Taking the Pulse of Colorado's Climate

What do our Climate Data tell us?

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Colorado State University
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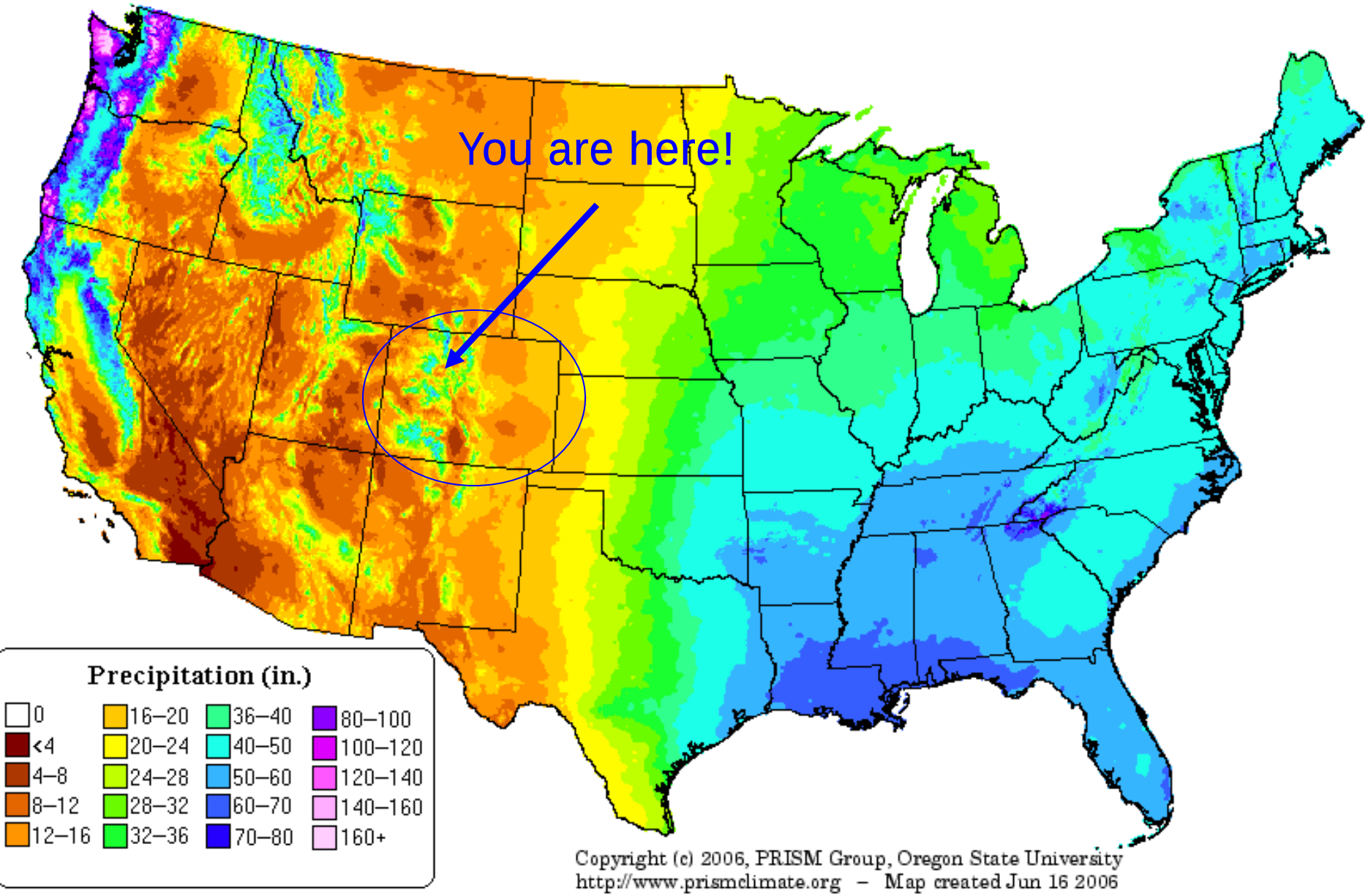
Colorado Water Congress Summer Meeting
Vail, Colorado August 26, 2010

Precipitation: Annual Climatology (1971–2000)



First, a short quiz.

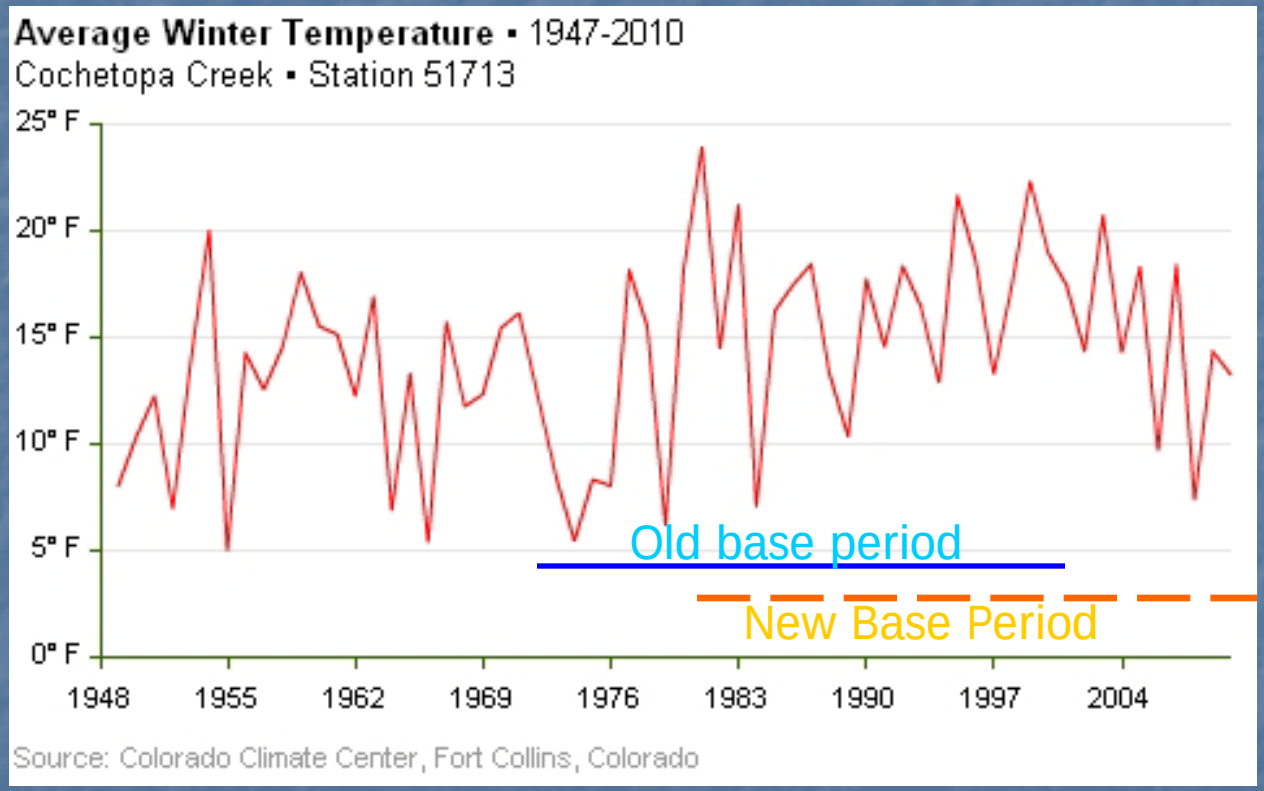
- On a typical August day how much different are the temperatures here in Vail compared to Denver ? . . . . . Grand Junction?

At the end of this year, the new "Climate Normals" will be computed for the U.S.

- The new base period for Climate comparisons will change from 1971-2000 to 1981-2010

- ***Our question: How much will the new "Normals" change?***

Example of a Colorado climate station data time series



Several dozen NOAA National Weather Service Cooperative Weather stations have long term data for assessing climate variability and change.

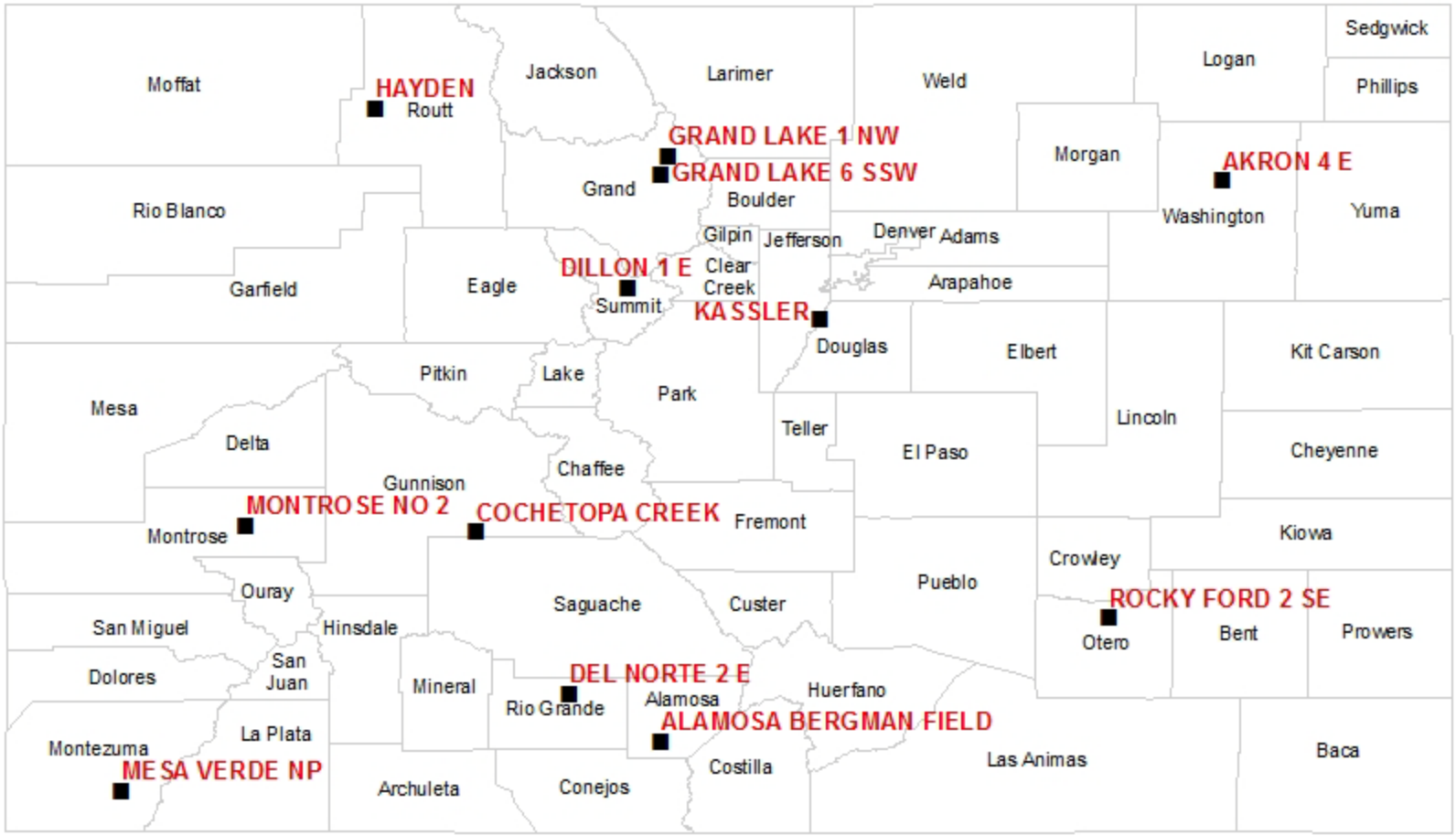
- Let's look at a few examples around the state

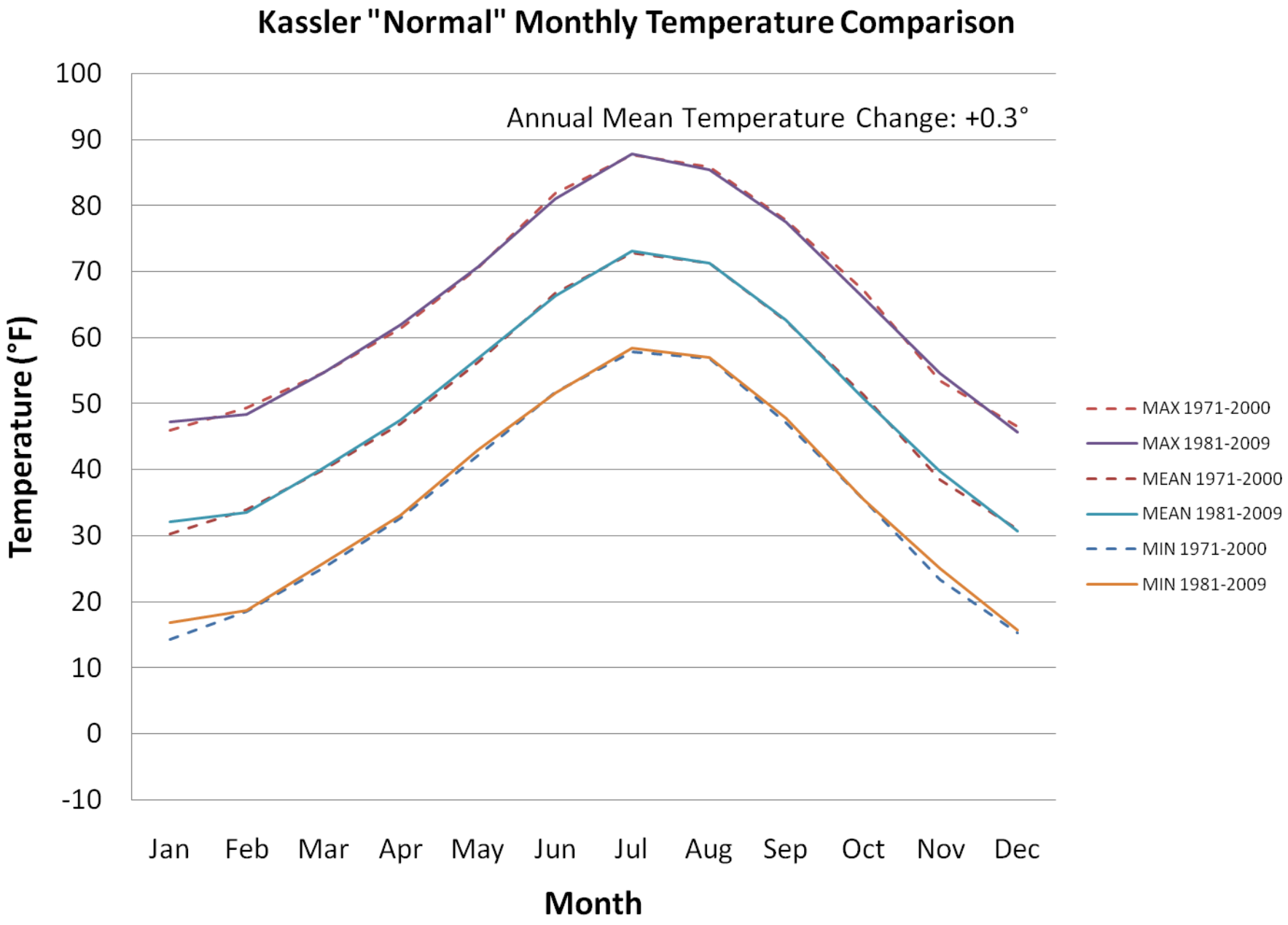
- First temperatures, then precipitation

