2
	PARTLY CLOUDY	48	7.0	6.2	6.9	7.9	9.6	11.0	12.7	11.9	8.4	7.6	5.5	5.8	100.5
	CLOUDY	48	16.7	14.7	17.0	15.9	15.2	13.9	10.9	11.3	14.6	16.4	19.5	18.6	184.7
<b>PR</b>	MEAN STATION PRESSURE(IN)	30	28.45	28.48	28.49	28.44	28.43	28.42	28.46	28.50	28.48	28.46	28.45	28.45	28.46
	MEAN SEA-LEVEL PRES. (IN)	30	30.06	30.08	30.06	29.99	29.96	29.93	29.96	30.00	30.00	30.00	30.01	30.05	30.01
<b>WINDS</b>	MEAN SPEED (MPH)	30	10.6	10.4	10.6	11.1	10.5	9.3	8.5	8.6	9.4	10.4	10.6	10.3	10.0
	PREVAIL.DIR.(TENS OF DEGS)	39	31	31	10	09	09	11	11	12	31	31	31	33	09
	MAXIMUM 2-MINUTE: SPEED (MPH)	17	38	44	47	46	44	44	43	46	41	39	44	41	47
	DIR. (TENS OF DEGS)		27	29	08	08	28	10	29	29	10	31	08	28	08
	YEAR OF OCCURRENCE		2013	2002	1998	2003	2002	2013	2007	2001	2010	2006	1998	2001	MAR 1998
	MAXIMUM 3-SECOND SPEED (MPH)	17	52	56	57	62	54	54	60	62	52	49	55	56	62
	DIR. (TENS OF DEGS)		28	10	08	07	24	10	27	29	10	29	09	31	07
	YEAR OF OCCURRENCE		2009	2012	1998	2008	2012	2013	2007	2001	2010	2011	1998	1999	APR 2008
<b>PRECIPITATION</b>	NORMAL (IN)	30	0.96	0.81	1.49	2.43	3.23	4.23	3.85	3.70	4.11	2.85	2.09	1.21	30.96
	MAXIMUM MONTHLY (IN)	72	4.70	2.72	5.12	8.18	7.67	10.03	8.74	10.31	9.38	7.53	5.08	3.70	10.31
	YEAR OF OCCURRENCE		1969	1998	1965	2001	1962	2012	1999	1972	1991	1949	2000	1968	AUG 1972
	MINIMUM MONTHLY (IN)	72	0.13	0.13	0.22	0.24	0.15	0.55	.82	0.71	0.19	0.13	0.19	0.13	0.13
	YEAR OF OCCURRENCE		2008	1988	1959	1987	1976	1995	2005	1970	1952	1944	1976	1997	JAN 2008
	MAXIMUM IN 24 HOURS (IN)	72	1.74	1.38	2.38	2.60	3.93	6.99	3.68	5.79	3.77	2.94	2.64	2.12	6.99
	YEAR OF OCCURRENCE		1975	1965	1977	2001	2010	2012	1987	1978	1972	2010	1968	1950	JUN 2012
	NORMAL NO. DAYS WITH: PRECIPITATION >= 0.01	30	10.3	8.5	9.7	10.6	12.3	12.6	11.8	10.8	12.3	11.3	10.7	10.5	131.4
PRECIPITATION >= 1.00	30	0.0	0.1	0.1	0.3	0.5	0.9	1.0	1.1	1.1	0.5	0.4	0.1	6.1	
<b>SNOWFALL</b>	NORMAL (IN)	30	19.4	12.4	13.2	6.9	0.4	0.0	0.0	0.0	0.1	2.3	13.7	17.7	86.1
	MAXIMUM MONTHLY (IN)	70	46.8	32.1	45.5	50.8	8.1	0.2	T	T	2.4	9.7	50.1	44.3	50.8
	YEAR OF OCCURRENCE		1969	2001	1965	2013	1954	1945	1992	2008	1991	1995	1991	1950	APR 2013
	MAXIMUM IN 24 HOURS (IN)	70	23.2	17.0	19.4	11.6	4.4	0.2	T	T	2.4	7.9	24.1	25.4	25.4
	YEAR OF OCCURRENCE		2004	1948	1965	1983	2010	1945	1992	1995	1991	1966	1991	1950	DEC 1950
	MAXIMUM SNOW DEPTH (IN)	65	42	38	48	41	9	0	0	0	0	6	30	32	48
	YEAR OF OCCURRENCE		1969	1969	1965	1965	1950					2010	1991	1983	MAR 1965
	NORMAL NO. DAYS WITH: SNOWFALL >= 1.0	30	4.5	3.8	3.6	1.8	0.1	0.0	0.0	0.0	0.0	0.8	3.8	5.0	23.4

