

2003

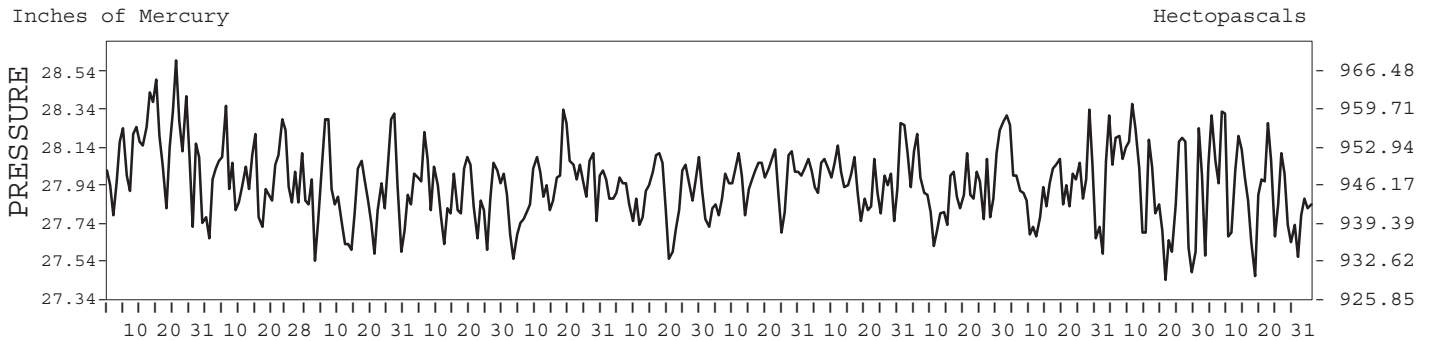
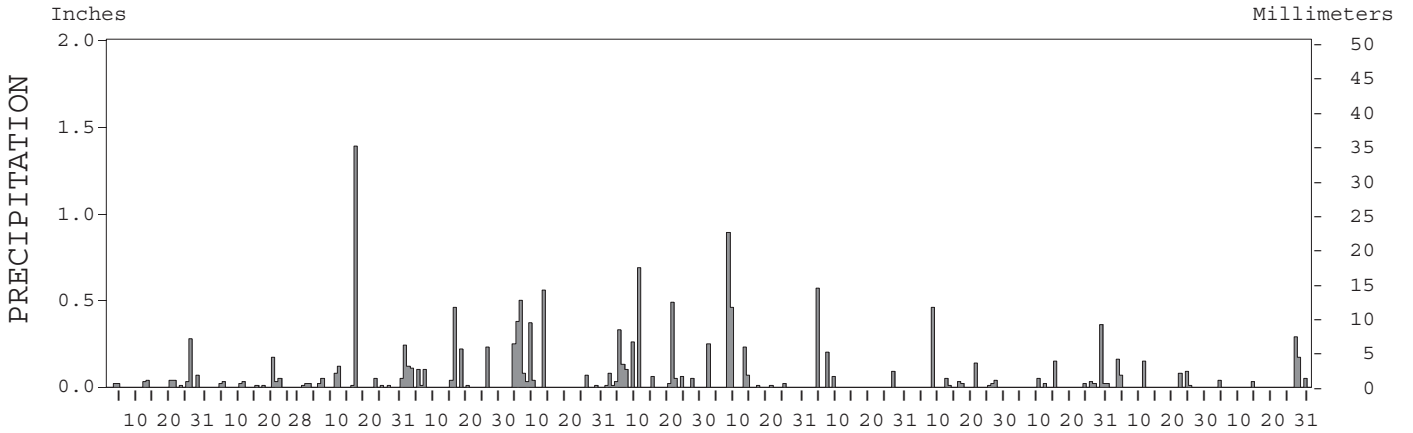
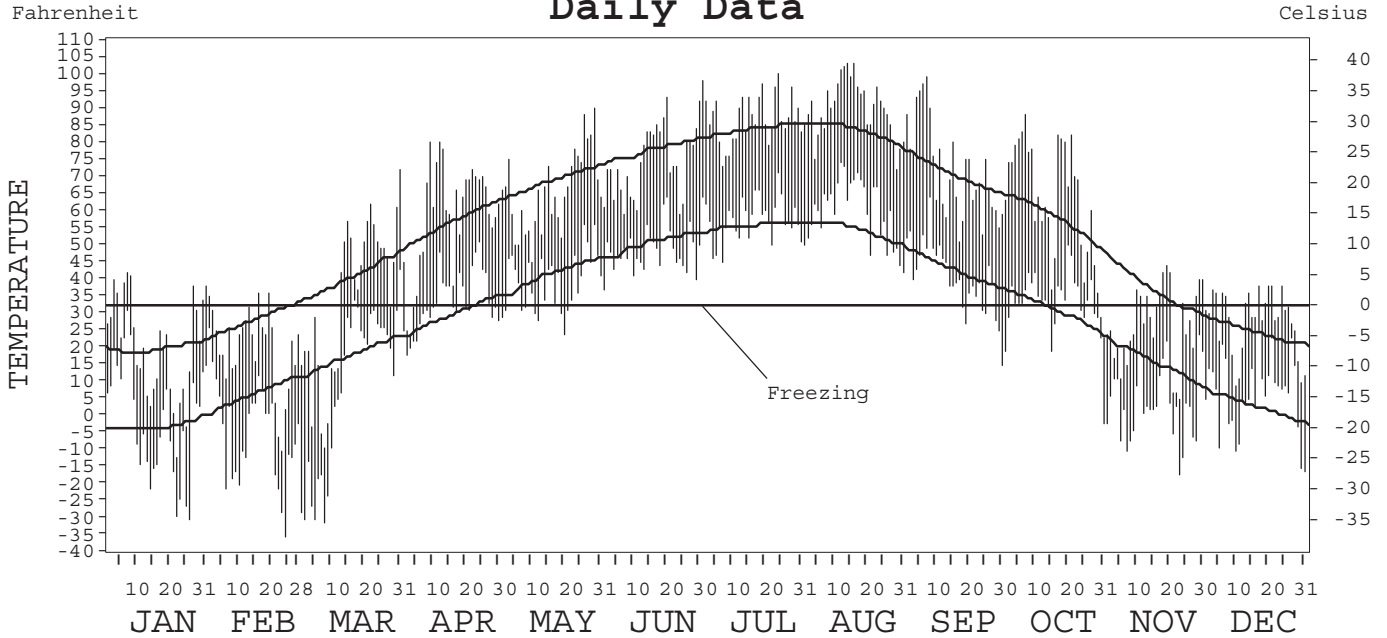
# LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-3857