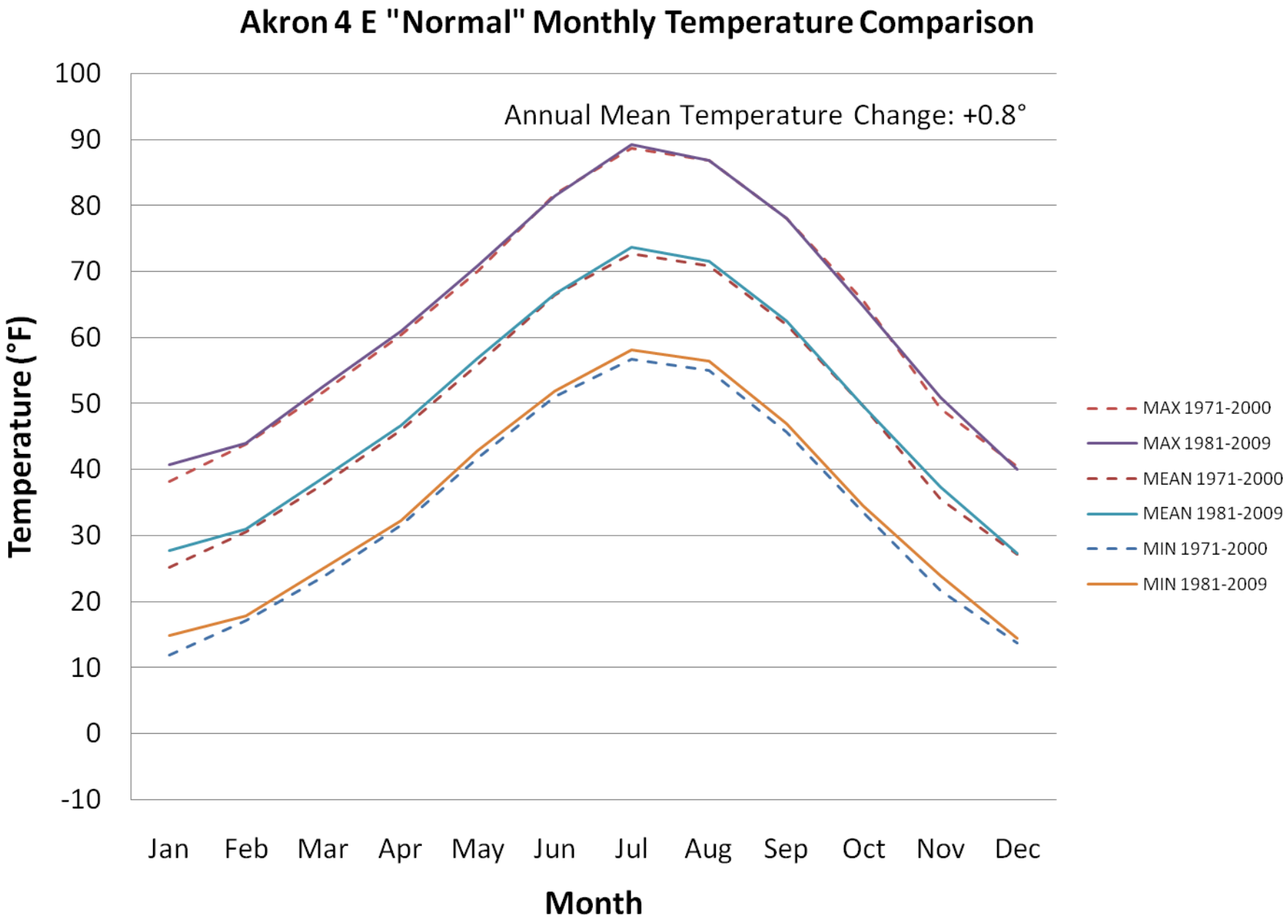
Remember, none of the long-term stations are "totally pristine"
-- some stations have moved, instruments changed, etc --