**PRECIPITATION (inches) 2013 DULUTH (KDLH)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1984	0.78	0.61	0.54	2.34	1.83	5.70	1.33	1.96	3.82	5.19	0.82	1.91	26.83
1985	0.39	0.66	1.85	2.35	4.44	3.18	4.16	3.91	6.02	1.76	2.33	0.78	31.83
1986	0.66	0.74	0.88	4.11	2.59	8.04	4.58	5.29	6.26	0.66	2.01	0.45	36.27
1987	0.69	0.31	0.60	0.24	4.02	0.83	5.46	1.87	2.93	0.96	1.26	0.67	19.84
1988	0.78	0.13	2.55	0.44	3.96	4.56	1.14	6.82	6.18	1.05	3.44	1.12	32.17
1989	1.87	0.34	1.49	2.11	3.50	3.81	1.09	5.02	4.40	1.02	1.01	0.63	26.29
1990	0.51	0.51	3.35	3.76	1.48	4.83	2.42	5.39	6.49	3.51	0.65	0.49	33.39
1991	0.52	0.55	1.17	3.90	6.11	5.64	5.33	2.49	9.38	2.85	4.89	0.61	43.44
1992	0.60	0.58	0.84	2.87	2.87	5.04	3.64	4.13	3.90	1.13	1.84	1.23	28.67
1993	1.79	0.38	0.44	2.42	4.74	6.95	5.75	3.63	1.81	0.56	2.60	1.28	32.35
1994	1.85	0.62	1.11	4.11	1.91	4.54	2.20	3.45	5.61	2.27	2.53	0.33	30.53
1995	1.38	1.04	1.97	2.19	4.13	0.55	5.73	6.67	3.02	4.24	1.84	1.54	34.30
1996	1.35	1.10	0.50	1.47	1.61	5.10	8.37	2.92	5.34	3.08	3.95	.86	35.65
1997	0.94	0.23	1.48	1.07	1.90	5.17	4.33	1.26	1.75	2.29	0.43	0.13	20.98
1998	0.36	2.72	1.84	1.42	2.21	6.13	1.72	2.59	3.33	4.21	3.42	1.57	31.52
1999	0.87	0.64	0.76	2.96	2.93	4.72	8.74	7.41	5.80	2.35	0.70	0.23	38.11
2000	0.77	1.08	2.64	1.38	3.07	4.18	3.50	4.42	2.02	2.27	5.08	0.93	31.34
2001	1.25	1.76	0.69	8.18	3.49	3.06	1.89	3.31	1.41	2.42	2.21	0.55	30.22
2002	0.40	0.64	1.87	2.72	2.04	5.75	5.40	4.22	3.93	3.05	0.34	0.81	31.17
2003	0.23	0.23	1.03	2.03	3.54	3.47	4.79	2.31	3.52	1.57	1.70	0.54	24.96
2004	1.89	1.48	2.11	1.38	3.56	1.87	3.72	3.72	4.31	3.17	0.49	2.13	29.83
2005	2.51	1.06	0.52	1.24	4.43	5.46	0.82	2.33	3.60	4.86	3.02	2.54	32.39
2006	0.48	0.94	1.56	1.61	4.72	3.53	3.47	1.16	2.86	1.78	1.22	1.22	24.55
2007	0.20	1.49	2.49	2.22	3.39	2.67	1.88	1.39	4.38	6.80	0.66	2.45	30.02
2008	0.13	0.37	0.81	3.77	2.73	5.21	4.58	2.90	4.17	2.95	1.44	1.94	31.00
2009	0.53	0.98	3.37	0.89	2.13	1.81	3.33	6.02	1.40	4.60	1.15	2.89	29.10
2010	1.10	0.41	0.94	0.75	5.95	5.25	2.95	6.39	3.48	3.87	2.42	2.08	35.59
2011	1.11	0.31	0.83	3.79	2.27	3.72	4.57	5.71	1.48	1.13	0.60	0.55	26.07
2012	0.37	1.41	1.62	3.70	6.61	10.03	3.09	1.42	0.84	1.34	1.33	1.44	33.20
2013	1.39	1.16	2.04	5.04	3.67	4.54	1.73	1.98	1.26	3.93	0.82	2.88	30.44
POR= 72 YRS	1.08	0.86	1.69	2.40	3.28	4.24	3.81	3.88	3.44	2.51	1.82	1.25	30.26