## WILLISTON, NORTH DAKOTA (ISN)

### Daily Data



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# METEOROLOGICAL DATA FOR 2003

## WILLISTON, ND (ISN)

LATITUDE: 48° 11' 41" N      LONGITUDE: 103° 38' 31" W      ELEVATION (FT): GRND: 1899      BARO: 1902      TIME ZONE: CENTRAL (UTC + 6)      WBAN: 94014

	ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	20.4	19.6	34.6	58.6	65.6	74.1	87.1	89.7	71.7	62.5	26.6	27.9	53.2	
	HIGHEST DAILY MAXIMUM	42	36	72	80	90	93	100	103	99	88	44	38	103	
	DATE OF OCCURRENCE	07	19+	31	12+	29	20	24	16+	07	07	19	24+	AUG 16+	
	MEAN DAILY MINIMUM	-1.0	-4.9	8.6	33.6	39.3	48.3	57.5	59.6	40.4	33.0	3.3	6.5	27.0	
	LOWEST DAILY MINIMUM	-30	-35	-31	18	24	37	45	42	15	-2	-17	-16	-35	
	DATE OF OCCURRENCE	26	24	08	02	20	01	07	31	30	31	23	31	FEB 24	
	AVERAGE DRY BULB	9.7	7.4	21.6	46.1	52.5	61.2	72.3	74.7	56.1	47.8	15.0	17.2	40.1	
	MEAN WET BULB	10.3		19.5	39.8	47.3	54.9	61.2	61.3	47.4	39.4	14.9	17.1		
	MEAN DEW POINT	7.4		14.7	32.7	40.6	49.5	53.5	52.1	38.9	30.3	11.7	14.0		
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	1	2	12	17	5	0	0	0	0	37
	MAXIMUM ≤ 32°	23	25	13	3	0	0	0	0	0	2	19	20	105	
MINIMUM ≤ 32°	31	28	29	17	9	0	0	0	7	11	30	31	193		
MINIMUM ≤ 0°	15	15	10	0	0	0	0	0	0	1	10	8	59		
H/C	HEATING DEGREE DAYS	1706	1607	1336	561	396	153	6	13	308	527	1495	1473	9581	
	COOLING DEGREE DAYS	0	0	0	0	16	46	241	322	46	0	0	0	671	
RH	MEAN (PERCENT)	86	87	76	65	65	68	56	50	58	58	83	83	70	
	HOUR 00 LST	89	90	83	73	74	78	69	56	68	65	83	85	76	
	HOUR 06 LST	90	90	85	82	84	87	81	73	78	75	87	85	83	
	HOUR 12 LST	81	84	68	55	52	54	41	37	42	48	81	82	60	
	HOUR 18 LST	85	84	62	50	49	52	33	31	39	46	82	81	58	
S	PERCENT POSSIBLE SUNSHINE	40	47	71	71	59	57	82	83	71	63	58	44	62	
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	6	3	5	2	2	2	0	0	0	2	5	2	29	
	THUNDERSTORMS	0	0	0	2	6	12	8	9	3	0	0	0	40	
CLOUDINESS	SUNRISE-SUNSET: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	MIDNIGHT-MIDNIGHT: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	NUMBER OF DAYS WITH:														
	CLEAR														
	PARTLY CLOUDY														
	CLOUDY														
PR	MEAN STATION PRESS. (IN.)	28.12	27.98	27.90	27.90	27.94	27.90	27.95	27.98	27.94	27.93	27.93	27.92	27.95	
	MEAN SEA-LEVEL PRESS. (IN.)	30.27	30.13	30.00	29.93	29.95	29.89	29.93	29.96	29.96	29.96	30.05	30.03	30.00	
WINDS	RESULTANT SPEED (MPH)	3.3	2.3	3.2	4.1	1.7	1.2	1.9	3.0	4.4	4.0	3.6	3.4	1.5	
	RES. DIR. (TENS OF DEGS.)	31	33	32	10	04	23	02	09	31	30	27	30	32	
	MEAN SPEED (MPH)	8.0	7.8	8.2	9.4	8.5	8.1	8.2	8.9	9.2	8.6	7.8	7.4	8.3	
	PREVAIL. DIR. (TENS OF DEGS.)	01	22	01	13	01	15	01	13	30	27	22	22	01	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	35	33	33	40	35	30	47	44	32	41	31	45	47	
	DIR. (TENS OF DEGS.)	32	28	29	30	30	31	30	31	34	31	29	33	30	
	DATE OF OCCURRENCE	17	11	31+	26	29	20	02	20	26	27+	30+	28	JUL 02	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	41	39	43	48	41	38	56	53	38	49	37	53	56	
DIR. (TENS OF DEGS.)	33	34	29	30	28	14	29	29	32	32	30	34	29		
DATE OF OCCURRENCE	17	11	31	26	29	19	02	20	23+	24	20	28	JUL 02		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	0.58	0.37	1.84	1.64	2.29	2.37	1.94	0.92	0.78	0.69	0.56	0.58	14.56	
	GREATEST 24-HOUR (IN.)	0.28	0.20	1.39	0.50	0.71	0.69	1.35	0.57	0.46	0.36	0.18	0.42	1.39	
	DATE OF OCCURRENCE	26	20-21	17	15-16	05-06	11	08-09	04	08	29	03-04	27-28	MAR 17	
	NUMBER OF DAYS WITH:														
PRECIPITATION ≥ 0.01	10	9	13	11	10	15	8	4	9	9	6	5	109		
PRECIPITATION ≥ 0.10	1	1	2	8	5	6	4	2	2	2	2	2	37		
PRECIPITATION ≥ 1.00	0	0	1	0	0	0	0	0	0	0	0	0	1		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)	7.3	8.9	7.7	13.5	T	0.0	0.0	0.0	0.0	7.0	9.7	12.3	66.4	
	GREATEST 24-HOUR (IN.)	1.7	4.3	3.5	4.4	T	0.0	0.0	0.0	0.0	4.9	2.5	6.5	6.5	
	DATE OF OCCURRENCE	26	20	12	02	26+					29	03	27	DEC 27	
	MAXIMUM SNOW DEPTH (IN.)	5	9	12	7	0	0	0	0	0	3	7	12	12	
	DATE OF OCCURRENCE	30+	28+	13	04						31+	10+	31	DEC 31	
NUMBER OF DAYS WITH:															
SNOWFALL ≥ 1.0	2	1	2	4	0	0	0	0	0	2	5	3	19		

