

# NMSU Meteorological Data Quality

Farmington Ag Science Center and  
NAPI stations

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# NMCC Website

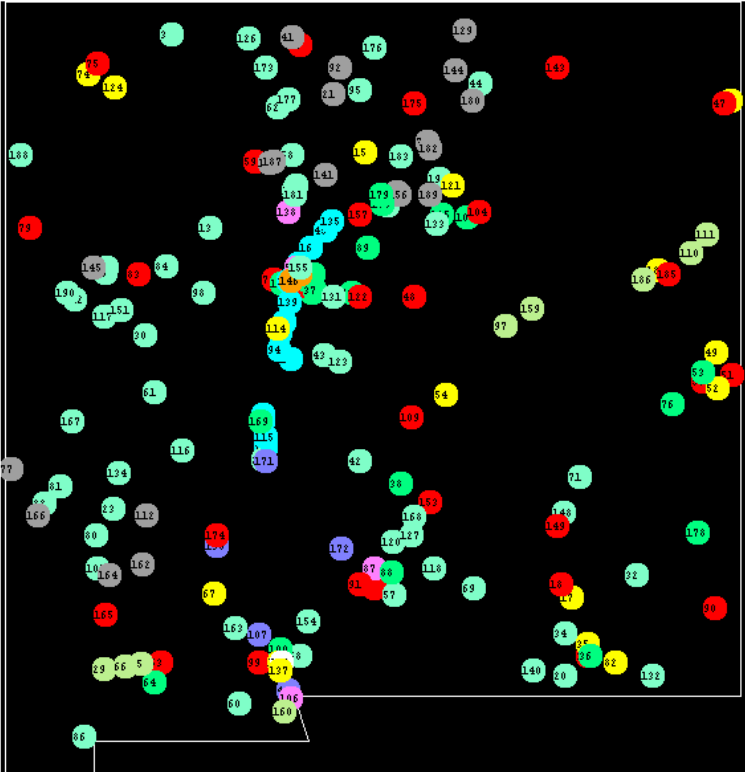
NMCC Climate Data Display Selection - Windows Internet Explorer provided by Comcast

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print Mail Print Print Preview

Address <http://weather.nmsu.edu/cgi-shl/cns/uberpage.pl?selected=2> Go Links

Google her station quality control Go 25 blocked Check AutoLink AutoFill Send to weather station quality control Settings



- NMCC acquires data from ~190 stations from multiple agencies

26: Bosque del Apache N 33.870000 106.862500	Station Info
27: Bosque Farms 34.831944 106.711111	Station Info
28: Bosque RAWS 33.800000 106.883333	Station Info
29: Briar Hill Tank UP 32.216800 108.182400	Station Info
30: Brushy Mountain RAWS 34.719722 107.848333	Station Info
31: Candelaria Farms 35.133333 106.683333	Station Info
32: Caprock RAWS 32.927778 103.856667	Station Info
33: Carlsbad METAR 32.333333 104.250000	Station Info
34: Carlsbad Portable RAWS 32.484167 104.440556	Station Info
35: Carlsbad SE 32.401300 104.254483	Station Info
36: Carlsbad South 32.325830 104.228000	Station Info
37: Carmuel 35.058830 106.465000	Station Info
38: Carrizozo 33.607500 105.771700	Station Info
39: Chama METAR 36.900000 106.583333	Station Info
40: Chamberino 32.062214 106.678710	Station Info

Applet stnmap started

start WxStns Documents Bureau of M... NMCC Clima... URA\_REPO... WRRISympo... wri2.ppt CoCoRaHST... Internet 7:35 PM

# All Data are Not Created Equal

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- Weather stations are owned and operated by multiple agencies and/or individuals and have different
  - Siting requirements
  - Sensors
  - Data communications
  - Data processing algorithms
  - Maintenance schedules
  - Documentation
  - Data formats
  - Communication
  - Data retrieval

# NAPI

January 1, 1997 - present (2/28/1997)

Location: 10 miles south of Farmington, NM

Ground Cover: Grass cover for 25 ft, then crop cover

Lat: 36° 35' 0" N

Lon: 108° 5' 46.00" W

Elev: 1700 m

View South



View North



# Farmington Ag Science Center

January 1, 1997 - present (2/28/1997)

Location: 5 miles south of Farmington, NM

Ground Cover: Grass cover for 25 ft, then crop cover

Extra Info: large cottonwood trees on a hill located ~ 200 ft east of the weather station;  
Xeriscape garden with 10 ft trees located between the weather station and these taller trees at a distance of ~ 50 feet; poplar tree plantation to the west at more than 500 ft.