Selected NOAA Long-term Stations

COLORADO




Kassler "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.3°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Akron 4 E "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.8°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
Feb
Mar
Apr
May
Jun
Jul
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Sep
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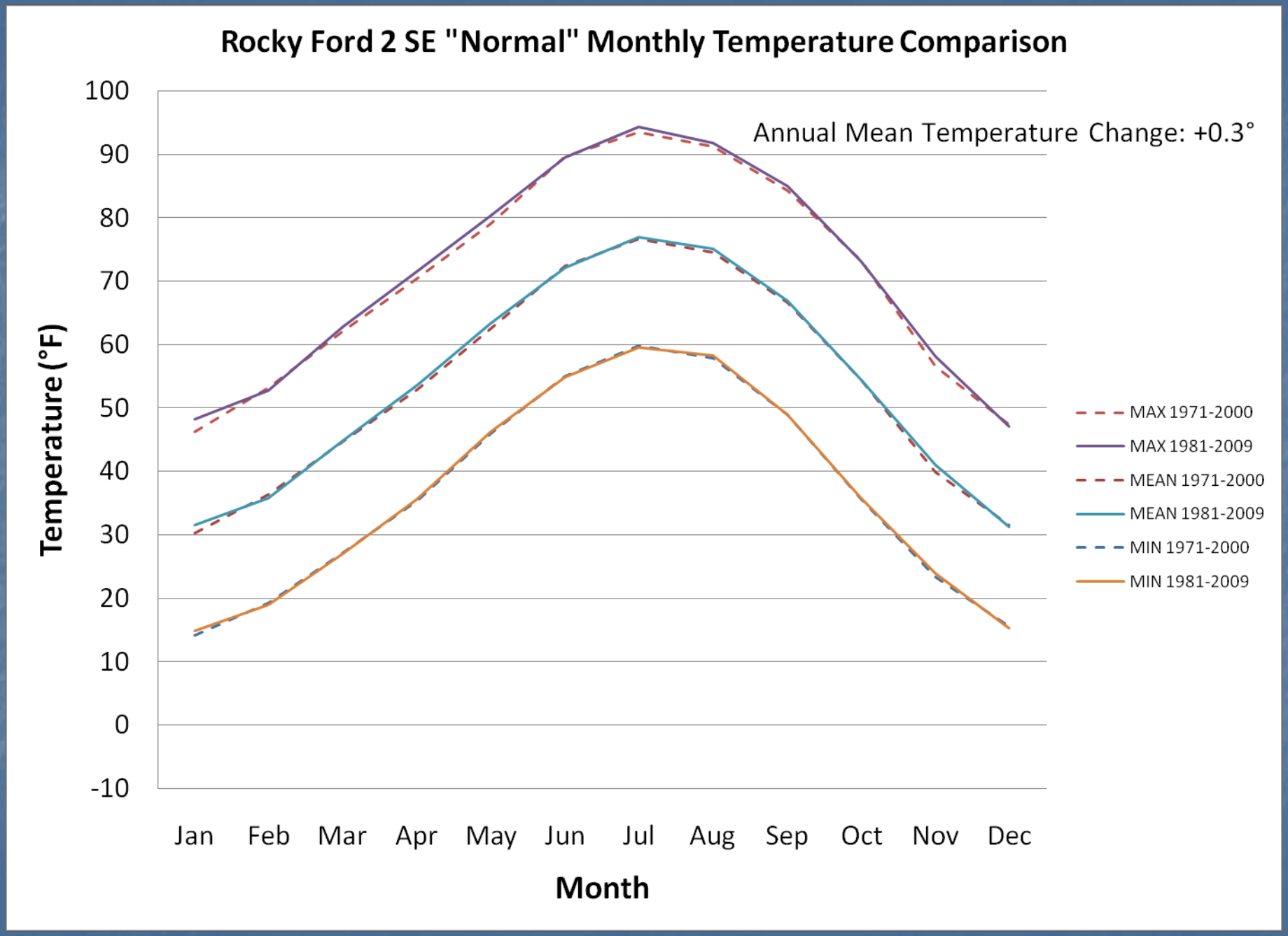
Nov
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Rocky Ford 2 SE "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.3°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
Feb
Mar
Apr
May
Jun
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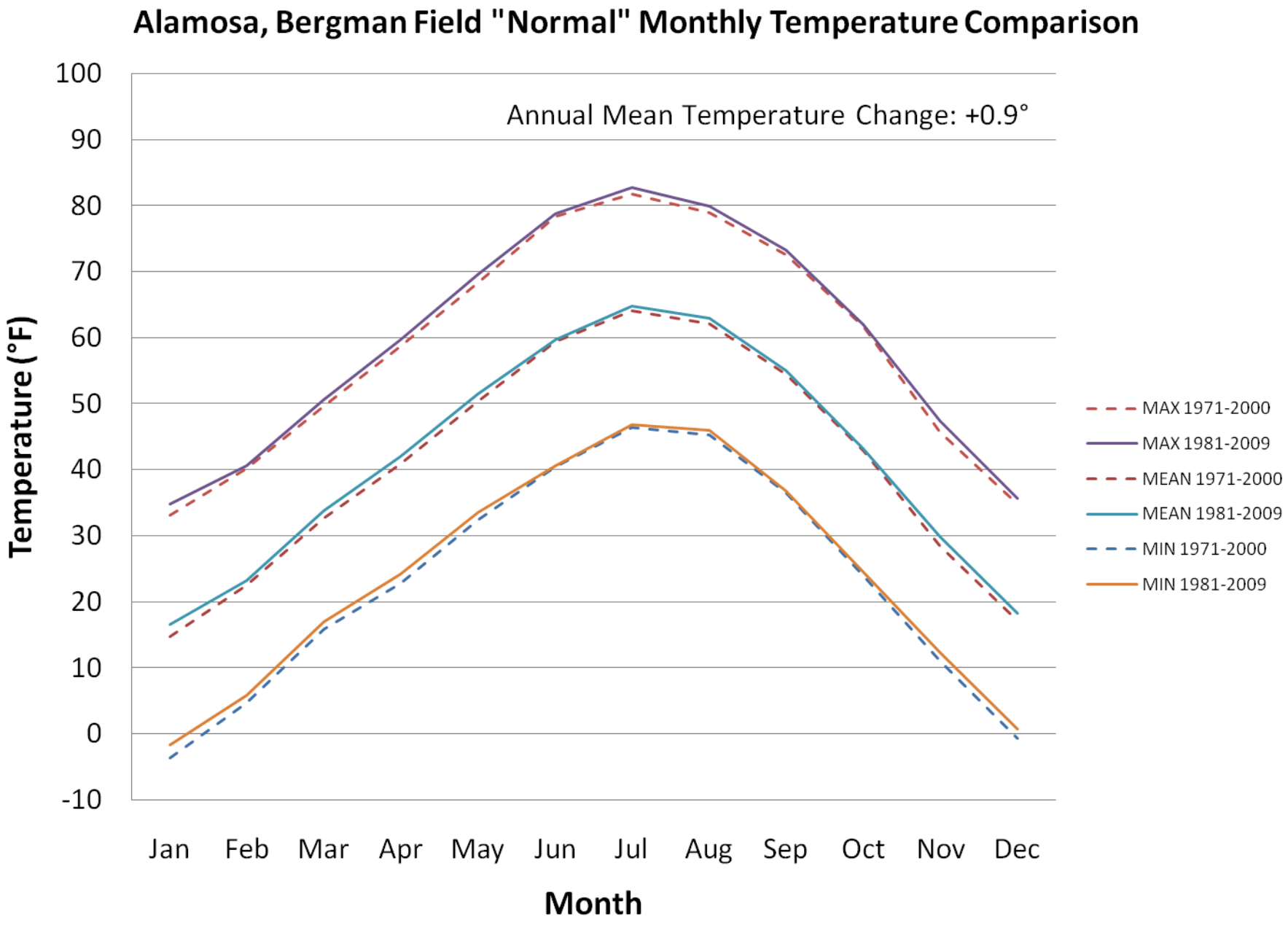
Aug
Sep
Oct
Nov
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Alamosa, Bergman Field "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.9°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
Feb
Mar
Apr
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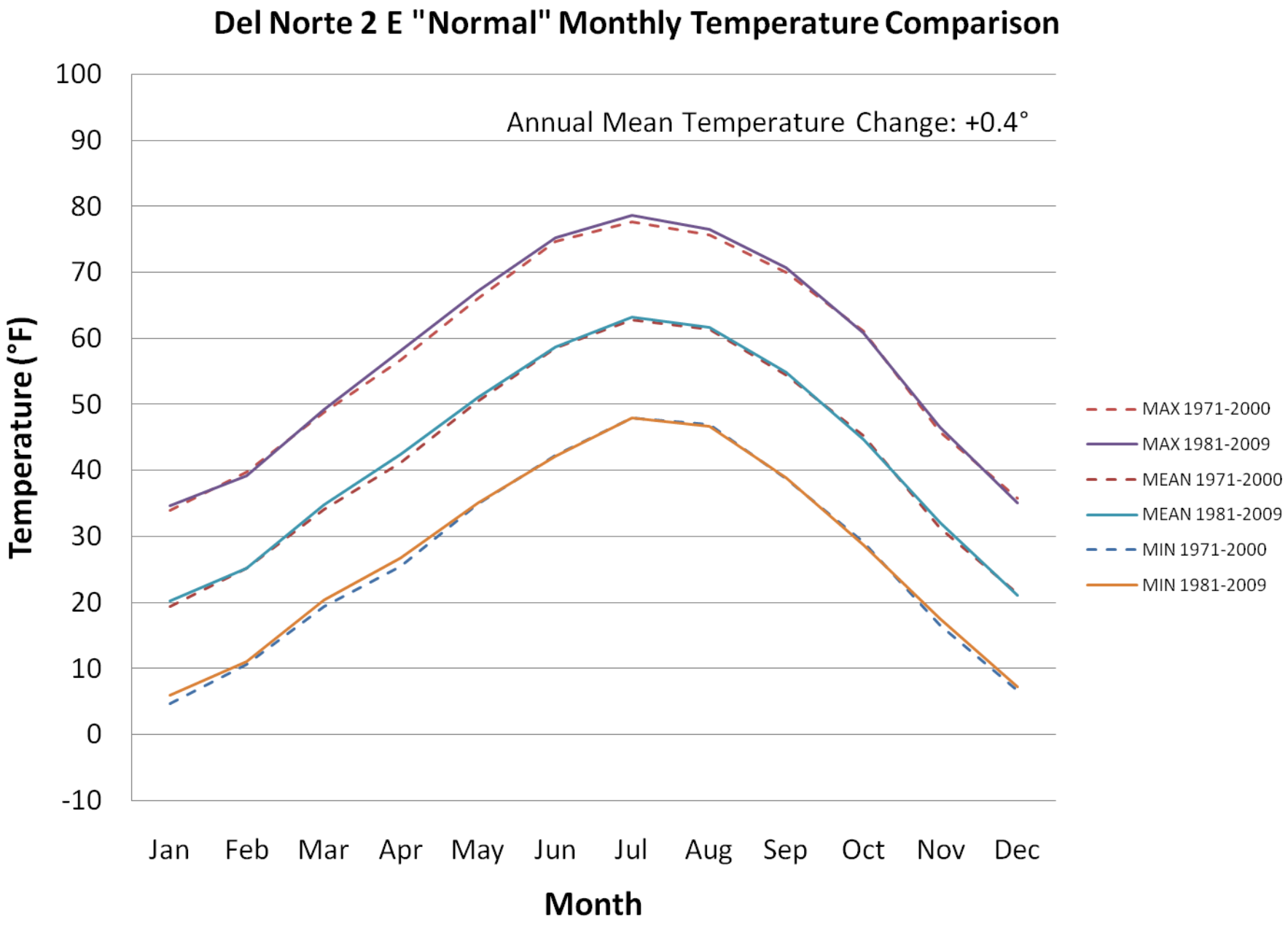
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Del Norte 2 E "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.4°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
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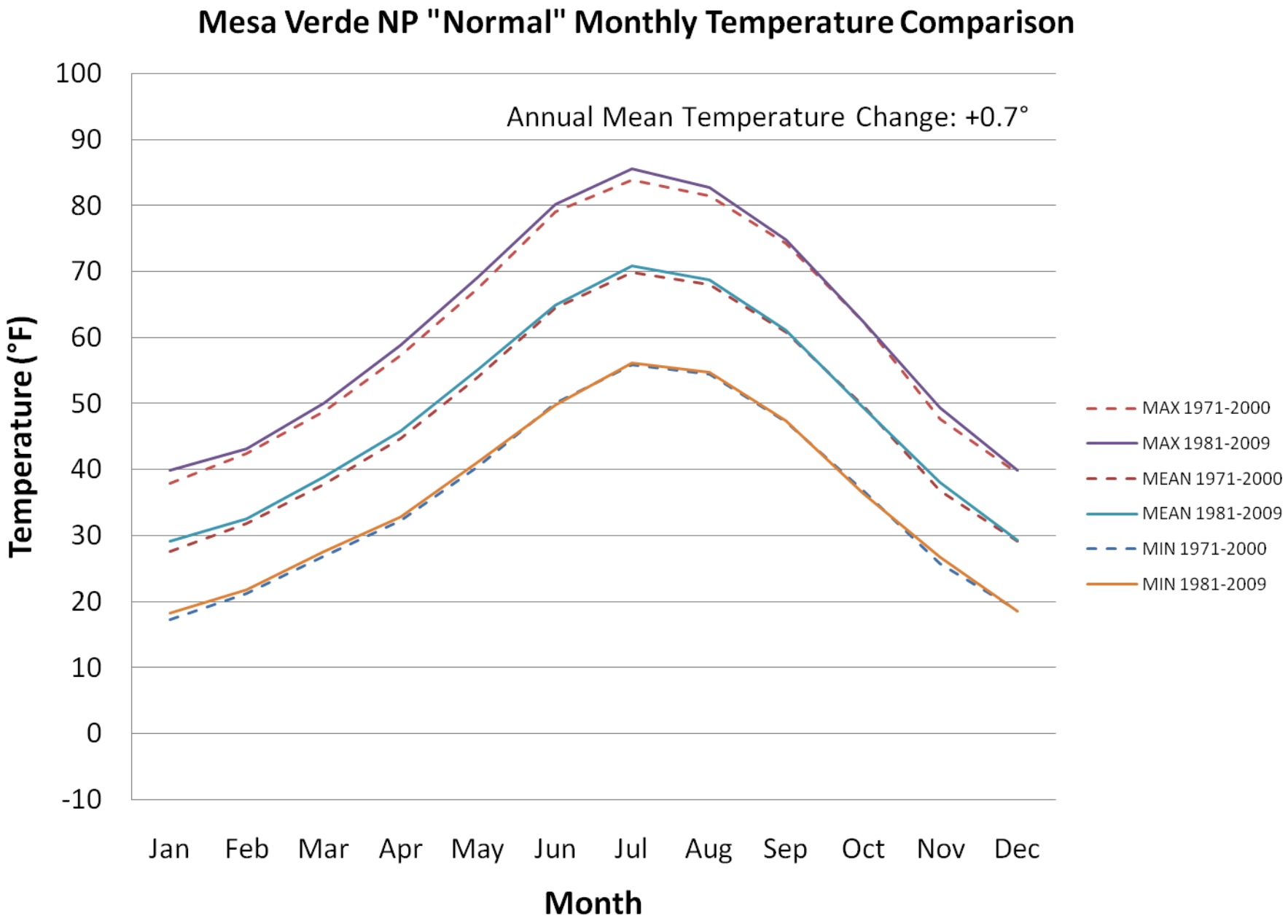
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Mesa Verde NP "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.7°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
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Mar
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May
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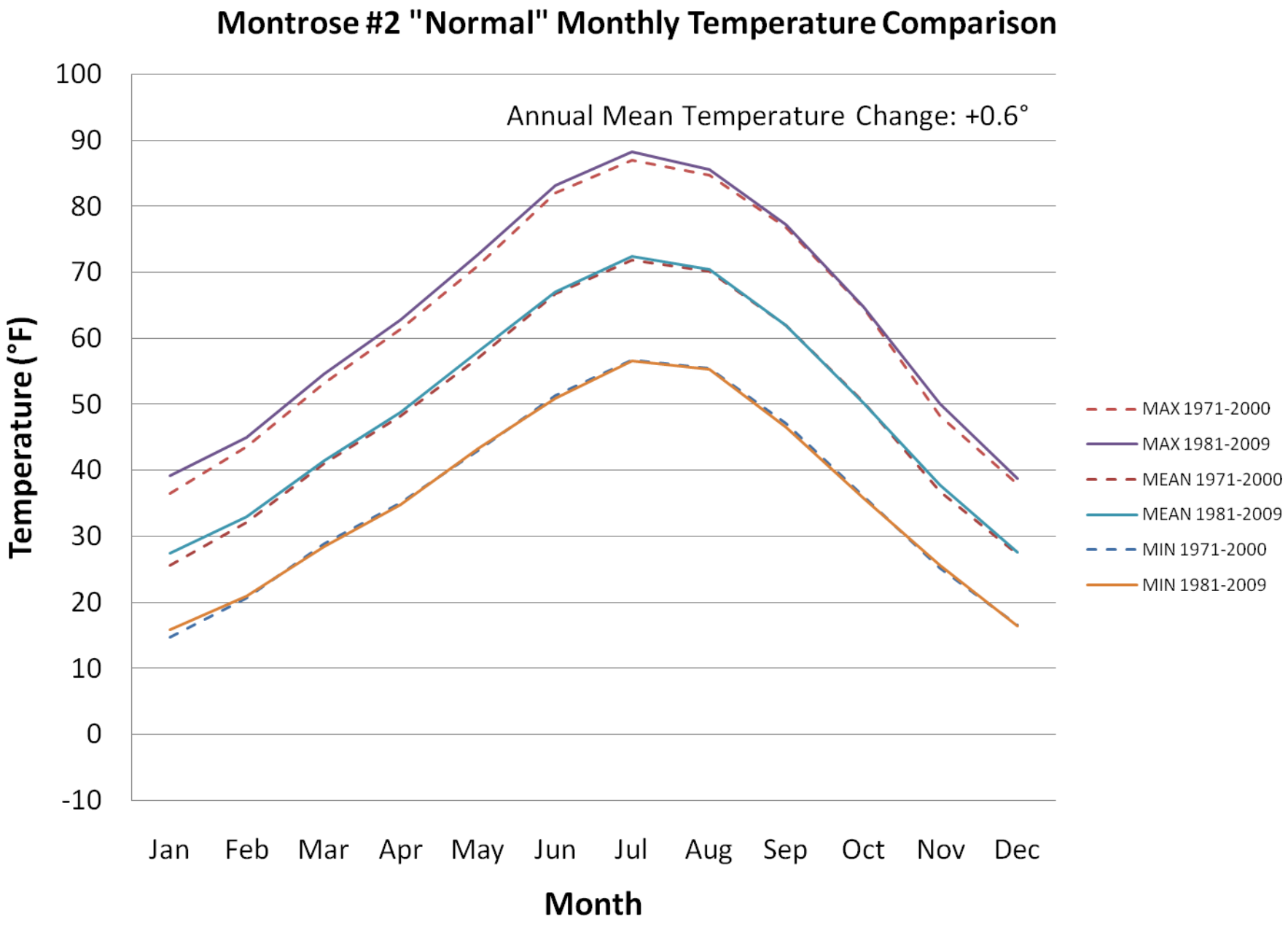
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Montrose #2 "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.6°
Temperature (°F)
100
90
80
70
60
50
40
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20
10
0
-10
Jan
Feb
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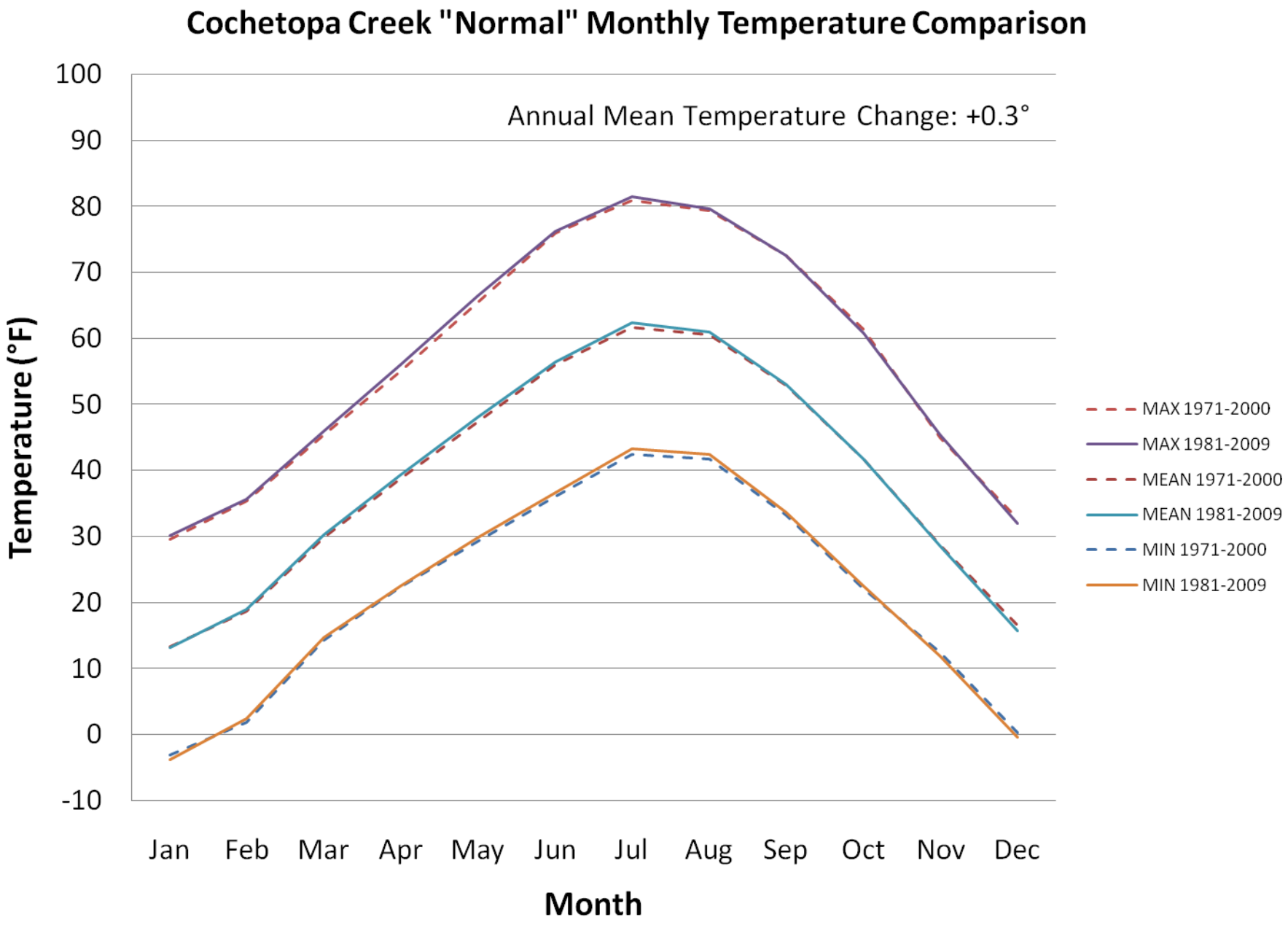
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Cochetopa Creek "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.3°
Temperature (°F)
100
90
80
70
60
50
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20
10
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-10
Jan
Feb
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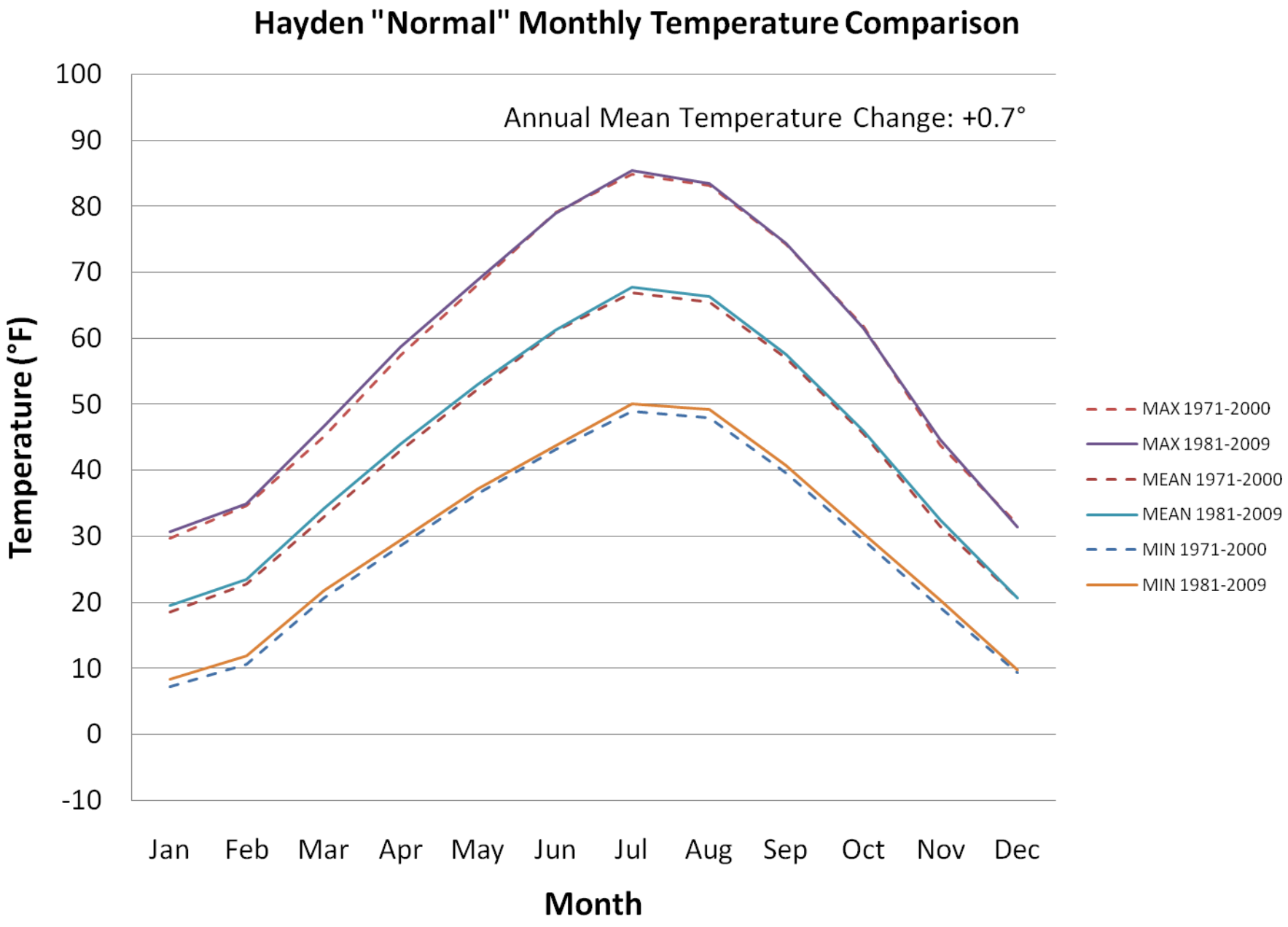
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Hayden "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.7°
Temperature (°F)
100
90
80
70
60
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40
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10
0
-10
Jan
Feb
Mar
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May
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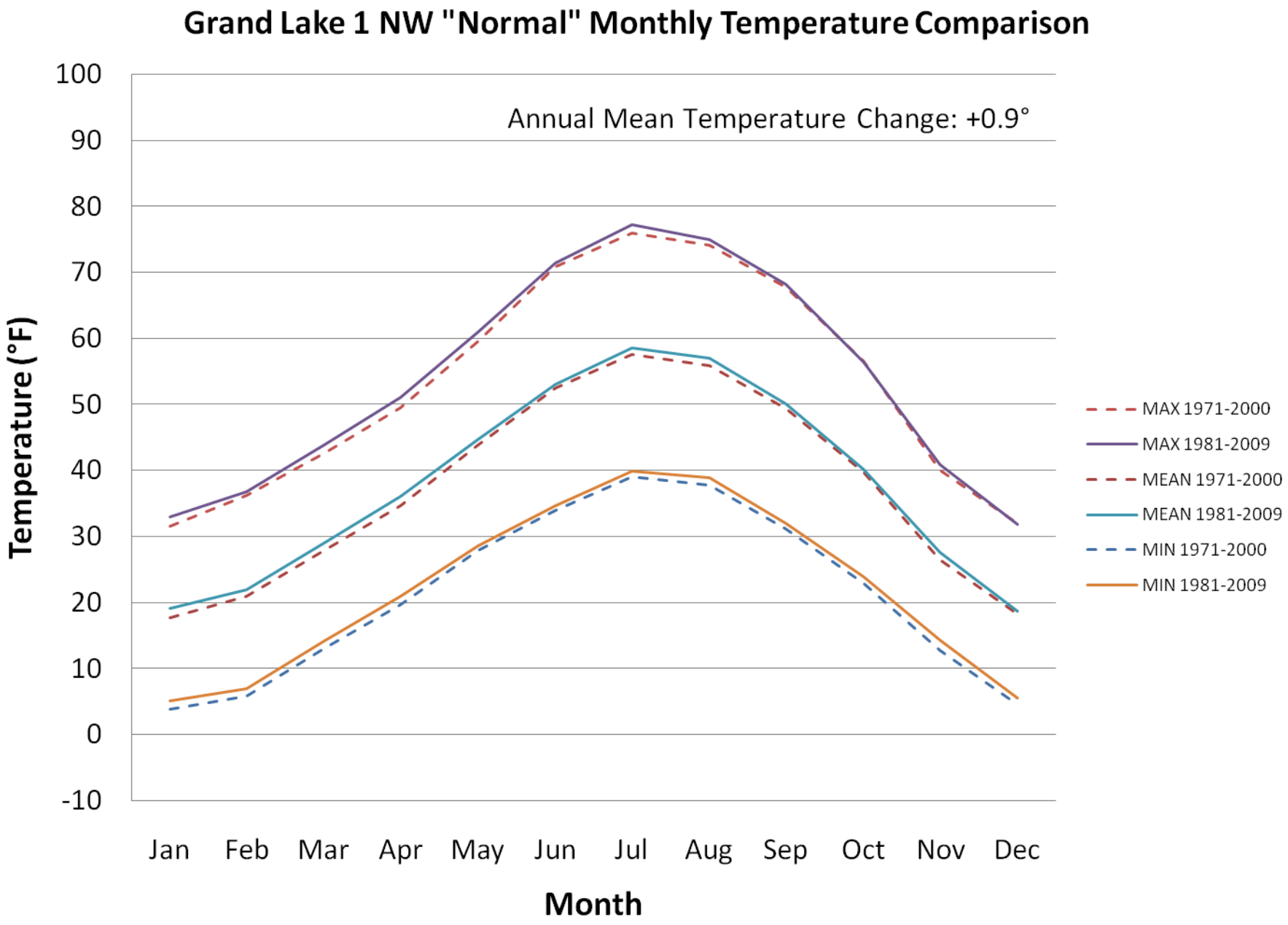
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Grand Lake 1 NW "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.9°
Temperature (°F)
100
90
80
70
60
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40
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20
10
0
-10
Jan
Feb
Mar
Apr
May
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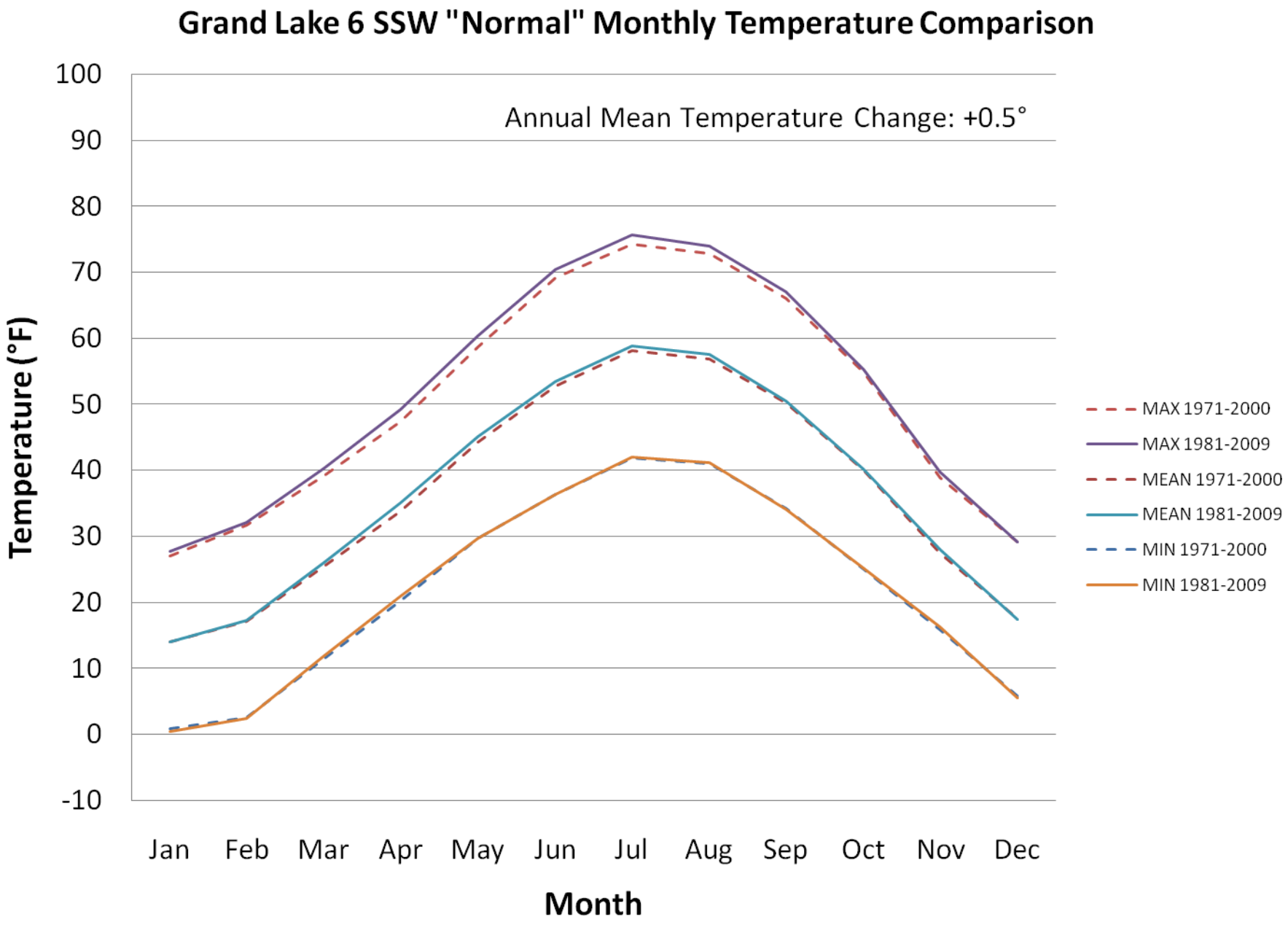
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009