# NORMALS, MEANS, AND EXTREMES

## WILLISTON, ND (ISN)

LATITUDE: 48° 11' 41" N      LONGITUDE: 103° 38' 31" W      ELEVATION (FT): GRND: 1899      BARO: 1902      TIME ZONE: CENTRAL (UTC + 6)      WBAN: 94014

ELEMENT		POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	19.4	27.6	40.1	56.0	68.2	77.3	83.4	82.8	70.0	57.0	36.2	24.0	53.5
	MEAN DAILY MAXIMUM	42	19.5	27.3	39.1	55.8	68.0	77.2	84.3	83.5	70.7	57.6	37.4	24.6	53.8
	HIGHEST DAILY MAXIMUM	42	53	66	78	92	106	106	109	107	104	93	76	58	109
	YEAR OF OCCURRENCE		1981	1992	1978	1980	1980	1988	1980	1983	1983	1963	1999	1979	JUL 1980
	MEAN OF EXTREME MAXS.	42	42.7	48.6	64.1	79.1	88.8	93.9	98.6	98.5	92.2	79.8	60.2	45.9	74.4
	NORMAL DAILY MINIMUM	30	-3.3	5.9	17.2	29.1	40.9	50.1	55.2	53.8	42.2	30.2	14.9	2.1	28.2
	MEAN DAILY MINIMUM	42	-2.0	5.9	17.1	30.4	41.5	51.0	56.4	54.3	42.9	31.3	16.5	3.9	29.1
	LOWEST DAILY MINIMUM	42	-40	-41	-31	-15	17	26	34	34	15	-9	-27	-50	-50
	YEAR OF OCCURRENCE		1966	1962	2003	1975	2002	1998	1967	1994	2003	2002	1996	1983	DEC 1983
	MEAN OF EXTREME MINS.	42	-28.0	-20.3	-7.8	12.8	26.2	38.0	44.3	40.7	27.5	13.4	-5.6	-23.2	9.8
	NORMAL DRY BULB	30	8.0	16.8	28.7	42.5	54.6	63.7	69.3	68.3	56.1	43.6	25.6	13.0	40.9
	MEAN DRY BULB	42	8.7	16.6	27.9	43.2	54.7	64.0	70.2	68.9	57.0	44.4	27.0	14.3	41.4
	MEAN WET BULB	18	11.5	17.0	25.8	37.1	47.5	55.9	60.2	58.6	48.5	37.4	23.6	14.0	36.4
	MEAN DEW POINT	18	7.5	12.5	20.0	28.2	39.1	49.1	53.3	51.0	41.3	30.0	18.9	10.2	30.1
NORMAL NO. DAYS WITH:															
MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.1	0.9	3.2	7.7	8.9	1.9	0.1	0.0	0.0	22.8	
MAXIMUM ≤ 32°	30	22.7	15.4	8.1	1.1	0.0	0.0	0.0	0.0	0.0	0.9	10.9	19.9	79.0	
MINIMUM ≤ 32°	30	30.9	27.7	28.5	17.4	4.2	0.2	0.0	0.0	2.9	16.4	28.5	30.9	187.6	
MINIMUM ≤ 0°	30	16.3	9.5	3.4	0.1	0.0	0.0	0.0	0.0	0.0	0.1	3.5	12.0	44.9	
H/C	NORMAL HEATING DEG. DAYS	30	1751	1336	1109	660	327	103	27	46	274	648	1167	1596	9044
	NORMAL COOLING DEG. DAYS	30	0	0	0	1	20	79	176	164	23	0	0	0	463
RH	NORMAL (PERCENT)	30	77	76	73	61	60	61	59	57	62	65	76	78	67
	HOUR 00 LST	30	79	80	79	70	69	72	70	66	70	72	80	80	74
	HOUR 06 LST	30	80	81	83	80	80	81	81	79	80	80	82	81	81
	HOUR 12 LST	30	74	71	64	49	48	48	46	45	50	54	70	74	58
	HOUR 18 LST	30	76	71	60	45	43	44	39	37	43	52	72	77	55
S	PERCENT POSSIBLE SUNSHINE	40	51	57	61	60	62	66	74	74	67	59	44	50	60
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	39	1.5	1.5	1.2	1.0	0.5	0.3	0.4	0.2	0.5	1.2	1.9	1.4	11.6
	THUNDERSTORMS	39	0.0	0.0	0.2	0.9	3.5	8.2	17.8	16.1	2.3	0.2	0.0	0.0	49.2
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	35	5.4	5.4	5.3	5.3	5.0	4.7	3.7	3.8	4.3	4.7	5.3	5.2	4.8
	MIDNIGHT-MIDNIGHT (OKTAS)	30	5.0	4.9	4.9	4.6	4.6	4.3	3.4	3.4	3.8	4.3	4.9	4.8	4.4