Lat: 36° 41' 0" N

Lon: 108° 18' 36.00" W

Elev: 1700 m

View South



View Northeast



# Sensors

- Wind Speed & Direction
- Solar Radiation
- Temperature
- Relative Humidity
- Soil Temperature

Model	Description
	-----Data Logger/POWER/ENCLOSURE-----
CR10X	128K MODULE & WIRE PANEL( data logger)
PS12LA	12V REGULATED POWER SUPPLY W/ .NO 18VAC 1.1A WALL CHARGER
MSX10 10	10 WATT SOLAR PANEL W/MOUNTS when 110 volts not available
ENC 12/14	12" X 14" WEATHER PROOF ENCLOSURE W. . SN . . BKT KIT FOR CM 6/10 OR UT30
	*****TELECOMMUNICATIONS*****
COM200	9600 BAUD PHONE MODEM
6362	Phone modem surge protector ( land line)
MSX20R 20	20 WATT SOLAR PANEL W/MOUNTS & REG FOR CELL PHONE POWER & CELL PHONE needs marine battery- use when no land line available.
	*****SYSTEM MOUNTING/SENSORS*****
014A	MET ONE ANEMOMETER W/11' LD or 34b wind set do no need cross arm or cs8000 wind set -height 11.5 ft
024A	MET ONE WIND DIRECTION W/11' LD or 34 b wind set do not need cross arm orcs8000 wind set- height 11.5 ft
019ALU	ALUMINUM CROSSARM SENSOR MOUNT
LI200X	LICOR PYRANOMETER (FIXED) W/11' LD -height 10 ft
LI2003S	PYRANOMETER BASE/LEVELING FIXTURE
015	PYRANOMETER MOUNTING ARM height 11 ft
CS500	VAISALA 50Y RH/TEMP SENSOR W/6' LD - height 6ft
41301	SOLAR RADIATION SHIELD FOR CS500
TE525-L	TE RAIN GAGE .01: OR .254MM/TIP W/. . . 25FT OF SIGNAL CABLE PER GAGE
107-L	TEMPERATURE PROBE (-35 TO +50c) W/. . . 10FT OF SENSOR CABLE PER PROBE used to measure soil temperature depth 5 cm

# NAPI Station & Sensors

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Looking South

# Farmington Ag Science Center Station & Sensors



# Output Format

Report for station Farmington Ag Sci Center  
Beginning Date: 09/26/2007  
Ending Date: 10/03/2007

Date	Temperature Max	Interp	Temperature Min	Interp	Temperature Mean	Interp	Humidity Max	Interp	Humidity Min	Interp	Humidity Mean	Interp	Precipitati Max	Interp	Precipitati Min	In
MM/DD/YY	F		F		F		%		%		%		in		in	
09/26/07	70.600		39.700		55.634		83.200		16.270		45.362		0.000		0.000	
09/27/07	76.600		42.100		58.983		78.800		15.980		40.634		0.000		0.000	
09/28/07	79.200		53.610		65.529		51.300		19.190		30.597		0.000		0.000	
09/29/07	77.100		47.920		64.807		51.180		13.550		32.760		0.000		0.000	
09/30/07	68.880		32.780		50.788		55.690		14.330		30.438		0.000		0.000	
10/01/07	77.000		45.930		57.627		80.200		16.770		42.133		0.010		0.000	
10/02/07	68.880	*	44.630	*	56.297	*	96.400	*	21.620	*	59.157	*	0.000	*	0.000	*
10/03/07	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
Averages	64.779	012%	38.359	012%	51.233	012%	63.346	012%	14.714	012%	35.513	012%	0.001	012%	0.000	0
8 entries																

- Presents a Max, Min, & Mean value for each day for all variables
- Presents interpolated values as the default for all missing variables

# RAW Data

http://weather.nmsu.edu/cgi-shl/cns/rstat.pl?station=farmin&type=daily&smmonth=01&sday=01&year= - Windows Internet Explorer pro

File Edit View Favorites Tools Help



Address http://weather.nmsu.edu/cgi-shl/cns/rstat.pl?station=farmin&type=daily&smmonth=01&sday=01&year=85&emonth=09&eday=30&eyear=07