Grand Lake 6 SSW "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.5°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
Feb
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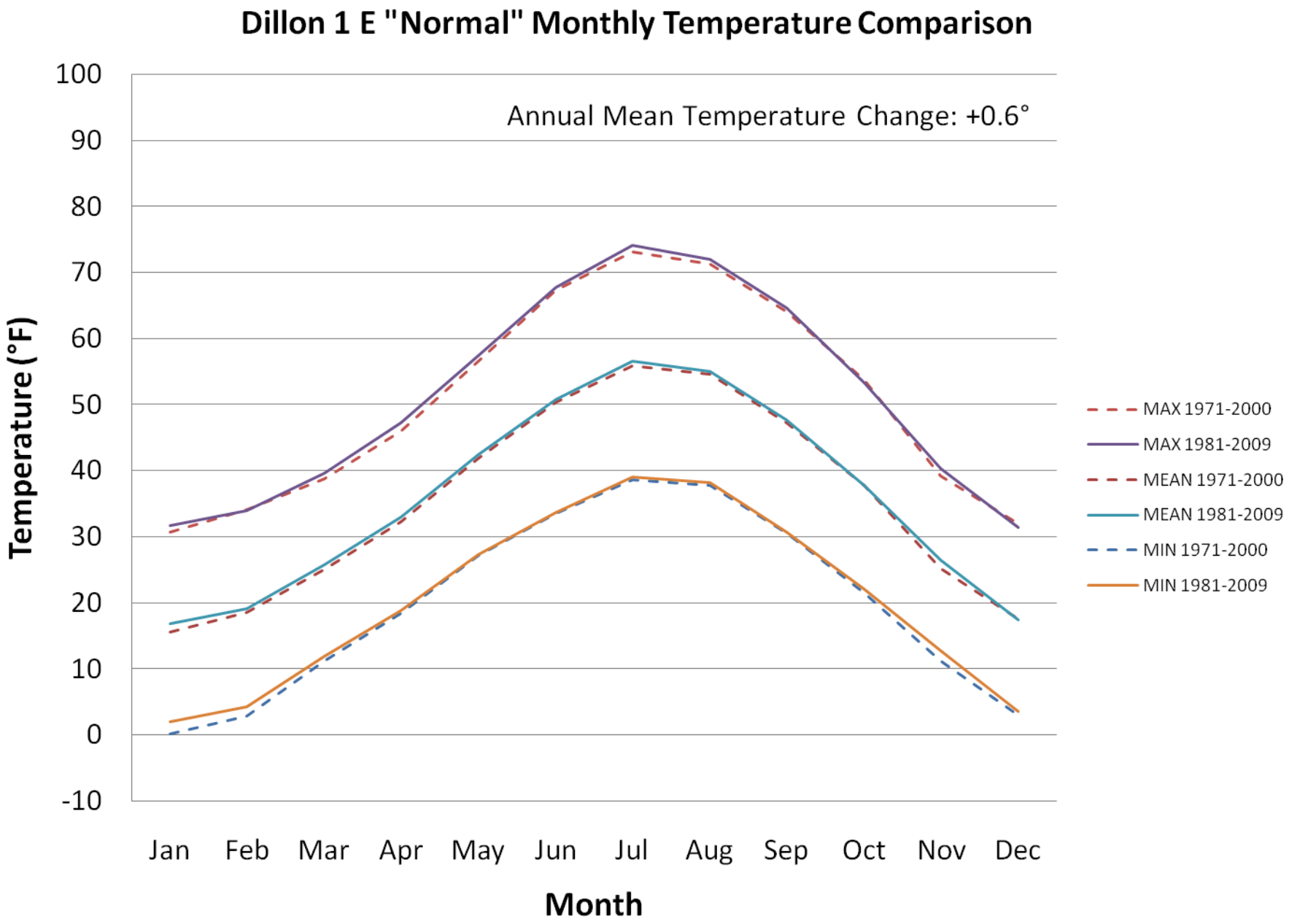
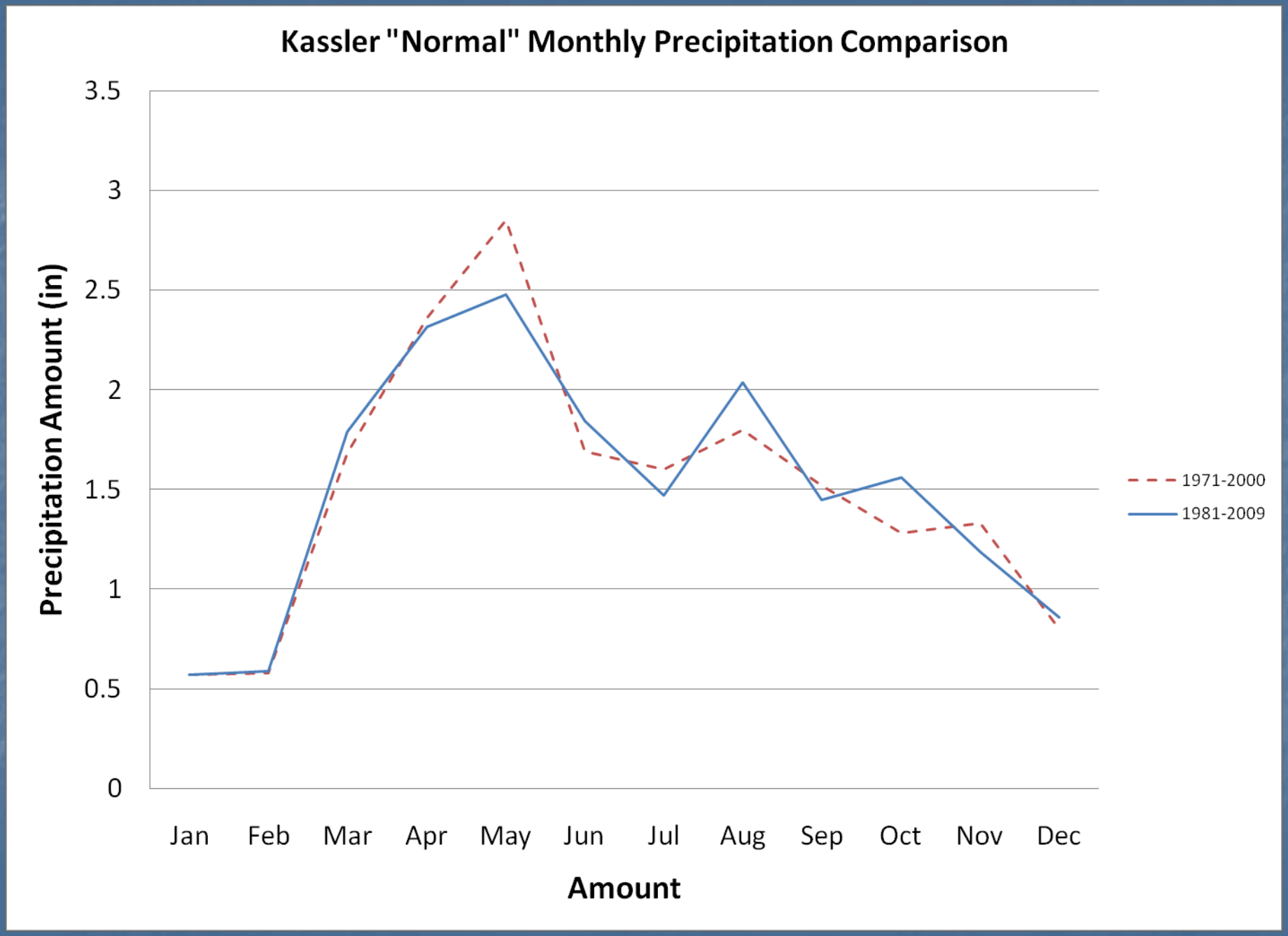
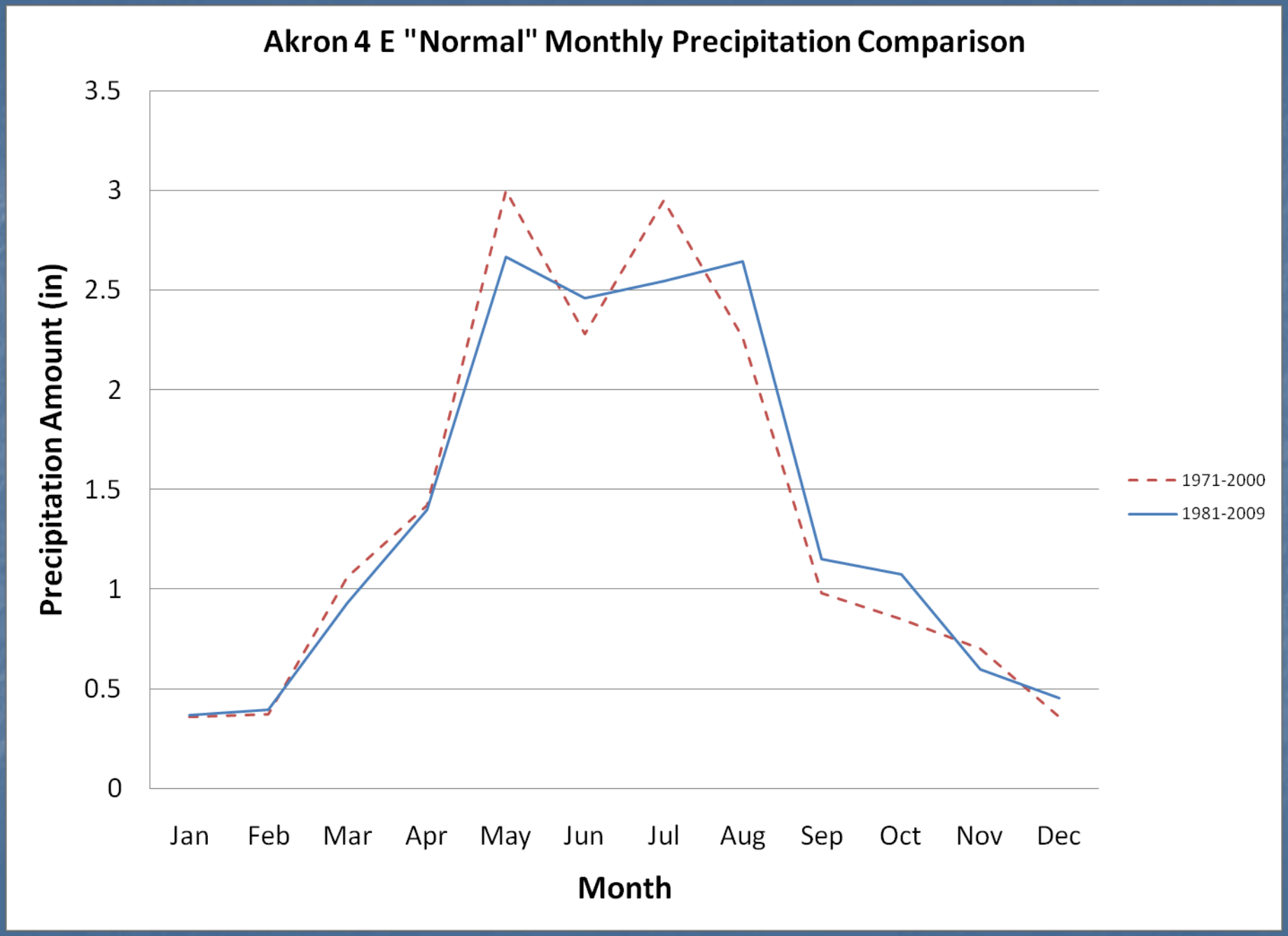
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009