	MEAN NO. DAYS WITH:														
CLEAR	35	6.2	5.7	6.9	6.0	6.4	7.7	11.6	11.4	9.8	8.8	6.3	6.7	93.5	
PARTLY CLOUDY	35	8.3	7.5	8.2	9.1	11.3	11.0	12.4	11.9	8.9	8.1	7.4	7.4	111.5	
CLOUDY	35	16.5	15.1	15.9	14.8	13.3	11.3	6.9	7.7	11.3	14.1	16.3	16.9	160.1	
PR	MEAN STATION PRESSURE (IN)	31	28.00	27.99	27.93	27.94	27.90	27.89	27.94	27.95	27.98	27.97	27.96	27.99	27.95
	MEAN SEA-LEVEL PRES. (IN)	20	30.12	30.12	30.07	29.97	29.92	29.89	29.94	29.95	29.99	30.02	30.05	30.11	30.01
WINDS	MEAN SPEED (MPH)	27	9.4	9.4	10.0	10.7	10.6	10.2	9.2	9.2	9.6	9.6	8.9	9.1	9.7
	PREVAIL. DIR (TENS OF DEGS)	28	22	21	36	36	36	36	36	14	36	21	22	21	36
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	7	39	46	45	55	46	56	61	44	40	55	52	45	61
	DIR. (TENS OF DEGS)		34	30	29	30	28	30	33	31	28	28	29	33	33
	YEAR OF OCCURRENCE		2000	2002	1999	2000	2001	2002	1999	2003	2002	1999	1999	2003	JUL 1999
MAXIMUM 5-SECOND:															
SPEED (MPH)	7	46	58	62	66	55	66	79	55	49	67	63	53	79	
DIR. (TENS OF DEGS)		35	27	30	30	29	30	34	31	28	29	29	34	34	
YEAR OF OCCURRENCE		2000	2002	1999	2000	2001	2002	1999	1998	2002	1999	1999	2003	JUL 1999	
PRECIPITATION	NORMAL (IN)	30	0.54	0.39	0.74	1.05	1.88	2.36	2.28	1.48	1.35	0.87	0.65	0.57	14.16
	MAXIMUM MONTHLY (IN)	42	1.83	1.75	2.26	3.31	7.38	6.16	6.62	4.66	3.11	3.56	3.31	1.43	7.38
	YEAR OF OCCURRENCE		1999	1998	1975	1967	1965	1991	1997	1993	1986	1971	2000	1982	MAY 1965
	MINIMUM MONTHLY (IN)	42	0.03	0.04	0.01	0.03	0.15	0.46	0.31	0.03	0.11	T	0.01	0.02	T
	YEAR OF OCCURRENCE		1973	1990	1966	1983	1980	1997	1994	2001	1963	1965	1999	1997	OCT 1965
	MAXIMUM IN 24 HOURS (IN)	42	0.77	0.69	1.39	2.04	2.05	2.29	5.03	3.11	2.24	2.21	2.07	0.88	5.03
	YEAR OF OCCURRENCE		1995	1998	2003	1967	1965	1994	1963	1993	1971	1971	2000	1982	JUL 1963
	NORMAL NO. DAYS WITH:														
PRECIPITATION ≥ 0.01	30	8.0	6.1	7.8	8.1	10.0	10.6	9.0	8.0	7.4	5.6	6.7	8.7	96.0	
PRECIPITATION ≥ 1.00	30	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.2	0.2	0.1	*	0.0	1.5	
SNOWFALL	NORMAL (IN)	30	8.8	5.7	7.4	3.7	0.9	0.*	0.0	0.0	0.3	1.7	6.7	8.2	43.4
	MAXIMUM MONTHLY (IN)	42	28.3	21.7	30.9	22.2	15.5	T	T	T	4.0	14.2	21.2	19.8	30.9
	YEAR OF OCCURRENCE		1999	1994	1975	1970	1983	1994	1995	1993	1984	1985	2000	1996	MAR 1975
	MAXIMUM IN 24 HOURS (IN)	42	12.6	9.2	9.7	15.0	14.6	T	T	T	4.0	10.5	7.9	10.1	15.0
	YEAR OF OCCURRENCE		1995	1994	1985	1986	1983	1994	1995	1993	1984	1985	1975	1978	APR 1986
	MAXIMUM SNOW DEPTH (IN)	41	18	20	22	17	12	0	0	0	2	4	13	17	22
	YEAR OF OCCURRENCE		1997	1979	1975	1975	1983				1984	1991	2000	1978	MAR 1975
NORMAL NO. DAYS WITH:															
SNOWFALL ≥ 1.0	30	2.3	1.8	2.3	1.0	0.2	0.0	0.0	0.0	0.1	0.5	2.0	2.7	12.9	