WBAN : 14913

**AVERAGE TEMPERATURE (°F) 2013 DULUTH (KDLH)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1984	7.1	23.0	18.7	42.4	50.5	61.4	66.6	67.7	51.9	45.7	28.4	13.2	39.7
1985	6.5	11.6	30.3	42.1	54.9	56.5	64.6	59.7	52.1	42.7	19.9	3.0	37.0
1986	11.7	11.5	28.5	42.1	51.8	58.9	64.7	60.8	52.7	43.4	24.0	18.8	39.1
1987	15.3	23.7	31.6	46.1	53.1	63.1	67.6	63.5	57.2	39.4	32.2	20.4	42.8
1988	4.8	6.2	24.4	40.1	56.0	62.8	70.0	64.5	55.4	38.6	28.9	13.5	38.8
1989	14.3	3.4	18.9	36.8	51.7	58.4	68.6	64.8	55.9	44.4	23.2	4.1	37.0
1990	18.7	14.9	27.1	40.2	48.3	61.5	64.6	64.1	56.2	42.1	31.4	12.6	40.1
1991	5.9	19.4	26.1	42.7	54.7	61.7	63.8	66.3	53.0	40.4	22.0	15.9	39.3
1992	16.7	21.2	25.9	36.2	53.8	56.3	59.4	60.5	53.8	41.7	27.3	15.9	39.1
1993	11.9	14.5	27.1	37.2	50.3	57.1	63.6	65.0	49.5	40.0	24.4	17.0	38.1
1994	-2.1	6.5	28.6	39.6	53.8	62.5	64.5	62.5	58.5	47.2	33.6	21.3	39.7
1995	13.7	11.7	28.2	34.7	52.4	65.1	66.8	67.4	55.1	43.7	20.6	12.1	39.3
1996	2.2	11.9	19.4	33.7	48.2	60.4	62.1	65.4	56.2	43.6	21.6	11.2	36.3
1997	7.0	14.5	23.5	35.7	45.8	62.2	63.8	61.0	57.5	43.9	24.9	22.7	38.5
1998	16.4	29.0	25.4	44.1	55.9	58.8	65.7	67.1	59.3	45.9	32.1	18.7	43.2
1999	9.3	21.3	27.8	41.4	53.6	60.6	67.6	63.5	54.5	42.3	36.2	19.7	41.5
2000	10.3	21.4	33.4	38.1	52.9	56.0	64.6	64.7	53.9	46.9	28.6	4.4	39.6
2001	17.4	7.8	24.5	39.8	52.8	60.9	65.7	67.0	55.4	43.4	39.5	22.2	41.4
2002	17.8	21.5	18.3	37.2	46.6	61.8	69.1	63.6	58.0	35.6	25.6	20.2	39.6
2003	9.0	9.1	22.9	38.3	50.7	59.8	66.2	67.6	56.2	44.3	26.7	20.5	39.3
2004	4.0	18.9	28.3	39.4	46.7	57.3	63.4	58.8	59.2	45.3	33.4	14.0	39.1
2005	7.7	19.4	23.2	43.1	48.9	61.8	67.6	64.7	59.7	45.9	30.7	17.7	40.9
2006	23.8	11.8	28.7	45.7	53.1	62.9	71.9	66.0	54.4	39.8	31.8	23.8	42.8
2007	13.7	8.0	29.4	38.9	53.9	63.1	67.4	65.1	57.4	47.7	28.9	13.4	40.6
2008	10.0	10.2	22.3	37.9	48.5	60.0	64.5	64.4	56.2	44.6	28.9	7.0	37.9
2009	3.3	15.3	24.6	39.7	50.2	58.8	62.2	62.2	62.1	39.1	37.9	12.4	39.0
2010	10.7	15.5	37.1	46.1	53.8	59.8	69.0	68.2	52.0	46.9	30.5	12.8	41.9
2011	7.1	14.6	24.0	39.1	49.7	58.1	69.9	66.8	56.3	48.5	33.1	21.8	40.8
2012	18.0	23.7	39.3	42.5	55.0	64.3	71.9	66.2	56.2	42.5	31.0	18.4	44.1
2013	12.1	14.6	21.8	34.4	49.5	61.6	67.8	69.0	59.9	45.0	27.9	4.6	39.0
POR= 86 YRS	9.2	13.3	24.6	38.4	50.5	59.1	65.9	64.3	54.7	44.2	28.4	14.9	38.9