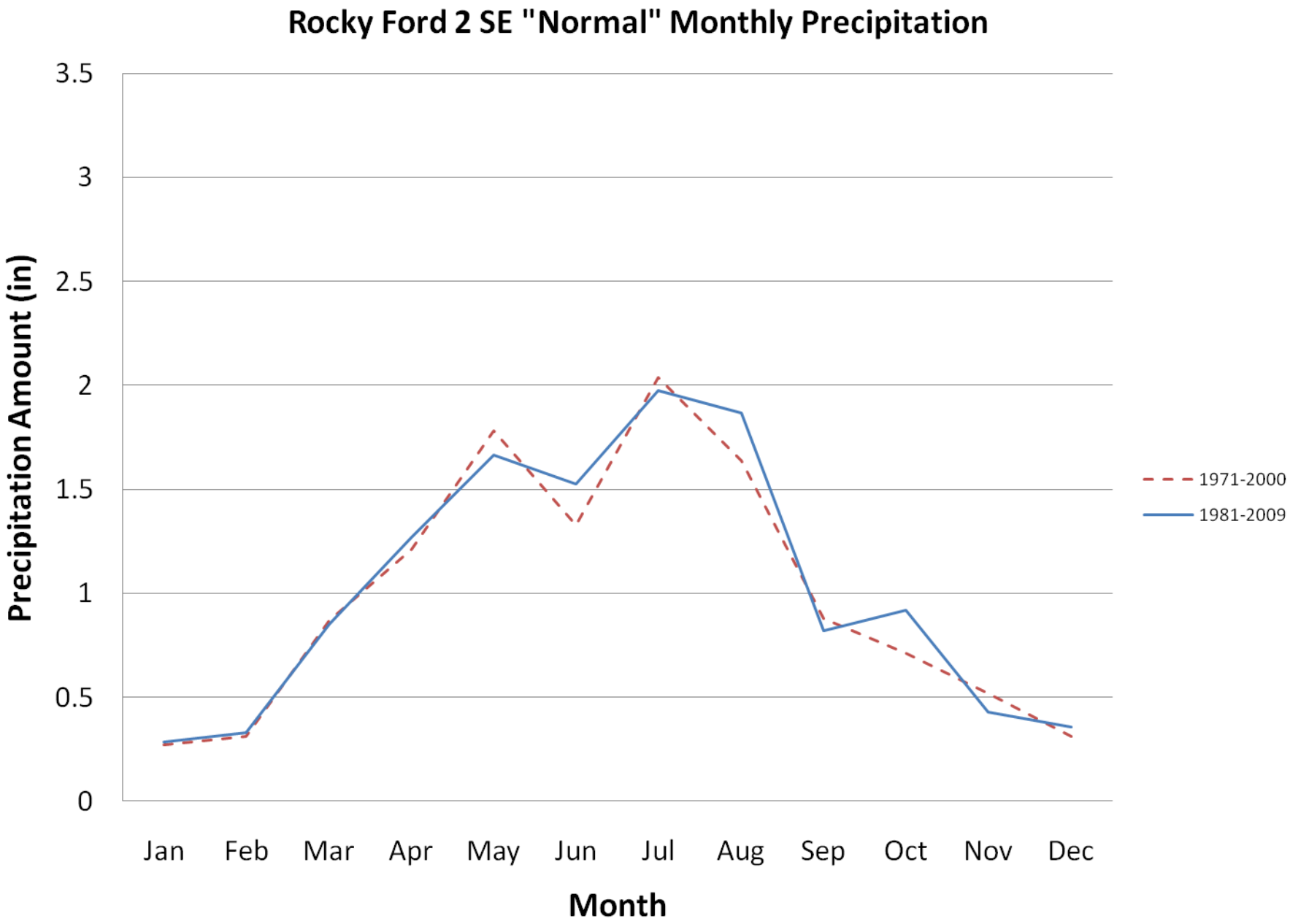

Dillon 1 E "Normal" Monthly Temperature Comparison
Annual Mean Temperature Change: +0.6°
Temperature (°F)
100
90
80
70
60
50
40
30
20
10
0
-10
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
MAX 1971-2000
MAX 1981-2009
MEAN 1971-2000
MEAN 1981-2009
MIN 1971-2000
MIN 1981-2009

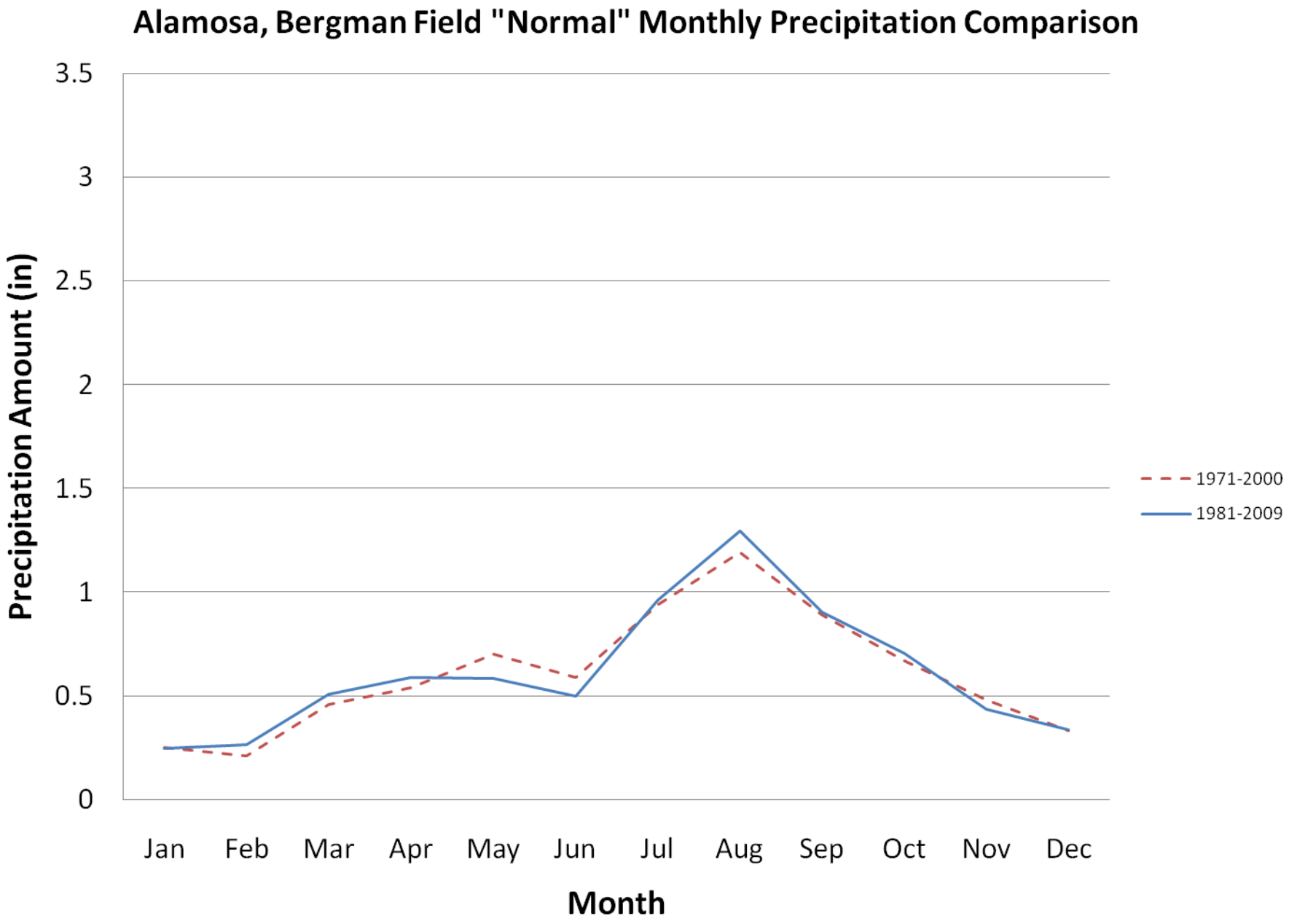
Temperature Changes since 1951-1980 Base Period

- Kassler -0.9 Deg. F
- Rocky Ford +0.8 F
- Alamosa +0.5 F
- Del Norte -0.5 F
- Mesa Verde -1.3 F
- Montrose +0.7 F
- Cochetopa Creek (Gunnison) +2.3 F
- Hayden +2.0 F
- Grand Lake 1 NW +2.9 F
- Grand Lake 6 SSE +1.1 F
- Dillon +0.3 F


Kassler "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Amount
1971-2000
1981-2009


Akron 4 E "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009


Rocky Ford 2 SE "Normal" Monthly Precipitation
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009


Alamosa, Bergman Field "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
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Jun
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Aug
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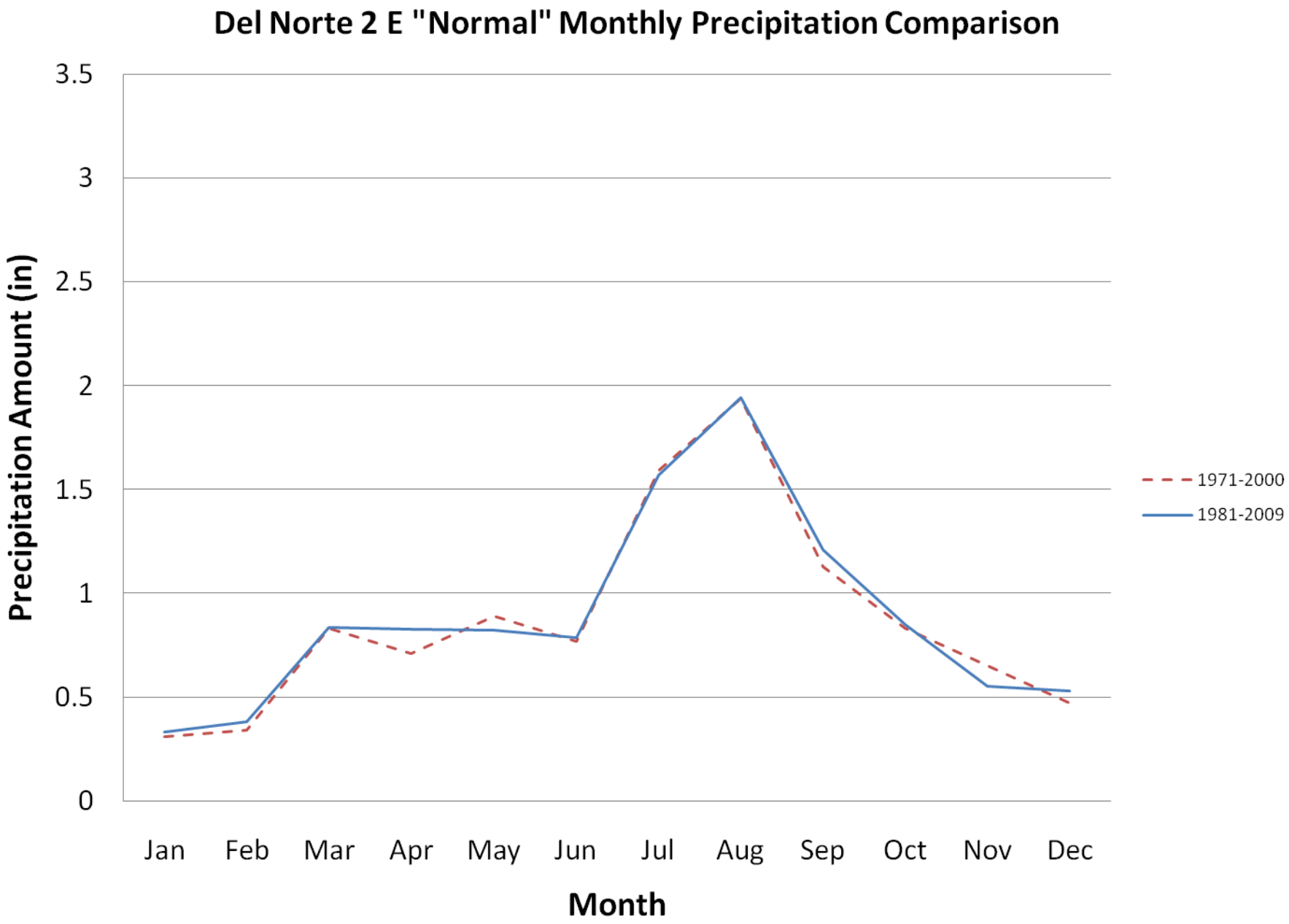
Nov
Dec
Month
1971-2000
1981-2009