PRECIPITATION (inches) 2003 WILLISTON, ND (ISN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	0.47	0.32	0.91	0.77	3.73	1.88	1.29	2.46	0.17	1.08	0.13	0.30	13.51
1975	0.14	0.13	2.26	2.81	0.86	3.41	2.35	1.50	1.77	1.29	1.14	1.20	18.86
1976	0.58	0.21	0.74	1.08	0.51	2.45	0.49	1.06	0.96	0.28	0.31	0.49	9.16
1977	0.97	0.30	0.02	0.53	2.94	1.30	1.28	1.55	2.30	0.41	0.97	0.86	13.43
1978	0.30	0.52	0.44	0.65	4.17	2.53	2.62	0.51	2.09	0.18	0.89	0.98	15.88
1979	0.12	0.81	1.01	1.69	1.82	2.93	1.78	0.33	0.38	0.23	0.06	0.09	11.25
1980	0.58	0.28	0.16	0.40	0.15	1.80	0.54	1.83	2.24	1.62	0.48	0.72	10.80
1981	0.08	0.21	0.18	0.39	1.18	3.58	2.47	0.87	0.57	0.51	0.51	0.36	10.91
1982	1.28	0.45	1.34	1.02	1.79	2.77	1.17	1.96	1.86	1.91	0.07	1.43	17.05
1983	0.35	0.07	1.07	0.03	1.98	0.87	2.12	0.87	0.51	0.30	0.78	0.57	9.52
1984	0.81	0.12	0.90	1.48	0.47	1.87	0.93	0.65	2.24	0.49	0.33	0.27	10.56
1985	0.13	0.24	1.07	1.53	1.08	1.12	1.40	1.96	1.08	1.86	0.58	0.64	12.69
1986	0.35	0.62	0.83	2.57	3.39	2.19	5.70	1.06	3.11	0.78	1.15	0.09	21.84
1987	0.32	0.19	1.70	0.29	2.02	0.71	4.97	0.47	0.65	0.11	0.18	0.07	11.68
1988	0.75	0.28	0.63	0.15	1.39	3.46	0.52	0.39	1.49	0.28	0.51	0.79	10.64
1989	1.00	0.39	0.53	1.44	1.68	1.48	0.87	1.01	0.54	1.75	0.44	0.41	11.54
1990	0.36	0.04	0.44	0.61	2.08	1.77	1.32	1.73	0.31	0.10	0.14	0.40	9.30
1991	0.18	0.37	0.44	1.60	2.60	6.16	1.04	1.46	2.74	0.38	0.46	0.18	17.61
1992	0.48	0.10	0.56	2.28	1.44	1.92	1.04	2.18	0.76	0.52	0.77	0.44	12.49
1993	0.23	0.23	0.88	0.41	0.81	3.76	6.28	4.66	0.28	0.09	0.95	0.38	18.96
1994	0.96	0.89	0.22	1.37	2.70	3.94	0.31	1.78	0.69	1.73	0.25	1.04	15.88
1995	0.91	0.21	1.11	0.87	2.11	1.36	3.49	2.49	0.54	0.39	0.79	0.67	14.94
1996	0.79	0.18	0.75	0.54	1.08	2.01	3.37	0.52	2.07	0.82	1.27	1.29	14.69
1997	0.18	0.21	0.94	0.27	0.19	0.46	6.62	1.72	0.15	0.61	0.40	0.02	11.77
1998	0.36	1.75	0.28	0.10	1.03	3.01	1.74	3.41	0.89	3.24	1.27	0.74	17.82
1999	1.83	0.46	0.40	0.32	3.29	1.89	3.90	1.04	1.57	0.18	0.01	0.30	15.19
2000	0.38	0.46	0.60	1.65	2.54	2.84	3.66	0.93	1.60	0.76	3.31	0.52	19.25
2001	0.30	0.10	0.02	2.35	0.81	4.54	4.30	0.03	0.30	0.29	0.12	0.66	13.82
2002	0.70	0.55	0.85	0.88	1.21	3.83	2.65	1.95	0.49	1.15	0.26	0.62	15.14
2003	0.58	0.37	1.84	1.64	2.29	2.37	1.94	0.92	0.78	0.69	0.56	0.58	14.56
POR= 125 YRS	0.57	0.46	0.71	1.16	1.87	3.08	1.99	1.41	1.11	0.74	0.56	0.55	14.21