09/02/07	89.300	1	59.990	1	67.030	5	70.200	1	24.020	1	61.390	5	0.000	5	0.000	5	0.000	1	0.000	5	0.397	5
09/03/07	87.600	1	55.690	1	65.860	5	84.500	1	24.180	1	61.770	5	0.000	5	0.000	5	0.000	1	0.000	5	4.757	5
09/04/07	86.800	1	56.800	1	66.260	5	78.000	1	23.530	1	58.010	5	0.000	5	0.000	5	0.000	1	0.000	5	3.654	5
09/05/07	86.100	1	62.910	1	69.700	5	67.640	1	23.630	1	52.630	5	0.000	5	0.000	5	0.000	1	0.000	5	6.546	5
09/06/07	84.100	1	58.920	1	68.100	5	70.000	1	21.140	1	54.690	5	0.000	5	0.000	5	0.000	1	0.000	5	13.880	5
09/07/07	83.300	1	52.110	1	67.909	5	72.600	1	9.960	1	32.474	5	0.000	5	0.000	5	0.000	1	0.000	5	14.390	5
09/08/07	88.200	1	53.060	1	69.307	5	50.020	1	11.340	1	27.292	5	0.000	5	0.000	5	0.000	1	0.000	5	11.320	5
09/09/07	88.000	1	56.460	1	72.543	5	63.490	1	13.310	1	29.497	5	0.000	5	0.000	5	0.000	1	0.000	5	20.050	5
09/10/07	83.900	1	54.920	1	70.553	5	85.600	1	17.500	1	45.208	5	0.000	5	0.000	5	0.000	1	0.000	5	13.170	5
09/11/07	85.200	1	55.390	1	69.876	5	72.800	1	18.290	1	42.653	5	0.000	5	0.000	5	0.000	1	0.000	5	19.490	5
09/12/07	82.300	1	54.730	1	64.980	5	73.800	1	15.240	1	45.450	5	0.000	5	0.000	5	0.000	1	0.000	5	7.740	5
09/13/07	84.900	1	50.280	1	58.130	5	51.770	1	12.260	1	43.440	5	0.000	5	0.000	5	0.000	1	0.000	5	4.757	5
09/14/07	87.700	1	57.760	1	62.790	5	92.800	1	14.100	1	29.640	5	0.000	5	0.000	5	0.000	1	0.000	5	8.840	5
09/15/07	85.600	1	55.910	1	64.050	5	59.320	1	21.310	1	42.170	5	0.000	5	0.000	5	0.000	1	0.000	5	8.480	5
09/16/07	83.900	1	58.920	1	64.800	5	84.300	1	27.270	1	51.030	5	0.000	5	0.000	5	0.170	1	0.000	5	8.720	5
09/17/07	73.600	1	53.230	1	65.950	5	82.600	1	34.480	1	64.580	5	0.000	5	0.000	5	0.040	1	0.000	5	7.470	5
09/18/07	79.100	1	48.060	1	54.260	5	91.800	1	12.170	1	80.000	5	0.000	5	0.000	5	0.000	1	0.000	5	8.930	5
09/19/07	82.900	1	51.050	1	57.340	5	53.510	1	12.850	1	30.770	5	0.000	5	0.000	5	0.000	1	0.000	5	5.532	5
09/20/07	79.700	1	56.400	1	59.230	5	58.000	1	27.140	1	39.890	5	0.000	5	0.000	5	0.000	1	0.000	5	9.050	5
09/21/07	79.900	1	54.010	1	59.670	5	87.400	1	19.470	1	78.000	5	0.000	5	0.000	5	0.000	1	0.000	5	6.665	5
09/22/07	84.200	1	53.270	1	60.950	5	91.000	1	21.960	1	38.350	5	0.000	5	0.000	5	0.020	1	0.000	5	3.862	5
09/23/07	71.700	1	50.280	1	59.480	5	97.200	1	49.250	1	89.700	5	0.000	5	0.000	5	0.350	1	0.000	5	4.578	5
09/24/07	65.640	1	43.450	1	51.320	5	82.500	1	28.140	1	67.170	5	0.000	5	0.000	5	0.000	1	0.000	5	10.990	5
09/25/07	69.570	1	37.280	1	48.200	5	90.500	1	22.960	1	62.590	5	0.000	5	0.000	5	0.000	1	0.000	5	4.846	5
09/26/07	70.600	1	39.700	1	48.000	5	83.200	1	16.270	1	65.290	5	0.000	5	0.000	5	0.000	1	0.000	5	4.638	5
09/27/07	76.600	1	42.100	1	48.290	5	78.800	1	15.980	1	63.860	5	0.000	5	0.000	5	0.000	1	0.000	5	6.307	5
09/28/07	79.200	1	53.810	1	60.610	5	51.300	1	19.190	1	25.480	5	0.000	5	0.000	5	0.000	1	0.000	5	7.200	5
09/29/07	77.100	1	47.920	1	60.440	5	51.180	1	13.550	1	41.140	5	0.000	5	0.000	5	0.000	1	0.000	5	9.590	5
09/30/07	68.850	1	32.780	1	49.750	5	55.690	1	14.330	1	33.830	5	0.000	5	0.000	5	0.000	1	0.000	5	18.260	5