Del Norte 2 E "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
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May
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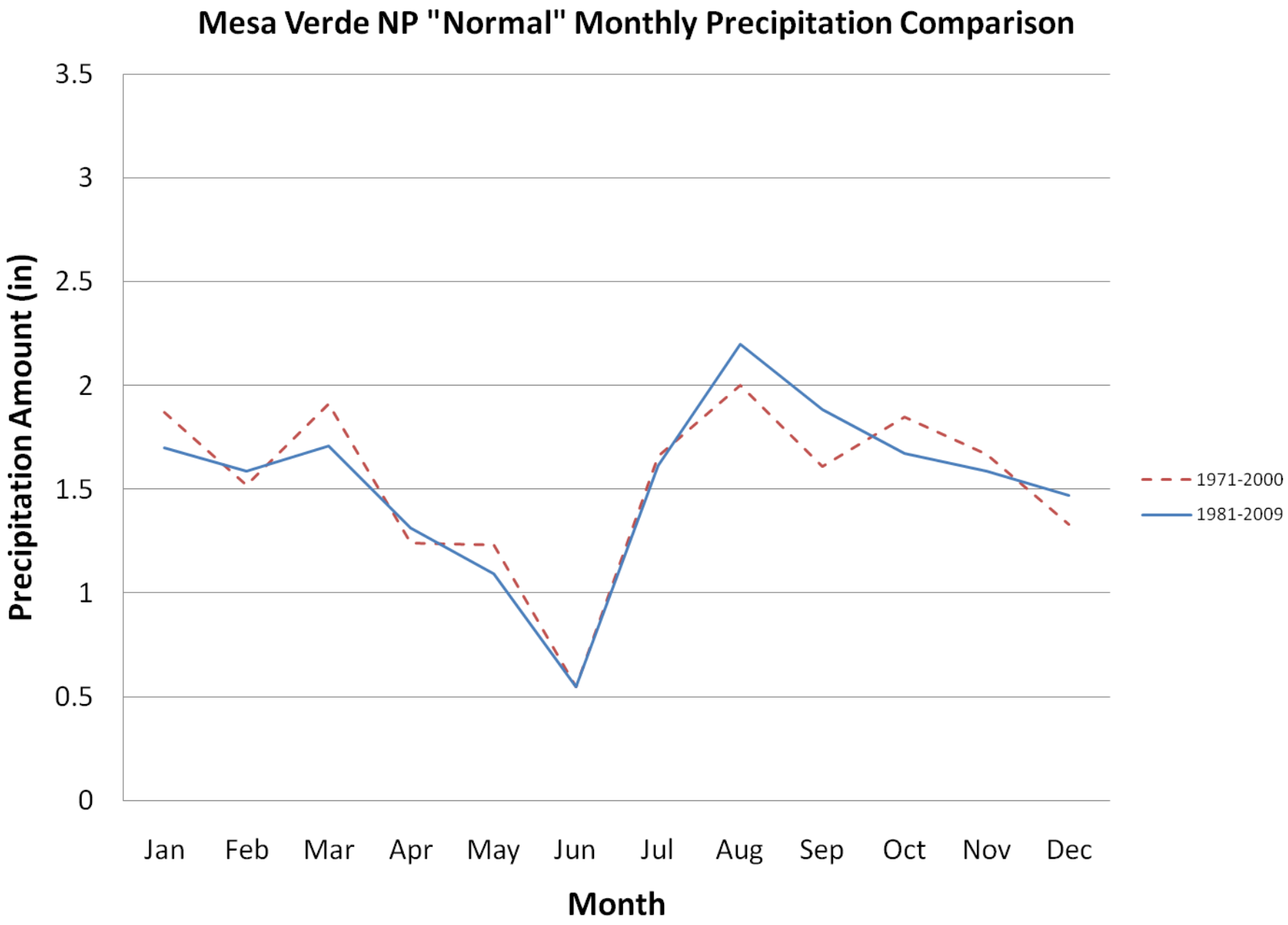
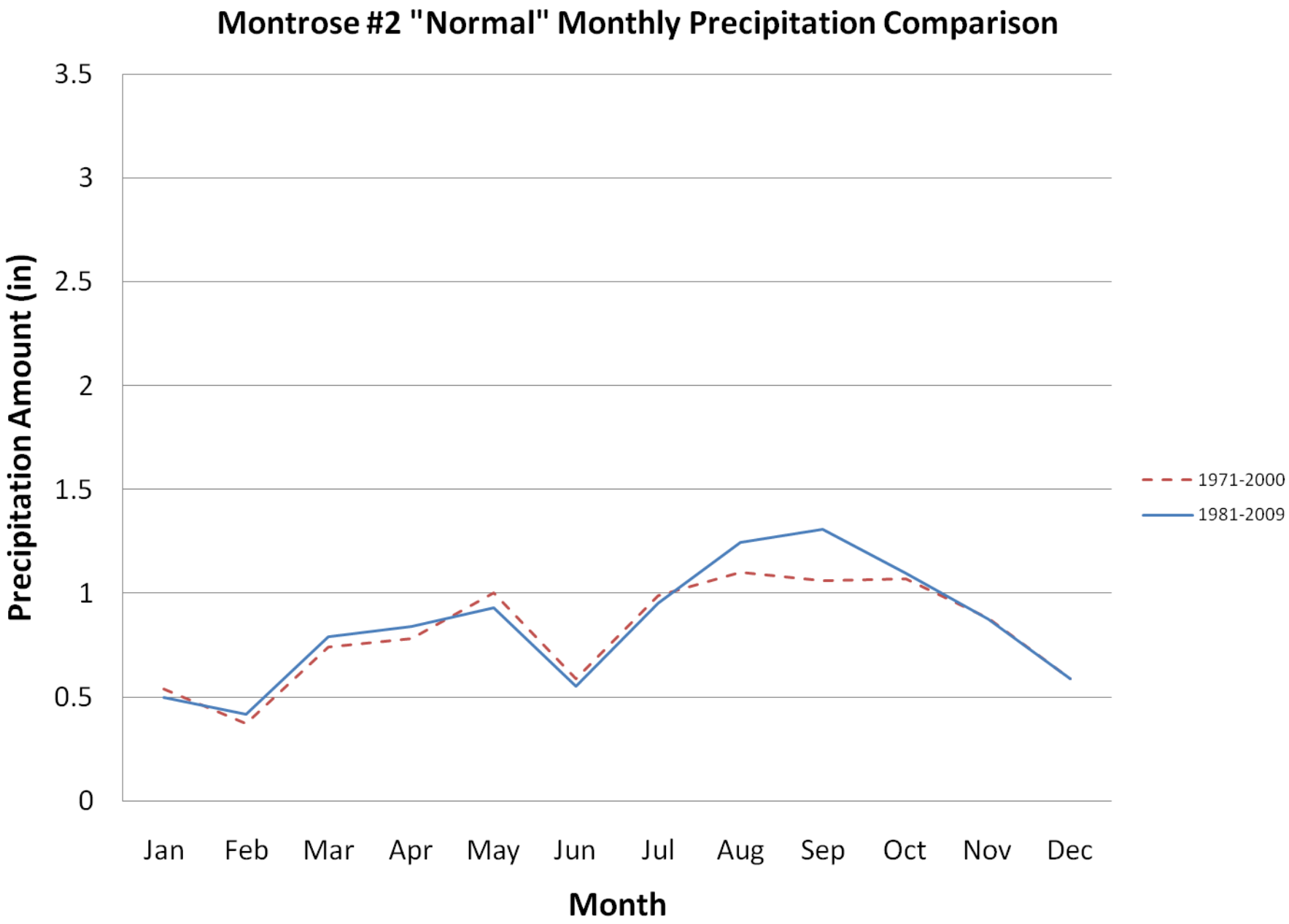
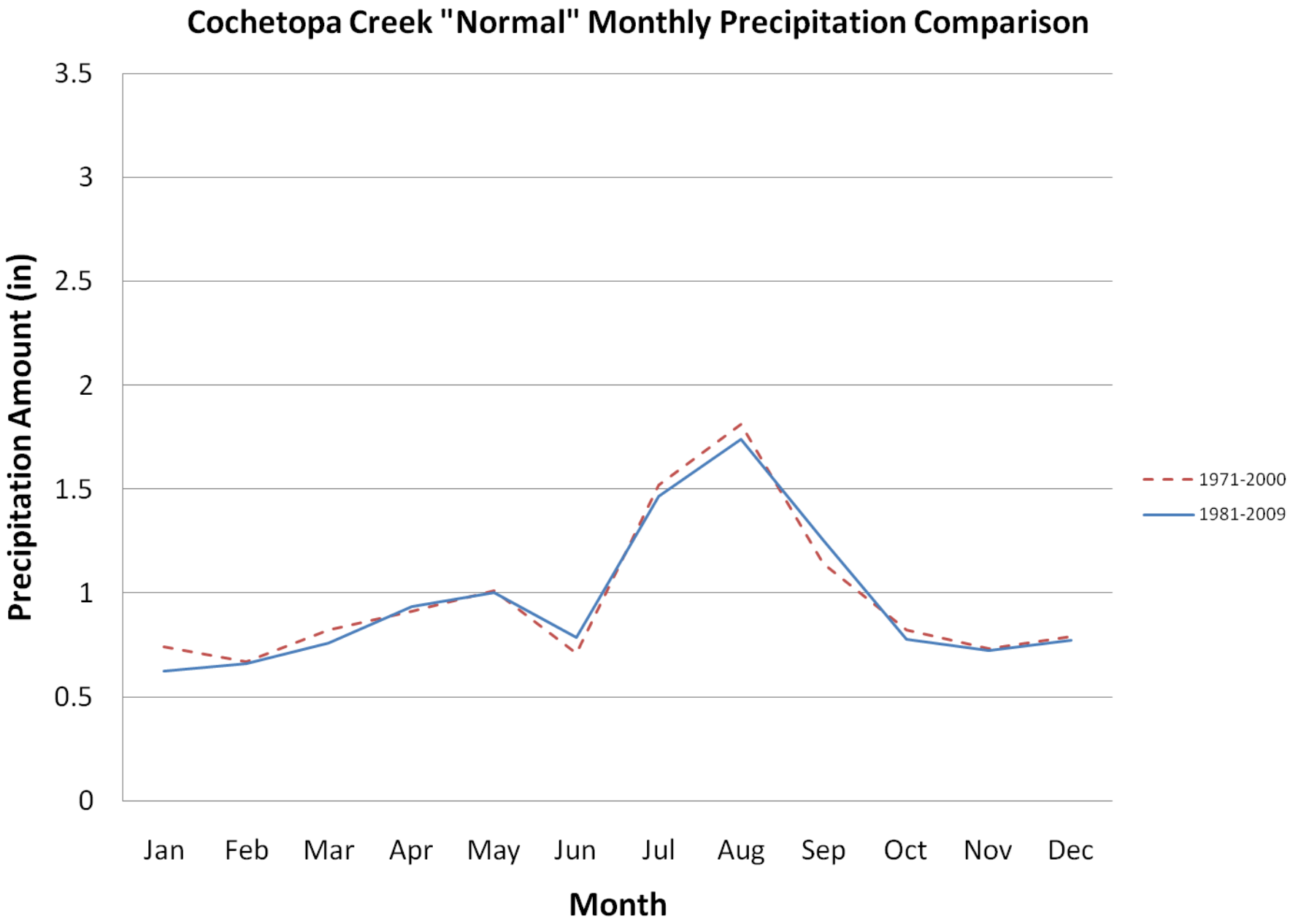
Month
1971-2000
1981-2009