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AVERAGE TEMPERATURE (°F) 2003 WILLISTON, ND (ISN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	6.8	19.9	26.0	43.0	50.3	65.1	74.3	63.2	53.0	47.0	29.7	23.0	41.8
1975	12.0	12.3	21.9	34.7	52.9	62.1	73.0	65.3	55.0	44.4	28.4	15.7	39.8
1976	10.8	22.6	24.6	46.2	56.3	65.0	70.5	70.5	59.2	40.9	24.3	14.5	42.1
1977	- .3	25.1	33.9	49.1	62.3	66.4	71.1	61.6	56.1	46.2	24.4	8.3	42.0
1978	-2.4	7.7	27.8	43.0	57.2	63.8	68.6	67.5	60.2	46.4	20.8	8.3	39.1
1979	-2.2	1.7	23.0	34.6	49.2	65.0	70.3	66.9	61.1	46.7	25.1	23.8	38.8
1980	7.7	14.9	25.6	49.7	60.6	67.1	73.2	65.7	58.1	46.6	33.2	16.2	43.2
1981	21.8	23.3	38.1	49.1	59.2	63.8	73.8	74.3	61.8	45.4	34.6	16.1	46.8
1982	-5.8	11.8	26.3	41.8	54.9	64.3	71.7	70.3	56.4	44.4	24.0	16.0	39.7
1983	20.0	25.0	30.0	41.2	51.1	63.7	74.9	78.0	56.3	47.2	30.3	-4.5	42.8
1984	15.2	30.9	28.3	47.4	54.5	63.4	73.0	73.7	50.2	41.0	27.2	5.5	42.5
1985	7.0	13.2	32.4	47.0	58.9	58.8	71.2	64.6	51.2	42.8	13.2	11.2	39.3
1986	22.2	13.3	39.8	41.9	55.8	66.8	67.3	66.8	52.0	45.0	22.6	22.1	43.0
1987	20.7	29.2	32.1	51.6	59.8	68.7	70.0	63.7	59.5	42.3	34.2	22.9	46.2
1988	7.6	15.1	33.2	45.3	61.6	77.3	72.9	69.3	55.7	44.2	27.7	17.1	43.9
1989	12.9	2.2	23.2	43.7	56.3	63.2	75.7	70.2	58.0	45.1	29.3	10.5	40.9
1990	22.9	20.5	34.9	43.2	54.5	65.5	69.9	71.4	61.9	44.6	30.3	9.1	44.1
1991	7.7	29.1	32.6	47.0	57.4	66.4	70.5	73.6	57.3	40.8	25.2	23.3	44.2
1992	22.7	28.2	36.2	43.2	55.6	63.4	64.0	63.9	55.4	44.0	27.6	9.9	42.8
1993	5.7	9.6	33.4	43.9	56.1	58.8	62.3	63.9	52.3	42.1	24.9	20.5	39.5
1994	2.2	3.2	34.2	43.4	56.7	62.4	67.7	68.2	61.1	46.6	29.0	15.7	40.9
1995	9.4	19.9	28.3	38.7	52.1	66.0	68.5	70.2	55.8	43.8	24.9	11.8	40.8
1996	- .1	19.5	18.8	39.0	49.6	65.0	68.4	71.6	55.2	42.1	15.5	5.3	37.5
1997	1.4	17.3	24.0	38.7	52.3	69.5	68.7	68.7	61.2	44.8	26.0	25.3	41.5
1998	8.7	30.8	20.2	46.6	55.7	59.4	71.7	73.0	63.1	45.7	29.7	16.6	43.4
1999	7.4	22.4	32.5	43.6	52.9	62.3	68.1	69.5	53.1	43.5	37.4	26.1	43.2
2000	11.7	21.2	35.8	42.6	55.6	60.0	72.1	69.5	57.9	46.0	17.2	5.4	41.3
2001	17.5	5.7	30.3	42.9	54.2	61.1	71.1	70.8	59.0	42.3	35.3	14.4	42.1
2002	16.6	24.9	13.9	37.5	48.8	63.8	73.5	65.4	56.9	32.4	29.4	19.5	40.2
2003	9.7	7.4	21.6	46.1	52.5	61.2	72.3	74.7	56.1	47.8	15.0	17.2	40.1
POR= 125 YRS	8.3	13.0	25.7	42.8	54.4	63.6	69.2	68.0	56.6	44.5	27.4	14.7	40.7

HEATING DEGREE DAYS (base 65°F) 2003 WILLISTON, ND (ISN)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1974-75	1	100	354	553	1052	1294	1635	1470	1329	904	371	117	9180
1975-76	1	60	299	632	1092	1522	1675	1226	1247	556	267	87	8664
1976-77	10	11	203	740	1215	1563	2024	1112	959	469	149	46	8501
1977-78	8	131	267	577	1212	1759	2091	1600	1148	655	252	91	9791
1978-79	21	39	213	569	1322	1756	2085	1774	1294	906	495	76	10550
1979-80	7	42	145	560	1190	1272	1775	1447	1216	460	237	43	8394
1980-81	5	52	221	567	947	1511	1330	1162	825	473	205	70	7368
1981-82	4	9	149	600	903	1509	2198	1485	1191	692	322	79	9141
1982-83	2	46	278	633	1223	1516	1389	1115	1076	708	436	101	8523
1983-84	1	1	300	544	1031	2158	1538	983	1131	520	343	92	8642
1984-85	0	25	444	741	1128	1845	1793	1446	1001	535	210	201	9369
1985-86	21	73	415	683	1553	1664	1321	1446	775	685	303	35	8974
1986-87	14	48	386	612	1266	1324	1369	997	1012	402	190	33	7653
1987-88	31	88	183	698	920	1301	1781	1444	980	585	175	8	8194
1988-89	1	35	279	637	1114	1479	1613	1757	1292	640	275	115	9237
1989-90	0	35	225	609	1065	1690	1294	1241	927	649	333	88	8156
1990-91	19	7	166	626	1034	1728	1775	999	997	533	253	20	8157
1991-92	5	8	262	744	1188	1289	1306	1058	887	649	313	112	7821
1992-93	75	111	296	644	1116	1704	1838	1551	973	630	277	203	9418
1993-94	100	87	377	704	1197	1376	1945	1727	945	638	257	103	9456
1994-95	19	63	138	563	1072	1524	1719	1259	1136	784	396	101	8774
1995-96	24	16	290	648	1197	1644	2023	1315	1427	776	470	84	9914
1996-97	23	6	293	702	1480	1844	1961	1330	1266	781	396	20	10102
1997-98	34	37	130	630	1167	1223	1740	953	1381	546	290	180	8311
1998-99	9	0	161	591	1051	1490	1778	1188	1001	635	371	118	8393
1999-00	27	17	352	661	817	1198	1645	1264	898	668	289	166	8002
2000-01	15	34	231	580	1425	1841	1467	1652	1067	661	339	157	9469
2001-02	12	15	211	698	883	1561	1491	1115	1581	821	510	114	9012
2002-03	0	67	265	1003	1064	1404	1706	1607	1336	561	396	153	9562
2003-	6	13	308	527	1495	1473							