8388 entries

### Data Quality Key:

- 0=no data or generated data
- 1=good data
- 2=datum above sensor max
- 3=datum below sensor min
- 4=difference from last reading too great

5 = generated data

Done

Internet



# RAW Data

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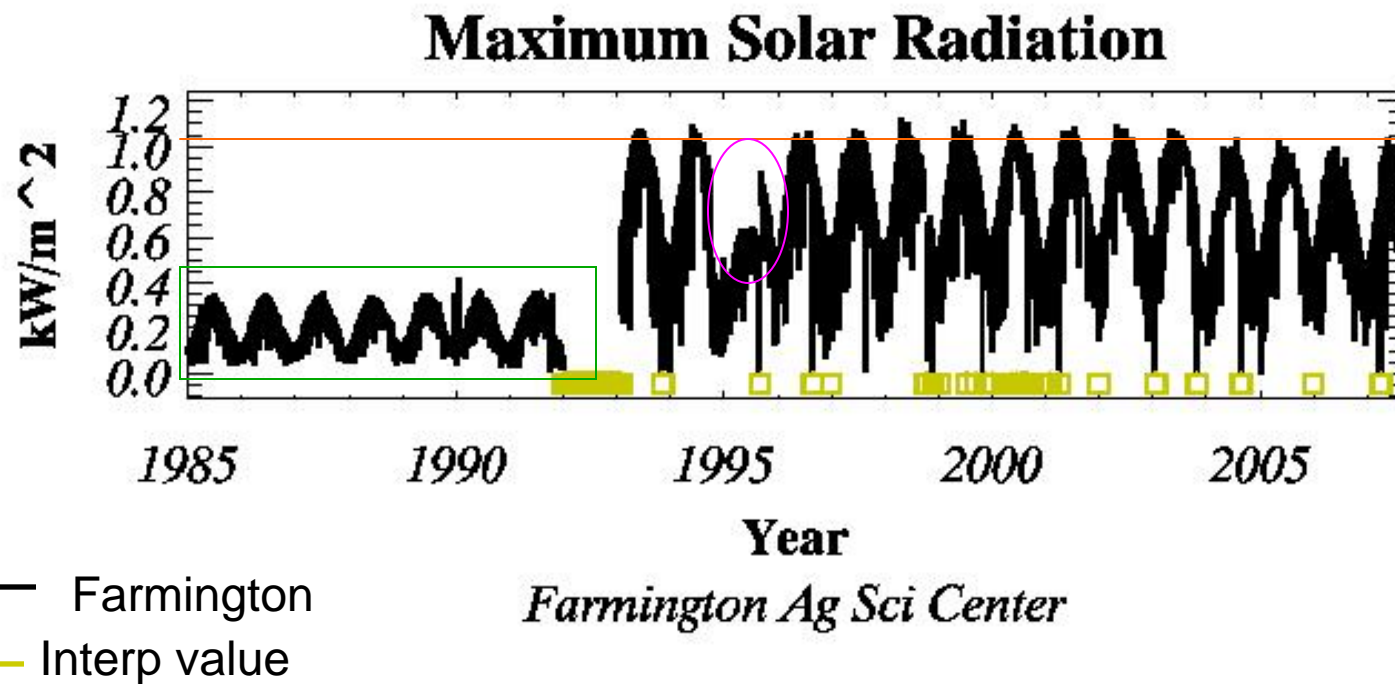
- Option to select "RAW" data
  - Sometimes this contains -999.000
  - Sometimes a "0"
  - Sometimes generated data
- Quality Codes
  - 0 no data or generated data
  - 1 good data
  - 2 data above sensor max
  - 3 data below sensor min
  - 4 difference from last reading to great
  - 5 (generated data)

# Data Quality

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- Ideally, we would like to have metadata or information about non-climatic influences on the data
  - changes in instrumentation
  - problems with instrumentation
  - sensor calibration
  - changes in surrounding environmental characteristics and structure
- This information does not exist for the NMSU sites