**HEATING DEGREE DAYS (base 65°F) 2013 DULUTH (KDLH)**

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1984-85	40	40	391	588	1093	1601	1809	1494	1067	679	314	252	9368
1985-86	57	178	394	686	1349	1925	1646	1492	1127	680	416	196	10146
1986-87	76	151	361	663	1224	1426	1537	1153	1027	561	376	112	8667
1987-88	34	100	234	782	977	1377	1862	1704	1253	741	300	146	9510
1988-89	22	97	287	812	1081	1590	1567	1721	1424	839	405	206	10051
1989-90	27	78	272	633	1249	1887	1428	1398	1166	745	506	130	9519
1990-91	76	94	273	700	1003	1623	1833	1273	1201	661	332	129	9198
1991-92	97	67	363	754	1284	1515	1492	1266	1207	859	355	271	9530
1992-93	174	167	332	717	1121	1518	1638	1408	1171	825	451	239	9761
1993-94	73	71	459	769	1214	1485	2082	1635	1123	756	351	105	10123
1994-95	58	114	197	544	932	1347	1584	1487	1136	902	389	98	8788
1995-96	43	16	305	655	1327	1634	1946	1537	1410	932	514	172	10491
1996-97	105	38	277	655	1296	1660	1789	1407	1280	873	588	106	10074
1997-98	96	155	228	649	1193	1309	1498	1001	1218	620	282	193	8442
1998-99	50	21	196	581	981	1431	1722	1221	1147	699	357	158	8564
1999-00	38	76	329	698	857	1396	1691	1256	975	800	369	274	8759
2000-01	75	52	336	556	1084	1872	1469	1595	1250	748	369	164	9570
2001-02	66	48	300	661	760	1320	1456	1211	1441	826	574	157	8820
2002-03	27	68	242	902	1176	1383	1730	1554	1301	795	438	171	9787
2003-04	49	36	277	638	1142	1373	1886	1329	1132	762	561	236	9421
2004-05	90	200	194	604	938	1572	1769	1270	1290	650	491	137	9205
2005-06	56	74	186	582	1021	1456	1269	1486	1117	572	372	91	8282
2006-07	10	32	319	777	988	1267	1581	1592	1094	778	348	100	8886
2007-08	60	63	254	526	1075	1594	1698	1582	1318	807	506	167	9650
2008-09	59	63	274	625	1077	1789	1908	1387	1246	751	454	212	9845
2009-10	99	124	106	796	806	1624	1679	1381	858	562	350	167	8552
2010-11	4	38	384	554	1032	1609	1788	1405	1263	770	465	204	9516
2011-12	28	23	287	513	950	1334	1449	1190	793	671	320	77	7635
2012-13	0	47	281	691	1015	1438	1631	1405	1333	908	471	146	9366
2013-	47	27	168	610	1105	1866							