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COOLING DEGREE DAYS (base 65°F) 2003 WILLISTON, ND (ISN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	0	0	0	2	0	92	295	51	0	0	0	0	440
1975	0	0	0	0	2	39	253	77	5	0	0	0	376
1976	0	0	0	0	4	95	185	185	37	1	0	0	507
1977	0	0	0	0	74	96	204	30	6	0	0	0	410
1978	0	0	0	0	19	60	142	125	75	0	0	0	421
1979	0	0	0	0	12	83	180	107	33	0	0	0	415
1980	0	0	0	7	107	114	265	84	22	4	0	0	603
1981	0	0	0	2	31	41	285	301	60	0	0	0	720
1982	0	0	0	0	13	64	217	215	29	0	0	0	538
1983	0	0	0	0	8	68	314	413	45	0	0	0	848
1984	0	0	0	0	21	54	251	304	8	0	0	0	638
1985	0	0	0	0	26	21	218	68	6	0	0	0	339
1986	0	0	0	0	27	96	94	110	0	0	0	0	327
1987	0	0	0	6	37	150	192	53	22	0	0	0	460
1988	0	0	0	0	75	383	253	175	4	0	0	0	890
1989	0	0	0	5	9	68	338	202	22	0	0	0	644
1990	0	0	0	4	17	110	175	211	75	0	0	0	592
1991	0	0	0	0	25	68	182	282	40	0	0	0	597
1992	0	0	0	3	29	71	50	87	13	2	0	0	255
1993	0	0	0	0	8	28	22	58	2	0	0	0	118
1994	0	0	0	0	5	31	110	169	27	0	0	0	342
1995	0	0	0	0	3	137	137	183	22	0	0	0	482
1996	0	0	0	0	0	89	137	215	7	0	0	0	448
1997	0	0	0	0	9	164	157	157	22	10	0	0	519
1998	0	0	0	0	6	20	223	257	108	0	0	0	614
1999	0	0	0	0	3	40	129	162	0	0	0	0	334
2000	0	0	0	0	3	24	240	181	28	0	0	0	476
2001	0	0	0	5	11	48	207	203	38	0	0	0	512
2002	0	0	0	0	15	84	269	83	29	0	0	0	480
2003	0	0	0	0	16	46	241	322	46	0	0	0	671

SNOWFALL (inches) 2003 WILLISTON, ND (ISN)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1974-75	0.0	0.0	0.0	0.1	2.2	4.4	3.6	1.3	30.9	10.3	0.0	0.0	52.8
1975-76	0.0	0.0	0.0	4.5	14.1	14.1	10.3	2.0	14.6	0.4	0.0	0.0	60.0
1976-77	0.0	0.0	0.0	1.9	2.9	6.9	11.1	3.1	T	2.0	0.0	0.0	27.9
1977-78	0.0	0.0	0.0	T	8.4	10.0	3.9	5.7	4.6	1.4	0.0	0.0	34.0
1978-79	0.0	0.0	0.0	T	9.4	15.2	2.9	14.1	10.3	10.1	T	0.0	62.0
1979-80	0.0	0.0	0.0	T	1.2	0.3	10.4	7.9	2.1	3.5	0.0	0.0	25.4
1980-81	0.0	0.0	0.0	1.1	3.3	10.4	1.2	3.1	T	0.0	T	0.0	19.1
1981-82	0.0	0.0	0.0	0.3	4.6	5.7	24.3	8.2	17.0	9.8	0.5	0.0	70.4
1982-83	0.0	0.0	T	T	0.8	13.4	1.7	1.6	9.2	0.1	15.5	0.0	42.3
1983-84	0.0	0.0	1.0	T	6.0	9.2	7.2	0.5	7.9	13.5	0.3	0.0	45.6
1984-85	0.0	0.0	4.0	4.5	3.5	6.5	1.8	3.1	11.4	1.5	0.0	0.0	36.3
1985-86	0.0	0.0	0.1	14.2	11.3	9.2	3.6	8.7	4.4	17.6	T	0.0	69.1
1986-87	0.0	0.0	0.0	T	13.4	1.2	4.2	1.8	14.2	0.4	0.0	0.0	35.2
1987-88	0.0	0.0	0.0	0.2	T	1.2	8.9	3.4	3.7	T	0.0	0.0	17.4
1988-89	0.0	0.0	0.0	T	4.2	13.3	22.8	6.2	1.8	1.3	0.0	T	49.6
1989-90	T	0.0	T	2.2	4.6	5.5	6.0	0.8	4.3	2.4	2.1	T	27.9
1990-91	T	T	0.0	T	1.6	8.7	4.4	5.2	7.2	1.8	2.7	T	31.6
1991-92	T	T	T	5.3	3.3	2.7	6.3	2.2	0.9	3.5	0.0	0.0	24.2
1992-93	0.0	T	0.0	3.8	8.5	10.7	7.3	4.1	2.6	T	0.0	0.0	37.0
1993-94	T	T	T	0.4	16.4	5.2	21.6	21.7	2.4	4.5	0.0	T	72.2
1994-95	0.0	0.0	0.0	T	3.6	14.0	16.1	2.6	9.0	1.9	0.1	0.0	47.3
1995-96	T	0.0	T	0.2	8.2	15.6	18.0	3.7	16.5	1.3	T	0.0	63.5
1996-97	0.0	0.0	0.0	5.8	15.6	19.8	3.2	2.6	12.3	0.5	T	0.0	59.8
1997-98	0.0	0.0	0.0	0.3	4.7	0.1	7.1	20.3	4.8	0.2	0.1	T	37.6
1998-99	0.0	T	0.0	T	15.3	11.3	28.3	4.7	4.2	4.2	4.2	0.0	72.2
1999-00	T	0.0	0.0	0.1	0.1	3.6	8.1	5.7	6.2	11.3	0.2	0.0	35.3
2000-01	0.0	0.0	T	0.4	21.2	7.5	4.8	1.7	0.4	9.1	0.0	0.0	45.1
2001-02	0.0	0.0	0.0	1.7	0.6	6.8	4.8	6.6	15.1	2.8	11.2	0.0	49.6
2002-03	0.0	0.0	0.0	7.5	2.8	6.6	7.3	8.9	7.7	13.5	T	0.0	54.3
2003-	0.0	0.0	0.0	7.0	9.7	12.3							
POR= 41 YRS	T	T	0.3	1.8	5.5	7.6	8.2	5.4	6.6	4.8	1.4	T	41.6