# Data Quality Examples Solar Radiation



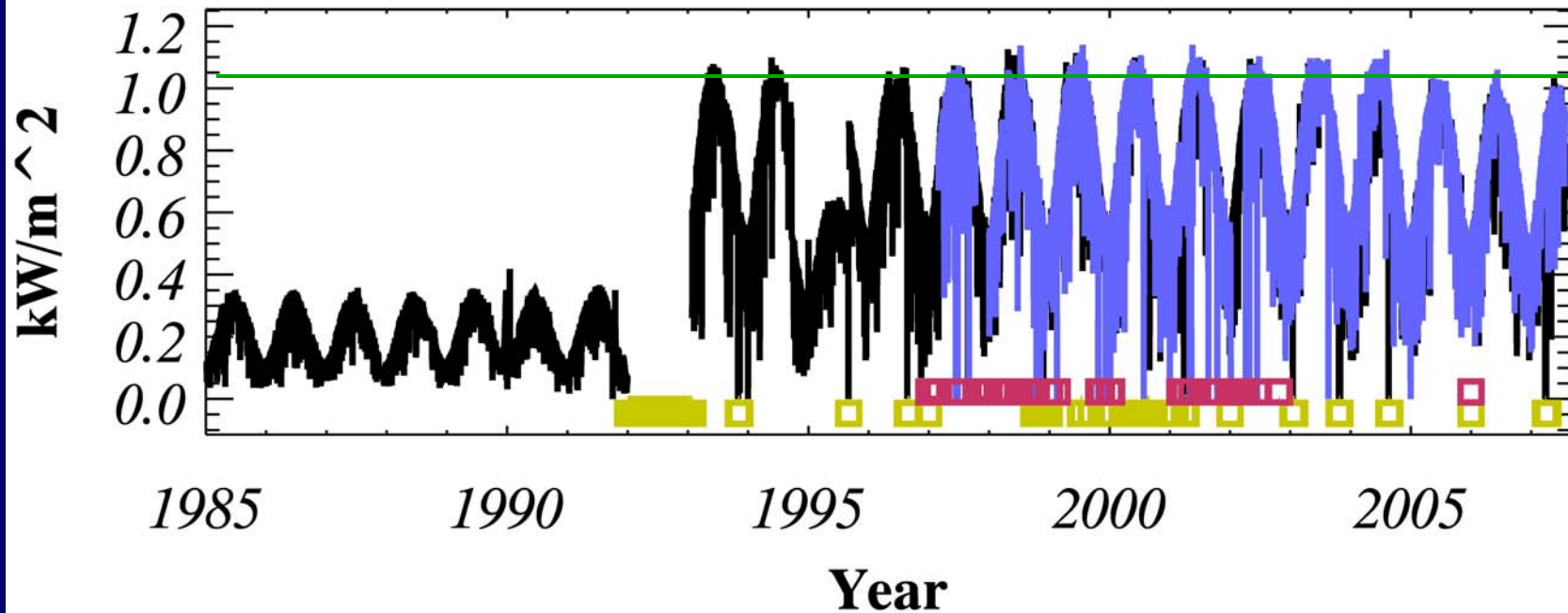
Farmington Total Records = 8277  
Interpolated =  $555/4280 = 6.7\%$