WBAN : 14913

**COOLING DEGREE DAYS (base 65°F) 2013 DULUTH (KDLH)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1984	0	0	0	0	4	13	96	133	4	0	0	0	250
1985	0	0	0	0	9	4	54	20	15	0	0	0	102
1986	0	0	0	0	13	18	74	26	0	0	0	0	131
1987	0	0	0	0	13	62	121	60	7	0	0	0	263
1988	0	0	0	0	27	83	183	89	4	0	0	0	386
1989	0	0	0	0	0	17	147	80	7	0	0	0	251
1990	0	0	0	7	0	32	70	73	16	0	0	0	198
1991	0	0	0	0	20	35	69	117	8	0	0	0	249
1992	0	0	0	0	13	18	9	37	3	3	0	0	83
1993	0	0	0	0	0	8	36	76	0	0	0	0	120
1994	0	0	0	0	11	36	52	43	8	0	0	0	150
1995	0	0	0	0	7	107	105	99	14	4	0	0	336
1996	0	0	0	0	0	44	25	58	21	0	0	0	148
1997	0	0	0	0	0	27	67	37	8	0	0	0	139
1998	0	0	0	0	8	12	81	93	32	0	0	0	226
1999	0	0	0	0	12	33	127	35	20	0	0	0	227
2000	0	0	0	0	2	10	69	51	9	0	0	0	141
2001	0	0	0	0	0	49	96	117	17	0	0	0	279
2002	0	0	0	0	10	68	161	33	39	0	0	0	311
2003	0	0	0	0	0	21	94	122	20	3	0	0	260
2004	0	0	0	0	0	12	47	15	26	0	0	0	100
2005	0	0	0	0	0	46	142	74	35	0	0	0	297
2006	0	0	0	0	8	34	232	68	7	0	0	0	349
2007	0	0	0	0	8	48	142	73	35	0	0	0	306
2008	0	0	0	0	0	23	50	54	16	0	0	0	143
2009	0	0	0	0	0	33	17	44	24	0	0	0	118
2010	0	0	0	0	14	19	134	143	0	0	0	0	310
2011	0	0	0	0	0	2	186	85	32	9	0	0	314
2012	0	0	0	0	16	61	218	90	24	0	0	0	409
2013	0	0	0	0	1	53	141	156	24	0	0	0	375