WBAN : 94014

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. NORMALS ARE 30-YEAR AVERAGES (1971 - 2000). 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 AND ON SATELLITE DATA FOR CLOUDS ABOVE 12,000 FEET. THE NUMBER OF DAYS WITH CLEAR, PARTLY CLOUDY, AND CLOUDY CONDITIONS FOR ASOS STATIONS IS THE SUM OF THE CEILOMETER AND SATELLITE DATA FOR THE SUNRISE TO SUNSET PERIOD.</p>	<p>GENERAL CONTINUED: CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS. WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED. 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 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.</p> <p>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 EIGHTS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.</p>
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2003  
WILLISTON,  
NORTH DAKOTA (ISN)

Williston lies in a flat valley at the junction of the Missouri River and Little Muddy Creek. The surrounding country is rolling. Hills to the east are highest, ranging from 250 to 300 feet in height at a distance of 5 to 7 miles. Across the Missouri River to the south, the bluffs are about 225 feet high at 4 miles distance.

Great extremes of temperatures are encountered, winters being cold, while summer days are usually warm. In winter, temperatures below zero are common and lows of -50 degrees have been recorded. When temperatures are lowest, however, the air is generally dry, with little or no wind and the weather is fine and invigorating. At the other extreme, temperatures above 100 degrees have been reached in all months from May to September. The low humidity that generally prevails on the hottest summer days keeps them from becoming oppressive.

The climate of Williston and vicinity is continental, semi-arid, characterized by marked season changes. Winter is the relatively dry season, with only about 1/2 inch of monthly precipitation occurring from November to February. There is considerably less than the average amount of snowfall for similar locations in the United States. Ice crystals, which rarely yield more than a trace of precipitation, are common in the cold months. Although snow has been observed every month except July and August, there is usually very little from April to November. Accumulated winter snow remains unmelted on the ground until about March. Summer precipitation is variable from year to year. The amount of rain occurring during the growing period is the most important element of climate for agricultural interests in the vicinity of Williston. Generally, considerably more precipitation occurs in the spring and summer months than in winter, but even so, the rainfall is just adequate for successful farming operations in normal years. A series of dry years, in addition to causing failure of crops, may result in erosion of the fertile topsoil by winds.

The growing season averages 131 days. It has ranged from 94 to 172 days during the period of record.

Clear and partly cloudy skies, nearly equally distributed, occur about 70 percent of the time. Heavy fog occurs on the average about ten times a year. Because of the northern latitude of Williston, it enjoys long hours of daylight in the spring and summer. Relatively little cloudiness occurs then, so that the duration of sunshine averages about two-thirds of the possible amount. These conditions are conducive to rapid growth of vegetation, making successful agricultural pursuits possible in spite of the relatively short growing season.

Summer storms are generally in the form of thunderstorms or rain showers, occasionally accompanied by hail and squally winds. Tornadoes are rare in this area. In the winter, cold waves and occasionally blizzard conditions occur. Cold waves result when extremely cold air advances southward from northwestern Canada. In blizzard conditions the advancing cold wave is accompanied by winds of gale force and the air is filled with fine, wind-driven snow. In extreme instances in the country, it becomes impossible for persons to ascertain their bearings or to remain alive many hours without shelter in such storms.

# STATION LOCATION

WILLISTON, NORTH DAKOTA

LOCATION	Occupied From	Occupied To	Airline Distances and Directions from previous Location	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE										AUTOMATED OBSERVING EQUIPMENT *	* TYPE M = AMOS T = AUTOB S = ASOS W = AWOS  REMARKS
						GROUND											
						SEA LEVEL	WIND INSTRUMENT	EXTREME THERMOMETER	PSYCHROMETER	SUNSHINE SWITCH	TIPPING BUCKET	RAIN GAUGE	WINDHOLE	8 INCH RAIN GAUGE	HYGROMETER		
*NOTE: <u>AIRPORT</u> Administration Building Sloulin Field *	1/19/62	8/21/81	2 mi. NNW	48°11'	103°38'	1899	a20	5	5	22		5	3	b5	a. 35 feet to 8/23/67. b. Installed on field 5/1/80.		
* Designated Sloulin Field International Airport in 1968. NWS Building Sloulin International AP	8/21/81	04/01/96	250' N	48°11'	103°38'	1900	c20	5	5	15 f15	h4	5 d5	4 e4	c5 g5 i5	c. Not moved 8/21/81. d. Weighing rain gauge decommissioned 8/22/83 and recommissioned 10/6/83. e. Minor adjustment 5/14/84. f. Moved from tower to roof 3/26/84. g. Type change 5/14/84. h. Installed 6/15/84. i. Type change 9/3/85.		
Sloulin Field Int'l Airport	04/01/96	Present	NA	48°12'	101°39'	j1899								S	ASOS Commissioned 04/01/96 j. Ground Elevation		

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 United States Department of Commerce  
 NOAA Permit No. G - 19

\* NOTES: For earlier station history see previous edition.