Mesa Verde NP "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009


Montrose #2 "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009


Cochetopa Creek "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
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Nov
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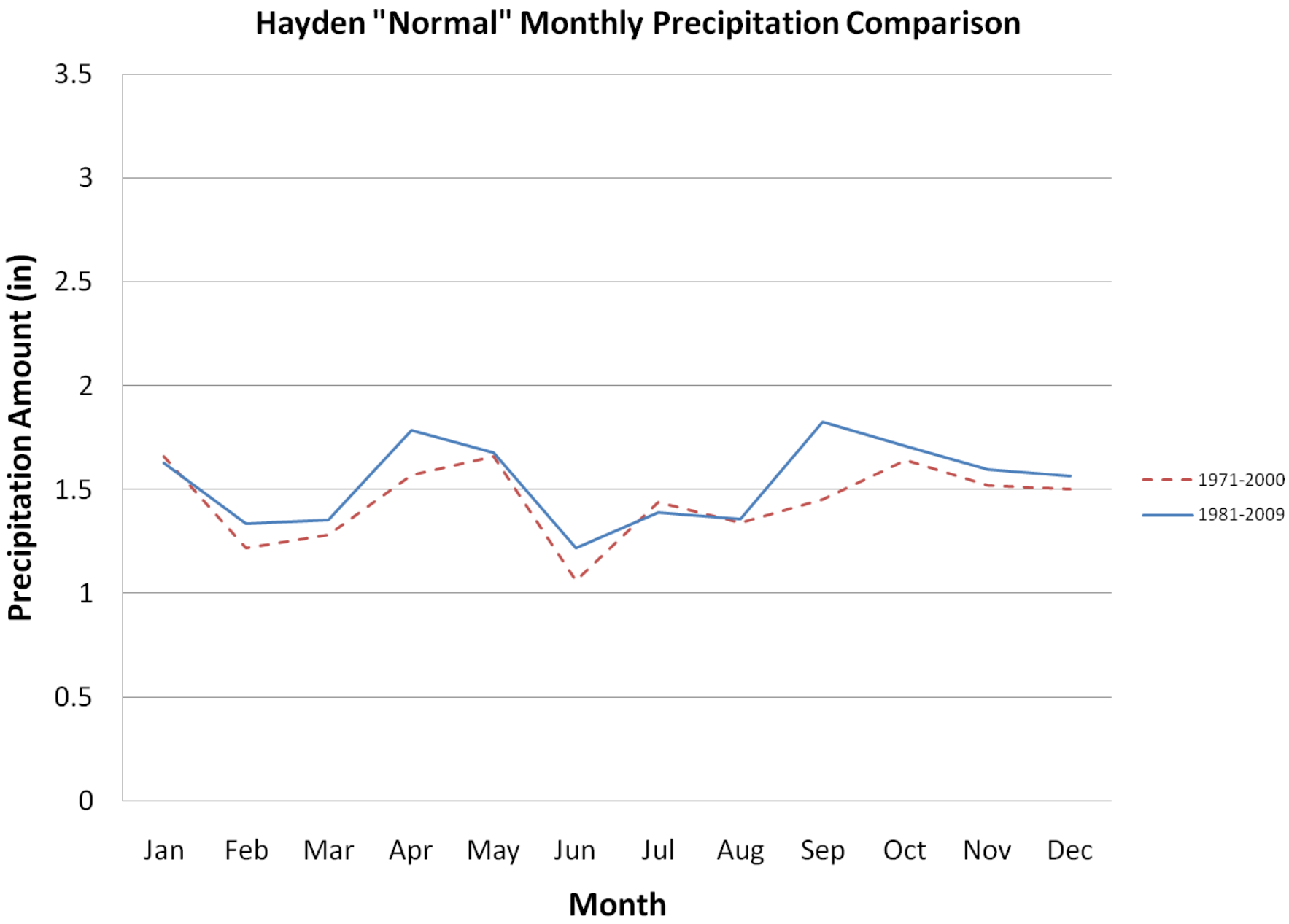
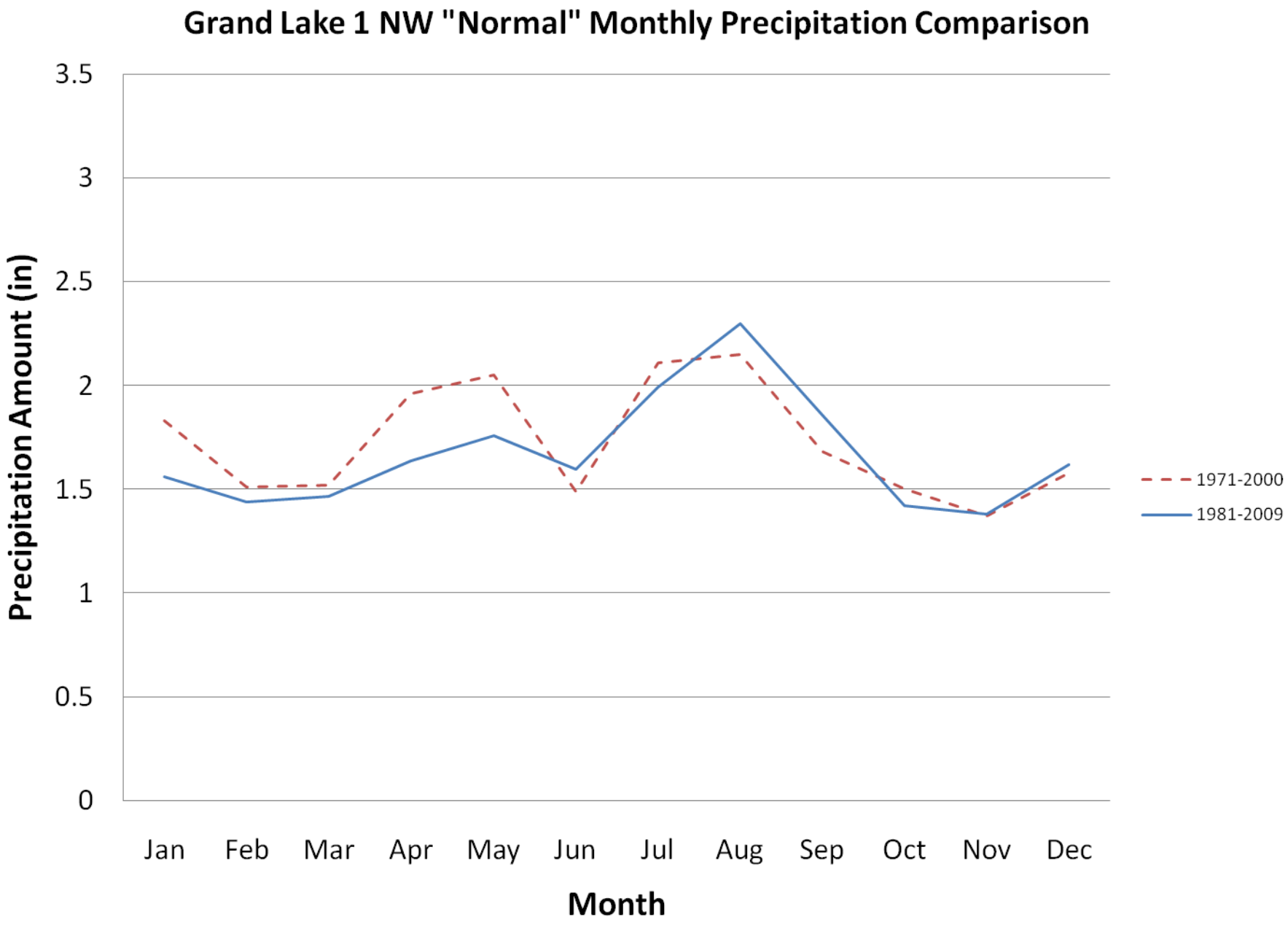
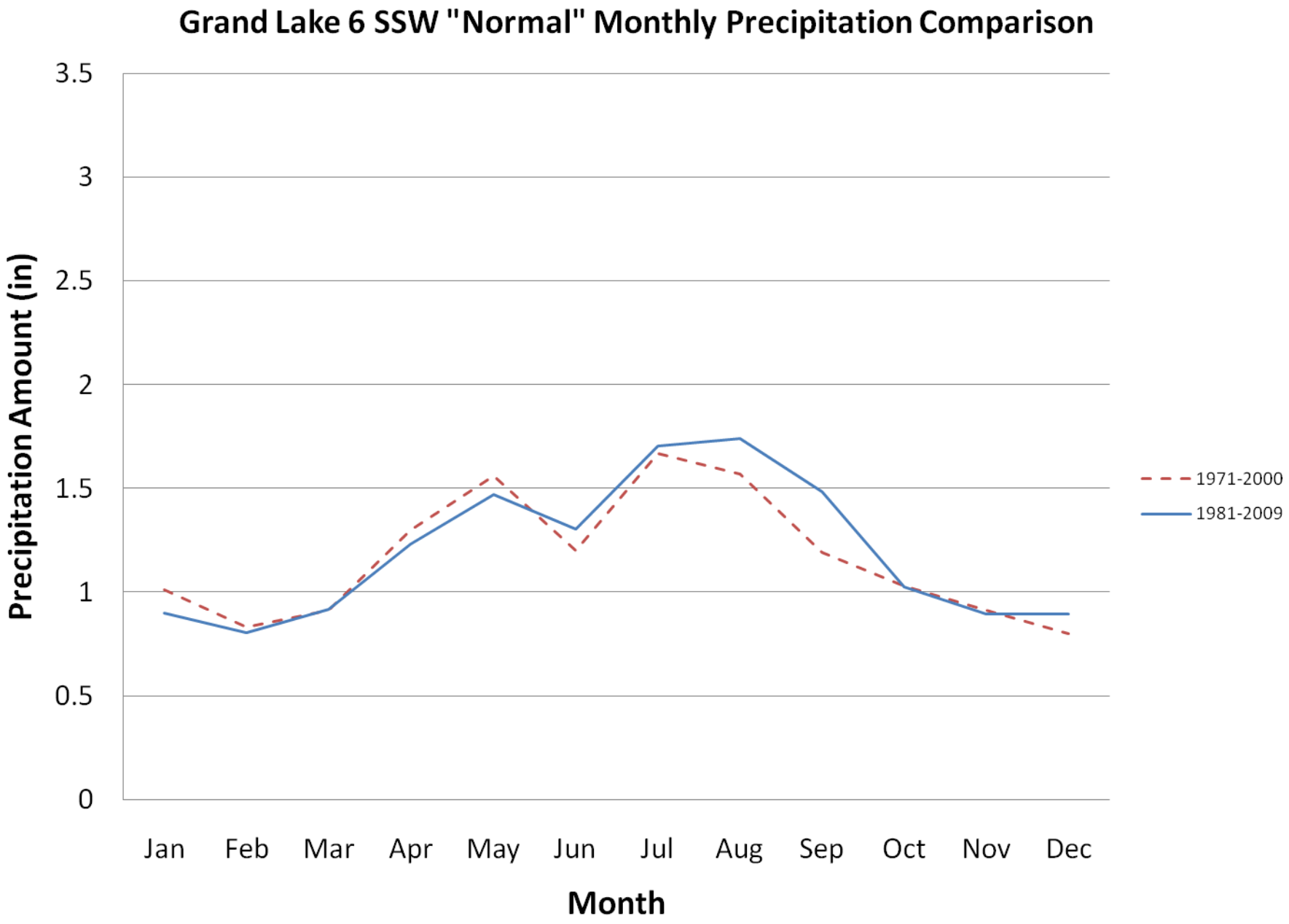
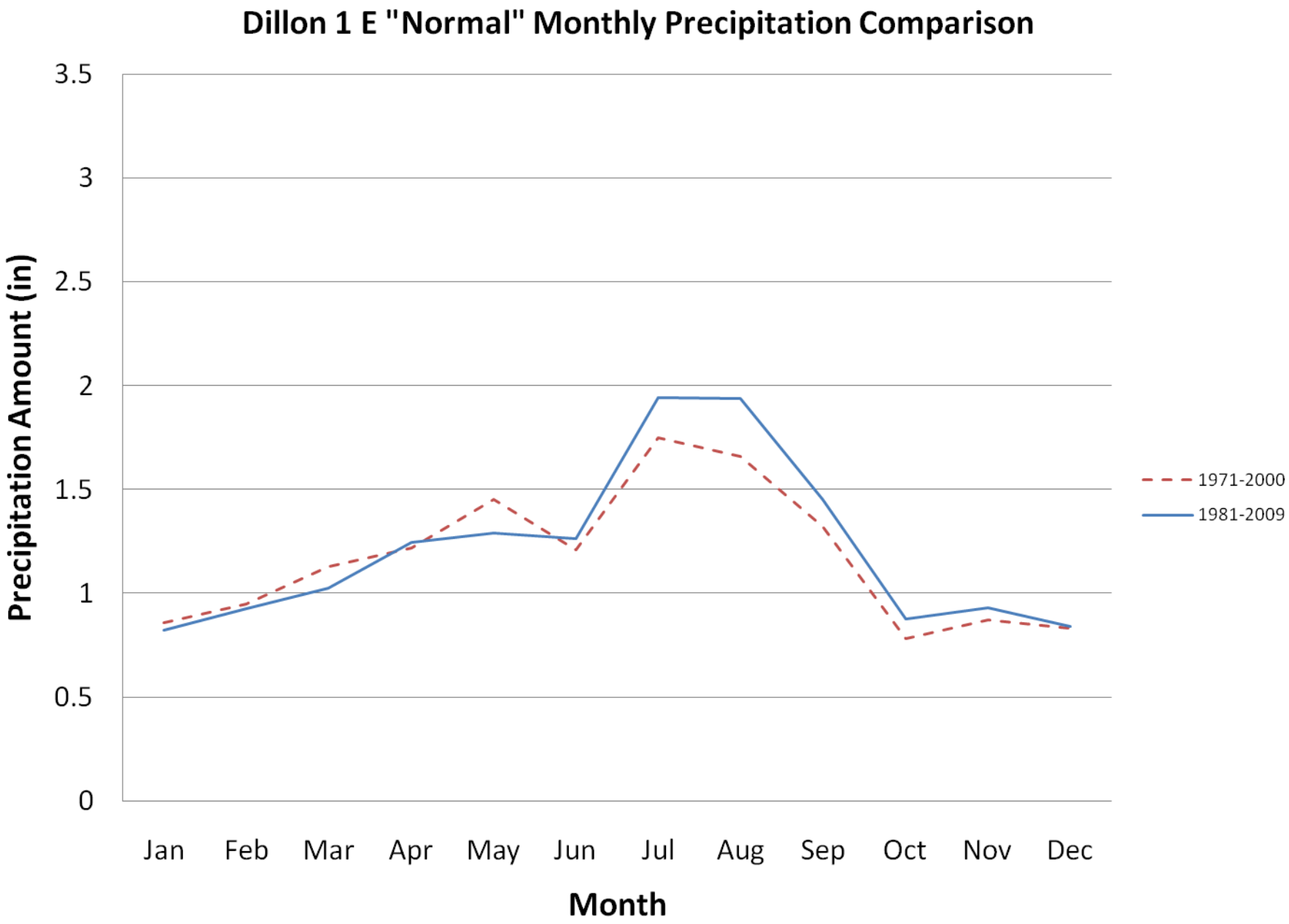
Month
1971-2000
1981-2009


Hayden "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009


Grand Lake 1 NW "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009

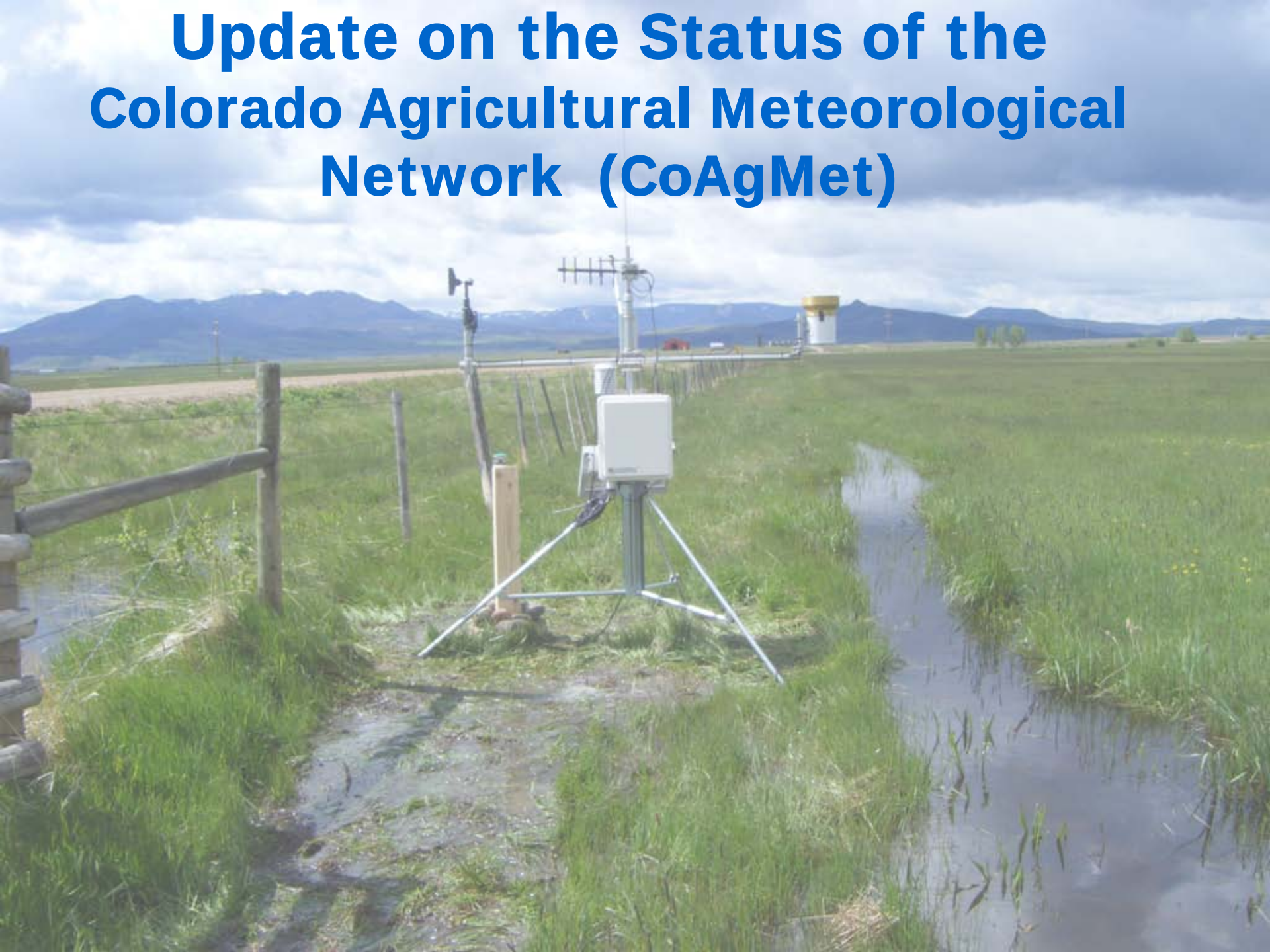

Grand Lake 6 SSW "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009

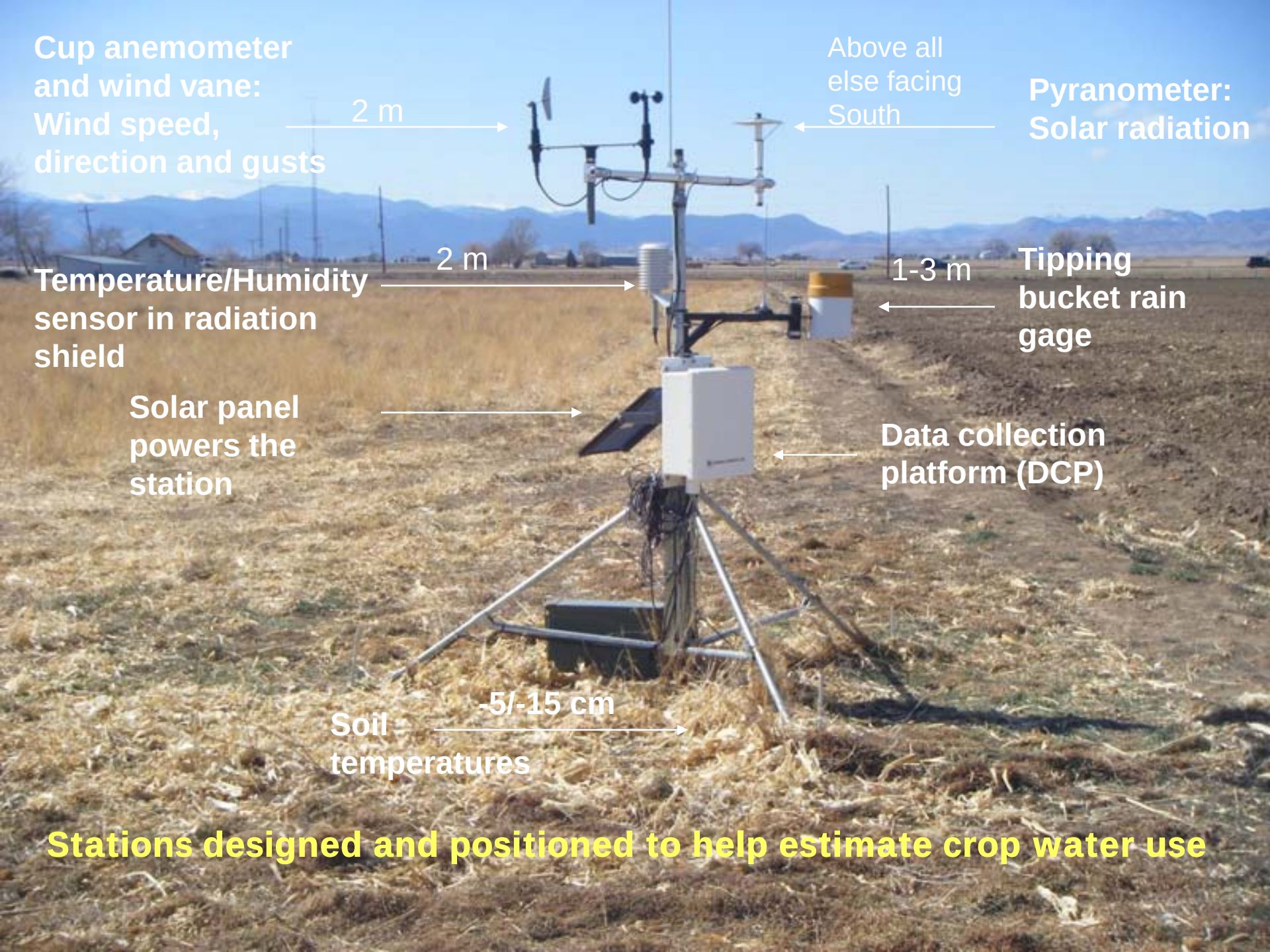

Dillon 1 E "Normal" Monthly Precipitation Comparison
Precipitation Amount (in)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
1971-2000
1981-2009

Precipitation Changes since 1951-1980 Base Period

- Kassler +0.97 Inches
- Rocky Ford +1.24”
- Alamosa +0.20”
- Del Norte +0.97”
- Mesa Verde +0.84”
- Montrose +0.99”
- Cochetopa Creek (Gunnison) +0.83”
- Hayden +2.52” (seems too high ??)
- Grand Lake 1 NW -0.02”
- Grand Lake 6 SSE -0.68”
- Dillon -0.09”