**SNOWFALL (inches) 2013 DULUTH (KDLH)**

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1984-85	0.0	0.0	T	3.5	2.4	8.2	15.3	12.0	26.7	0.1	0.0	0.0	68.2
1985-86	0.0	0.0	0.7	2.3	34.1	18.8	11.5	10.3	11.4	0.2	T	0.0	89.3
1986-87	0.0	0.0	0.0	1.8	8.2	7.3	11.2	5.1	6.7	0.3	T	0.0	40.6
1987-88	0.0	0.0	0.0	3.9	5.8	11.3	16.7	2.3	13.7	0.1	0.0	0.0	53.8
1988-89	0.0	0.0	0.0	0.3	24.3	20.7	31.2	5.3	17.6	19.0	0.7	0.0	119.1
1989-90	0.0	T	0.0	0.6	8.4	14.2	5.5	15.0	11.6	2.4	0.6	T	58.3
1990-91	0.0	0.0	0.0	3.2	5.1	13.5	11.4	9.7	9.5	8.5	2.9	0.0	63.8
1991-92	0.0	0.0	2.4	4.3	50.1	12.9	9.3	10.6	0.7	9.7	0.0	0.0	100.0
1992-93	T	0.0	T	5.1	29.4	15.5	24.9	10.0	5.8	3.5	T	0.0	94.2
1993-94	0.0	0.0	T	0.6	28.5	15.1	35.3	7.9	13.0	10.0	0.0	T	110.4
1994-95	0.0	0.0	0.0	0.2	15.5	6.2	12.8	17.6	20.9	16.2	T	0.0	89.4
1995-96	0.0	T	0.1	9.7	20.4	25.9	34.0	21.3	11.4	12.6	T		
1996-97				15.9	41.7	35.5	8.9	23.6	1.7	0.1	0.0		
1997-98	0.0	0.0	0.0	1.2	16.9	6.0	29.9	9.6	14.2	2.3	0.0	T	80.1
1998-99	0.0	T	0.0	T	15.7	12.8	18.9	13.5	17.8	11.5	0.0	0.0	90.2
1999-00	0.0	0.0	0.0	0.0	6.2	4.4	16.5	13.3	9.5	5.6	T	0.0	55.5
2000-01	0.0	0.0	0.0	T	17.5	19.2	14.9	32.1	7.9	7.7	0.0	0.0	99.3
2001-02	0.0	0.0	0.0	2.0	11.4	7.3	11.3	11.2	29.7	11.6	1.5	0.0	86.0
2002-03	0.0	0.0	T	6.3	4.3	3.4	5.9	6.4	17.1	12.9	0.0	0.0	56.3
2003-04	0.0	0.0	T	4.5	19.4	8.4	42.3	23.4	11.6	0.3	0.0	0.0	109.9
2004-05	0.0	0.0	0.0	T	1.4	17.3	45.7	20.2	6.3	0.5	0.1	0.0	91.5
2005-06	0.0	0.0	0.0	0.1	11.4	34.5	7.3	23.4	12.5	T	T	T	89.2
2006-07	0.0	0.0	0.0	4.1	4.0	10.1	4.5	19.7	25.5	12.7	0.1	0.0	80.7
2007-08	0.0	0.0	0.0	T	6.0	35.4	2.8	7.1	13.6	14.6	0.5	0.0	80.0
2008-09	0.0	T	0.0	0.2	3.2	37.1	9.3	7.1	15.5	1.2	T	0.0	73.6
2009-10	0.0	0.0	0.0	3.7	1.1	33.4	14.6	8.5	T	T	4.5	0.0	65.8
2010-11	0.0	0.0	0.0	7.7	27.9	18.1	18.5	3.2	7.4	10.6	T	0.0	93.4
2011-12	0.0	0.0	0.0	T	3.7	8.1	5.1	19.7	11.9	0.6	0.0	0.0	49.1
2012-13	0.0	0.0	0.1	1.1	10.1	13.2	9.2	19.1	25.8	50.8	T	T	129.4
2013-	0.0	0.0	0.0	0.3	4.7	39.9							
POR= 65 YRS	T	T	0.1	1.7	12.0	16.9	17.6	12.3	14.1	7.4	0.7	T	82.8