NAPI Total Records = 3863  
Interpolated =  $354/4280 = 9.2\%$

# Data Quality Examples

## Solar Radiation

### Maximum Solar Radiation



— Farmington

— Interp value

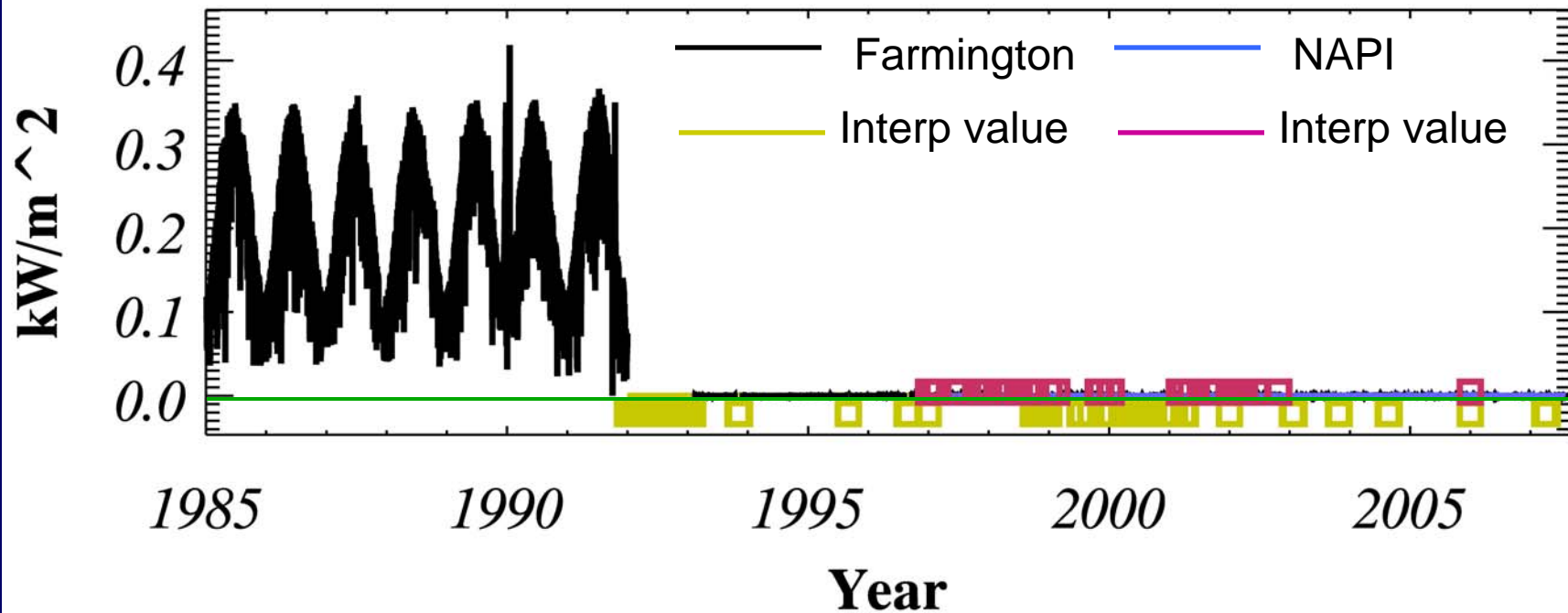
— NAPI

— Interp value

# Data Quality Examples

## Solar Radiation

### Minimum Solar Radiation

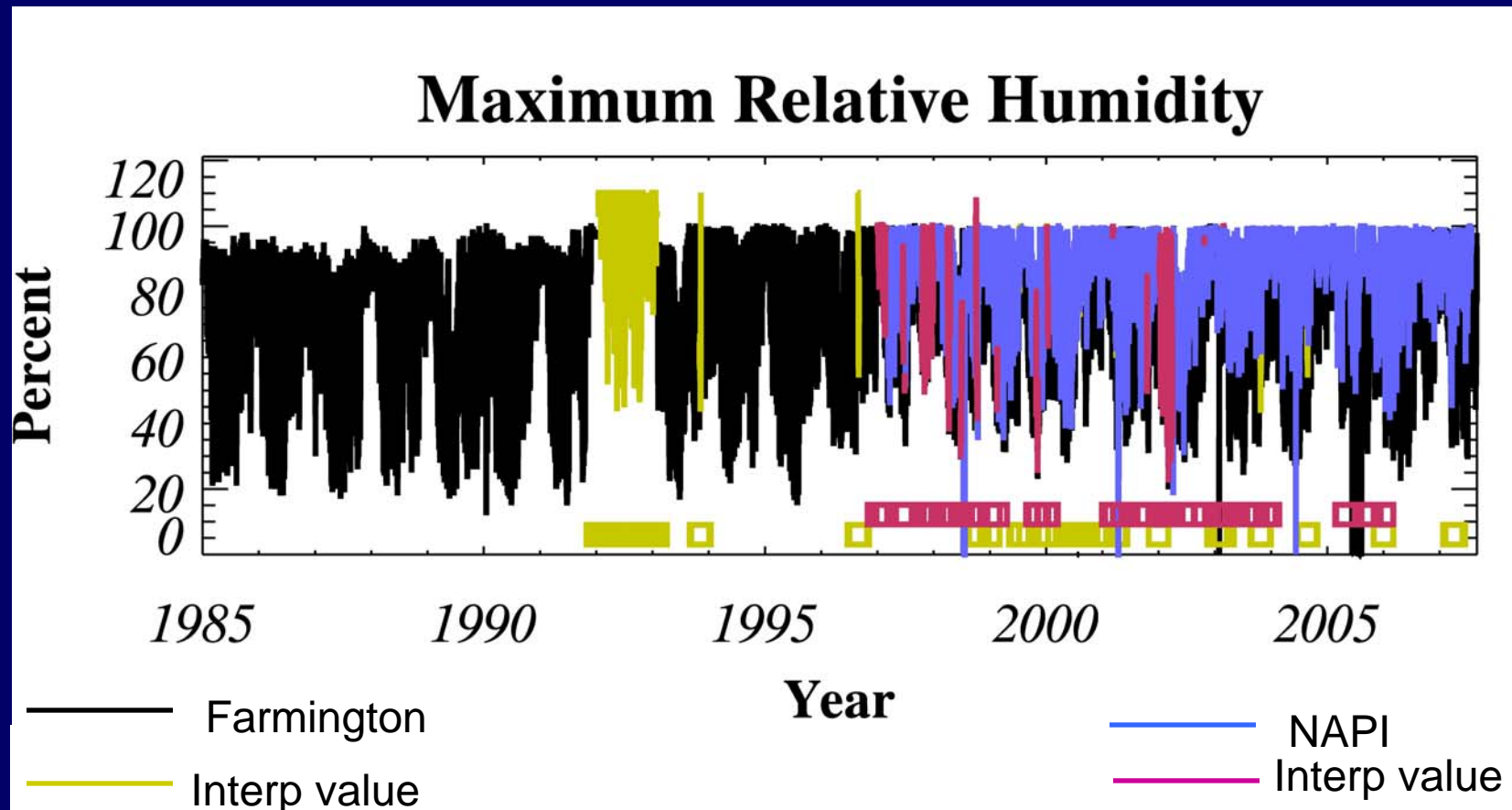