WBAN : 14913

**REFERENCE NOTES :**

<p>PAGE 1: THE TEMPERATURE GRAPH SHOWS NORMAL MAXIMUM AND NORMAL MINIMUM DAILY TEMPERATURES (SOLID CURVES) AND THE ACTUAL DAILY HIGH AND LOW TEMPERATURES (VERTICAL BARS).</p> <p>PAGE 2 AND 3: H/C INDICATES HEATING AND COOLING DEGREE DAYS. RH INDICATES RELATIVE HUMIDITY W/O INDICATES WEATHER AND OBSTRUCTIONS S INDICATES SUNSHINE. PR INDICATES PRESSURE. CLOUDINESS ON PAGE 3 IS THE SUM OF THE CEILOMETER AND SATELLITE DATA NOT TO EXCEED EIGHT EIGHTHS(OKTAS).</p> <p>GENERAL: T INDICATES TRACE PRECIPITATION, AN AMOUNT GREATER THAN ZERO BUT LESS THAN THE LOWEST REPORTABLE VALUE. + INDICATES THE VALUE ALSO OCCURS ON EARLIER DATES. BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA. ASOS INDICATES AUTOMATED SURFACE OBSERVING SYSTEM. PM INDICATES THE LAST DAY OF THE PREVIOUS MONTH. POR (PERIOD OF RECORD) BEGINS WITH THE JANUARY DATA MONTH AND IS THE NUMBER OF YEARS USED TO COMPUTE THE MEAN. INDIVIDUAL MONTHS WITHIN THE POR MAY BE MISSING. WHEN THE POR FOR A NORMAL IS LESS THAN 30 YEARS, THE NORMAL IS PROVISIONAL AND IS BASED ON THE NUMBER OF YEARS INDICATED. 0.* OR * INDICATES THE VALUE OR MEAN-DAYS-WITH IS BETWEEN 0.00 AND 0.05. CLOUDINESS FOR ASOS STATIONS DIFFERS FROM THE NON-ASOS OBSERVATION TAKEN BY A HUMAN OBSERVER. ASOS STATION CLOUDINESS IS BASED ON TIME-AVERAGED CEILOMETER DATA FOR CLOUDS AT OR BELOW 12,000 FEET CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS.</p> <p>GENERAL CONTINUED: WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH. RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION. AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2. SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN</p>	<p>PRECIPITATION, INCLUDING HAIL. A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65 F. DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR. DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY. WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY. ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTHS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER. STATION HISTORY STOPPED WITH THE 2009 ANNUAL. IF YOU NEED STATION HISTORY INFORMATION GO TO "Historical Observing Metadata Repository", URL IS: <a href="http://www.ncdc.noaa.gov/homr/">http://www.ncdc.noaa.gov/homr/</a> SNOWFALL STOPPED MONTH &amp; YEAR INDICATED ABOVE. NO FURTHER YEARS INCLUDED UNLESS RESTARTED.</p> <p><b>NOTE:</b> The "Period of Record:(POR)" for all "averages" is based on "Summary of the Day First Order Station" and "Cooperative Summary of the Day" archives.</p>
---	---

# 2013 DULUTH MINNESOTA (KDLH)

Duluth, Minnesota is located at the western tip of Lake Superior. The city, about 20 miles long, lies at the base of a range of hills that rise abruptly to 600 - 800 feet above the level of Lake Superior. The range runs in a northeast and southwest direction. Two or 3 miles from the lake the land becomes a slightly rolling plateau.

Duluth in the summer is known as the Air Conditioned City. Being situated below high terrain and along the lake, any easterly component winds automatically cool the city. However, with westerly flow in the summer, the wind generally abates at night, thus, allowing cool lake air to move back into the city area near the lake.

An important influence on the climate is the passage of a succession of high and low pressure systems west and east. The proximity of Lake Superior, which is the largest and coldest of the Great Lakes, modifies the local weather. Summer temperatures are cooler and winter temperatures are warmer. The lake effect at Duluth is most prevalent when low pressure systems pass to the south creating easterly winds. In the summer, warm, moist air flowing over the cold lake surface has a stabilizing effect that results in cool, cloudy weather over Duluth. However, during the winter cold air flowing over the warm open lake surface absorbs moisture that is later precipitated over Duluth as snow. The lake effect is further reflected from the low frequency of severe storms such as wind, hail, tornadoes, freezing rain (glaze), and blizzards when compared to other areas that are a further distance from the lake.

Easterly component winds at Duluth occur 40 to 50 percent of the time from March through August and 20 to 25 percent of the time from November through February. During the winter 60 to 70 percent of the winds are from a westerly component.

The climate of Duluth is predominantly continental with significant local Lake Superior effects. Duluth averages 143 days between the last occurrence of 32 degrees in mid-May and the first in early October. At the Duluth Airport about six miles away from the lake, the average first and last occurrences of 32 degrees are late May and late September, giving a freeze-free period of 123 days.

Fall colors throughout this area are outstanding. Reds, yellows, browns, and combinations of these are an experience to see. Recreation is superb from December through March for cross-country and down-hill skiing and snowmobiling. The snow is dry.