Farmington Total Records = 8277  
# with solar radiation < 0 = 4280

NAPI Total Records = 3863  
# with solar radiation < 0 = 2797

# Data Quality Examples

## Relative Humidity

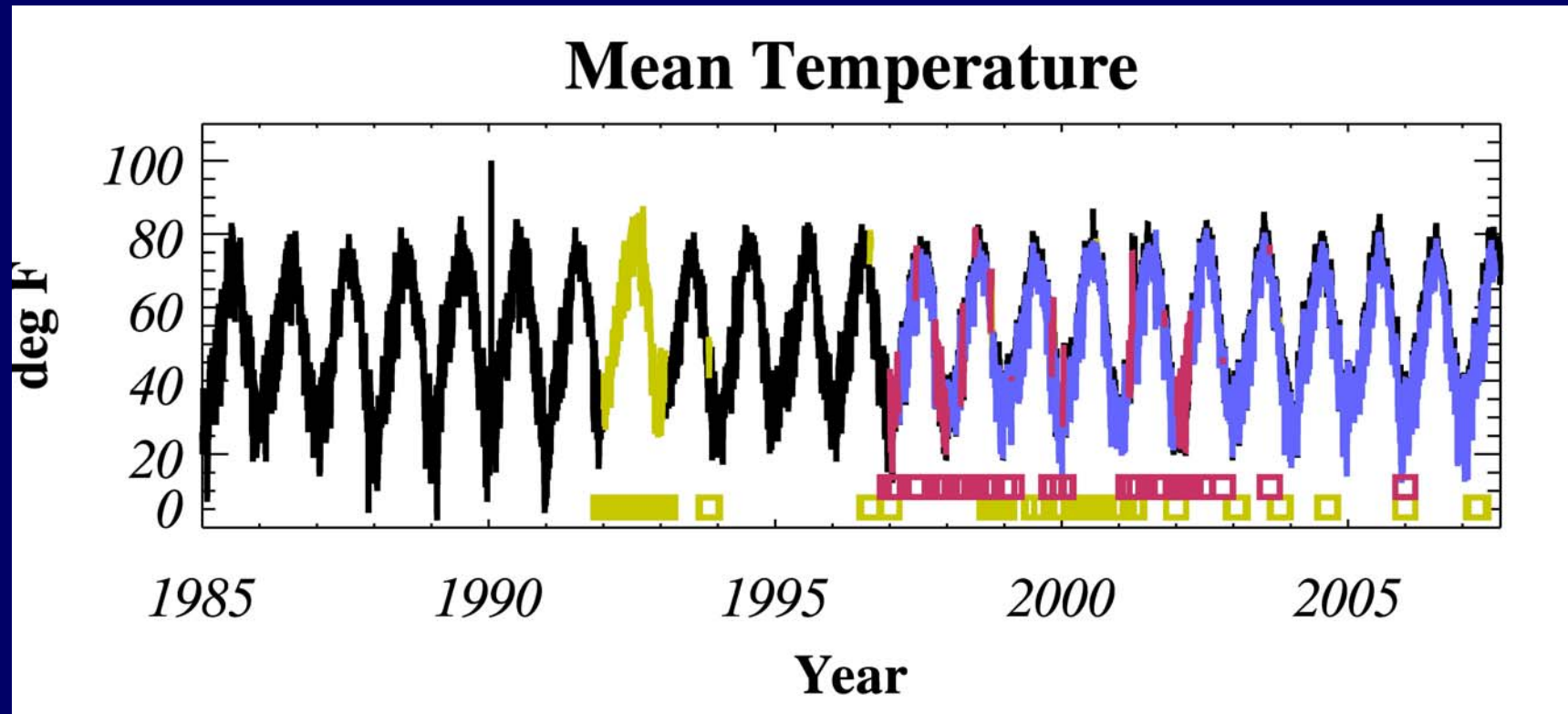


Farmington Total Records = 8277  
# with Relative Humidity >100% = 216  
Interpolated = 552/4280 = 6.7%

NAPI Total Records = 3863  
# with Relative Humidity >100% = 30  
Interpolated = 357/4280 = 9.2%

# Data Quality Examples

## Temperature



— Farmington

— Interp value

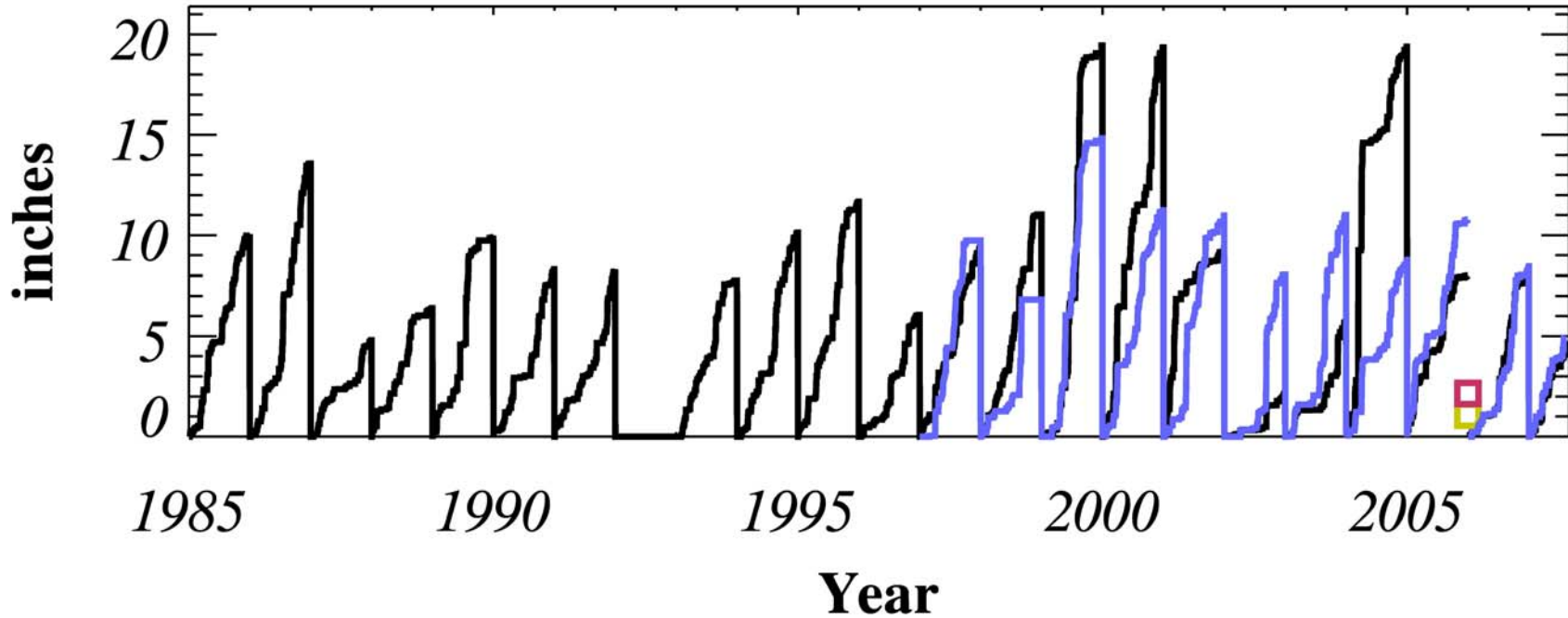
— NAPI

— Interp value

# Data Quality Examples

## Precipitation

### Accumulated Precipitation



— Farmington

— NAPI

— Interp value

— Interp value

# Summary & Future Plans

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- Data quality is questionable
- Changes need to be made to our data management, processing, & access system
- Have yet another request in to the state of New Mexico to replace old stations & add new in needed areas
  - Includes money for maintenance
  - Includes money for training
  - Includes the Farmington, NAPI, 7 other Navajo Nation stations



**Questions?**

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