Ice in the harbor forms about mid-November and generally is gone by mid-April. The shipping season can vary from year to year depending on temperatures and the winds that move the ice around. In most years there is little or no shipping during February and March on Lake Superior.

# Station History

DULUTH, MN

NAME	Begin Date	End Date	Latitude	Longitude	Elevation Feet	Relocation	Platform
DULUTH INTL AP	1969-01-01	1976-01-01	46° 49'	-92° 10'	1424		COOP, WXSVC
DULUTH WILLIAMSON JOHNSON MUNICIPAL AP	1940-08-01	1948-01-01	46° 49'	-92° 10'			AIRWAYS
DULUTH WILLIAMSON JOHNSON MUNICIPAL AP	1948-01-01	1963-12-01	46° 49'	-92° 10'	1424		AIRWAYS, COOP
DULUTH INTL AP	1996-04-01	1997-04-01	46° 49'	-92° 10'	1422		AIRWAYS, ASOS, COOP, WXSVC
DULUTH INTL AP	1963-12-01	1969-01-01	46° 49'	-92° 10'	1424		AIRWAYS, COOP
DULUTH INTL AP	1976-01-01	1989-09-05	46° 49'	-92° 10'	1427		COOP, WXSVC
DULUTH INTL AP	1997-04-01	2004-12-29	46° 50'	-92° 12'	1422		AIRWAYS, ASOS, COOP, WXSVC
DULUTH INTL AP	2004-12-29	Present	46° 50'	-92° 10'	1433		AIRWAYS, ASOS, COOP, WXSVC
DULUTH INTL AP	1989-09-05	1996-04-01	46° 49'	-92° 10'	1428		COOP, WXSVC

# Element History

Element	Begin Date	End Date	Frequency	Time Of Observation	Equipment *	Equipment * Modifications	Equipment Exposure
TEMP	1989-09-05	1997-04-01	DAILY	2400	MXMN		
PRECIP	1989-09-05	1997-04-01	DAILY	2400	SRG		
PRECIP	2004-12-29	2005-10-01	HOURLY	2400	AHTB	RCRD;HTD	
PRECIP	2005-10-01	Present	DAILY	2400	PCPNX		
PRECIP	1997-04-01	2004-12-29	HOURLY		UNIV	RCRD	
PRECIP	2004-12-29	2005-10-01	DAILY	2400	PCPNX		
PRECIP	1940-08-01	1961-06-01	DAILY	2400	UNIV	RCRD	
TEMP	1961-06-01	1989-09-05	DAILY	2400			
PRECIP	1961-06-01	1989-09-05	DAILY	2400	UNIV	RCRD	
TEMP	1940-08-01	1961-06-01	DAILY	2400			
PRECIP	1989-09-05	1997-04-01	HOURLY	2400			
TEMP	2005-10-01	Present	DAILY	2400	TEMPX		
TEMP	2004-12-29	2005-10-01	DAILY	2400	TEMPX		
PRECIP	1961-06-01	1989-09-05	HOURLY	2400			
PRECIP	2005-10-01	Present	HOURLY	2400	AWPAG	RCRD;HTD	
TEMP	1997-04-01	2004-12-29	DAILY	2400	MMTS		
PRECIP	1997-04-01	2004-12-29	DAILY	2400	SRG		

\* For explanation of codes and abbreviations see Station Metadata link below.

Other Station Information can be found at:

ASOS Implementation by NWS: <http://www.nws.noaa.gov/ops2/Surface/asosimplementation.htm>

Station Metadata website: <http://www.ncdc.noaa.gov/homr>

INQUIRES/COMMENTS CALL: (828) 271-4800, option 2

Fax Number : (828) 271-4876

TDD : (828) 271-4010

Email : [ncdc.orders@noaa.gov](mailto:ncdc.orders@noaa.gov)

NOAA/National Climatic Data Center

Attn: User Engagement & Services Branch

151 Patton Avenue

Asheville, NC 28801-5001

Visit our Web Site for other weather data: [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)