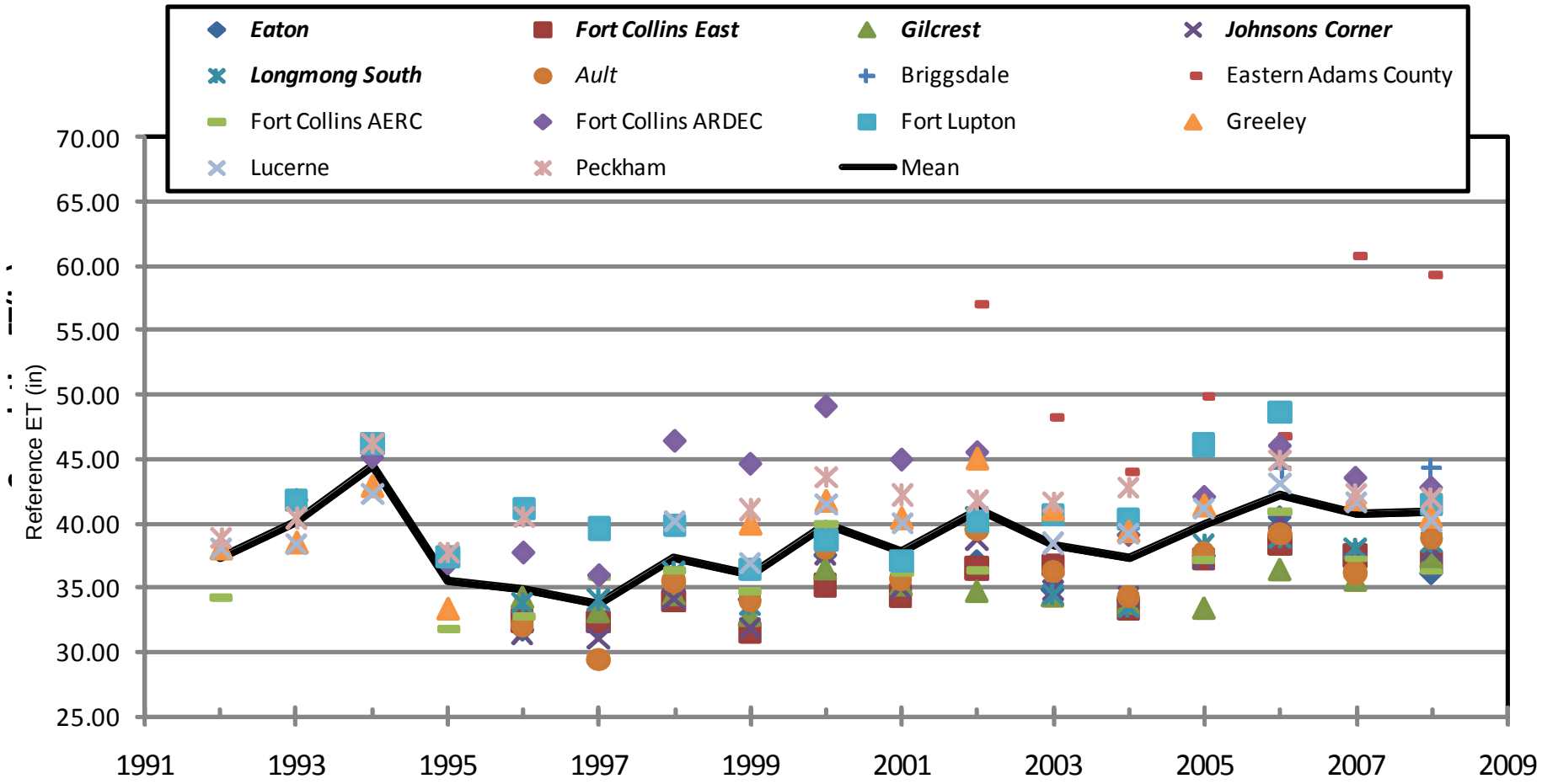
Update on the Status of the Colorado Agricultural Meteorological Network (CoAgMet)



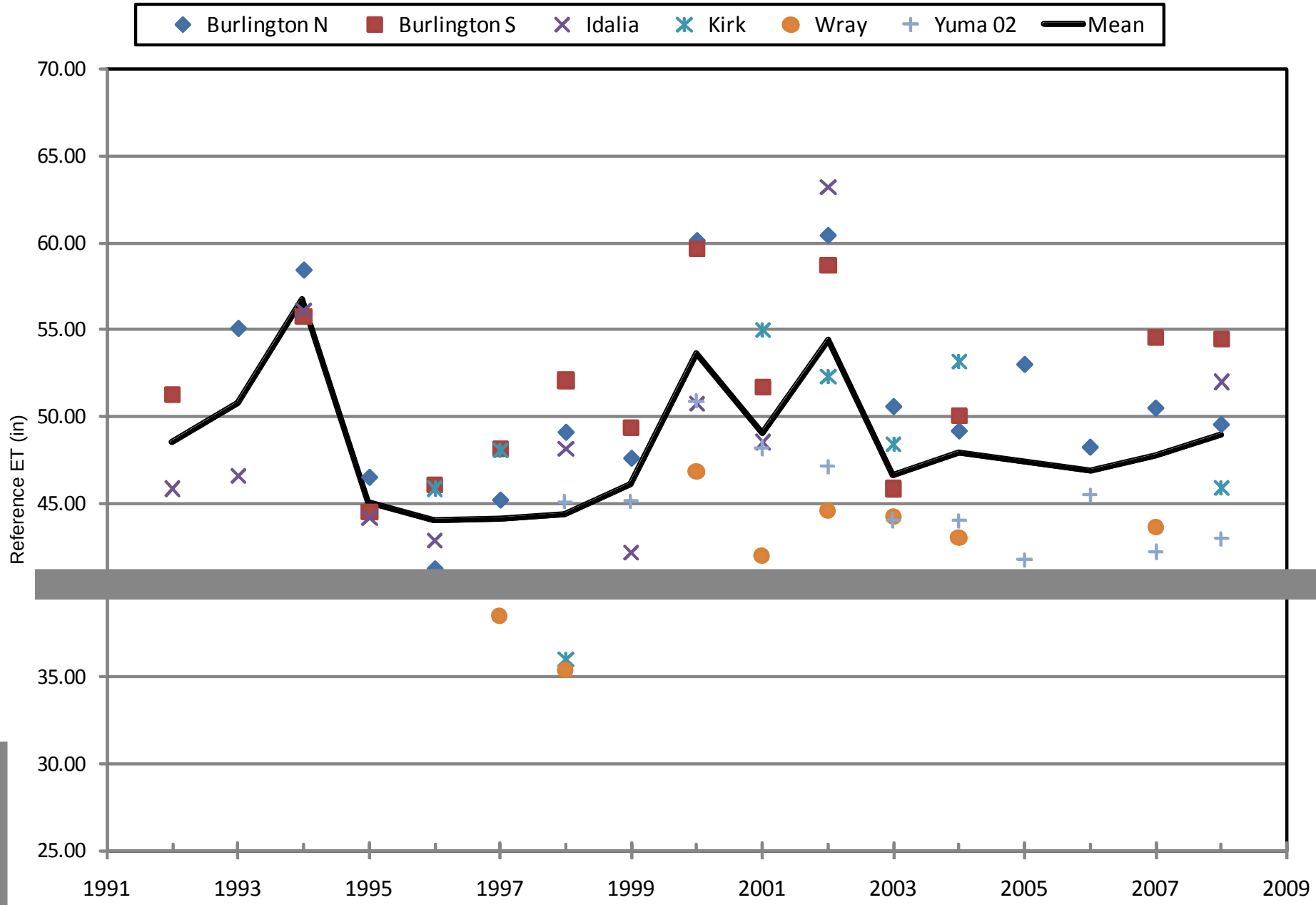


Stations designed and positioned to help estimate crop water use

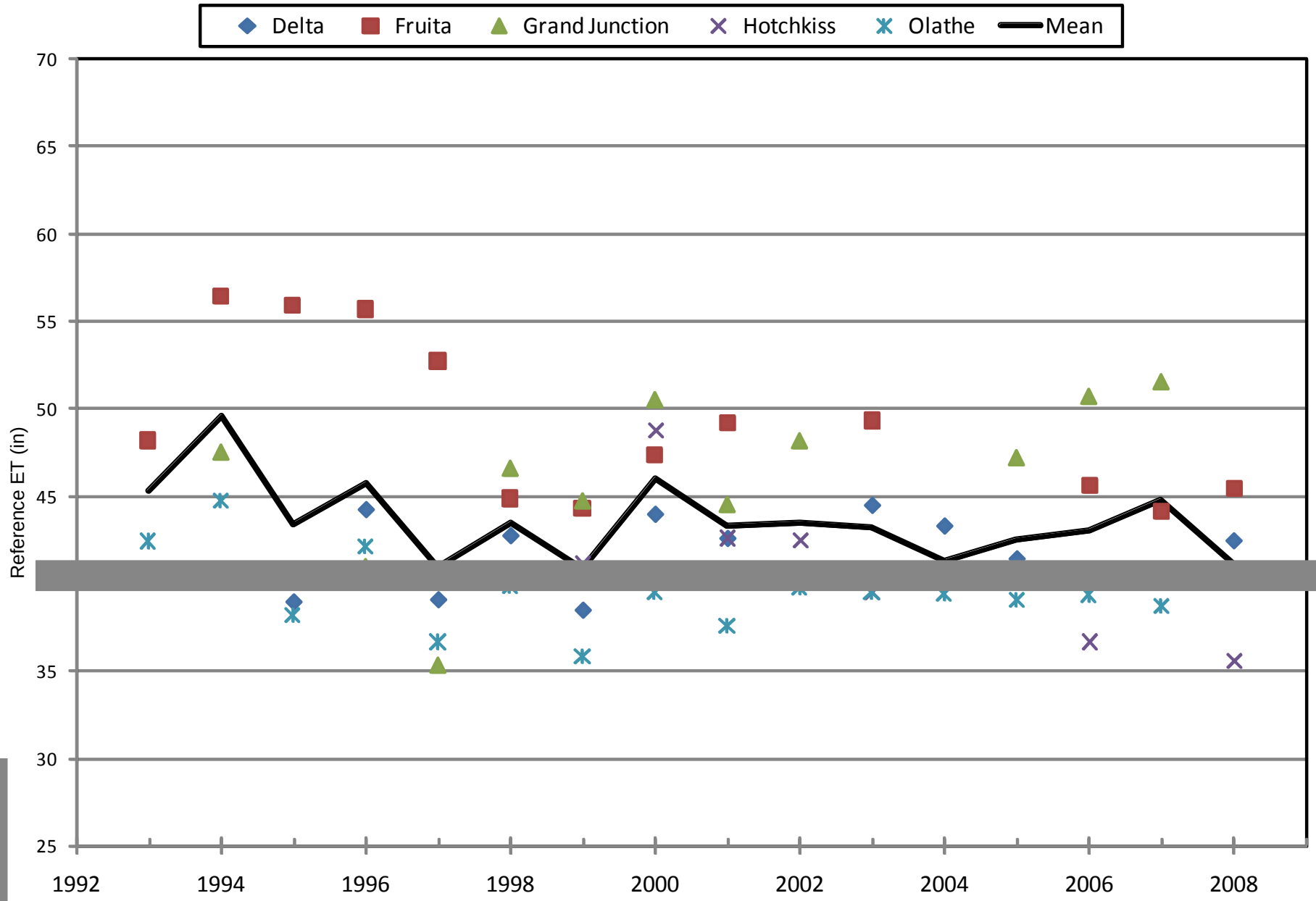
CoAgMet and *NCWCD* North Central Seasonal ET (May-Sept)



Republican River Basin Seasonal ET (May-Sept)



Western Slope Seasonal ET (May-Sept)



Recent Accomplishments

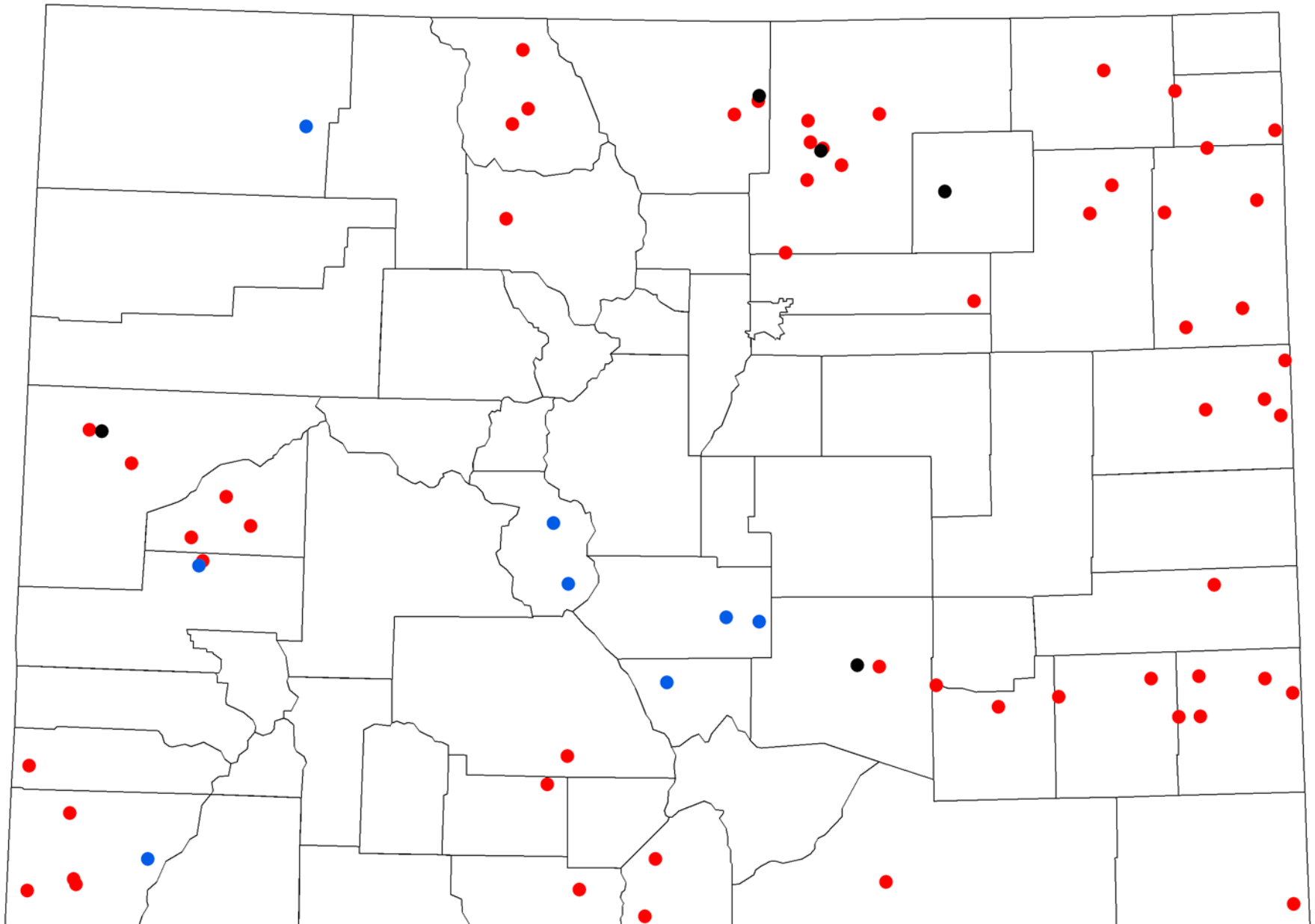
- March 2010 ET Workshop (Fort Collins) and fund raiser (nearly $20k for 2010 network operations)
- Closed several stations and considering more closings
- Secured new sponsors (S. Platte Roundtable, UAWCD, Mancos CD and others considering)

CoAgMet Network Changes 2010

Removed

New/Proposed

Current Active



Your help and potential sponsorship of the CoAgMet Network is Greatly Appreciated

CoAgMet web access:

http://ccc.atmos.colostate.edu/~coagmet/

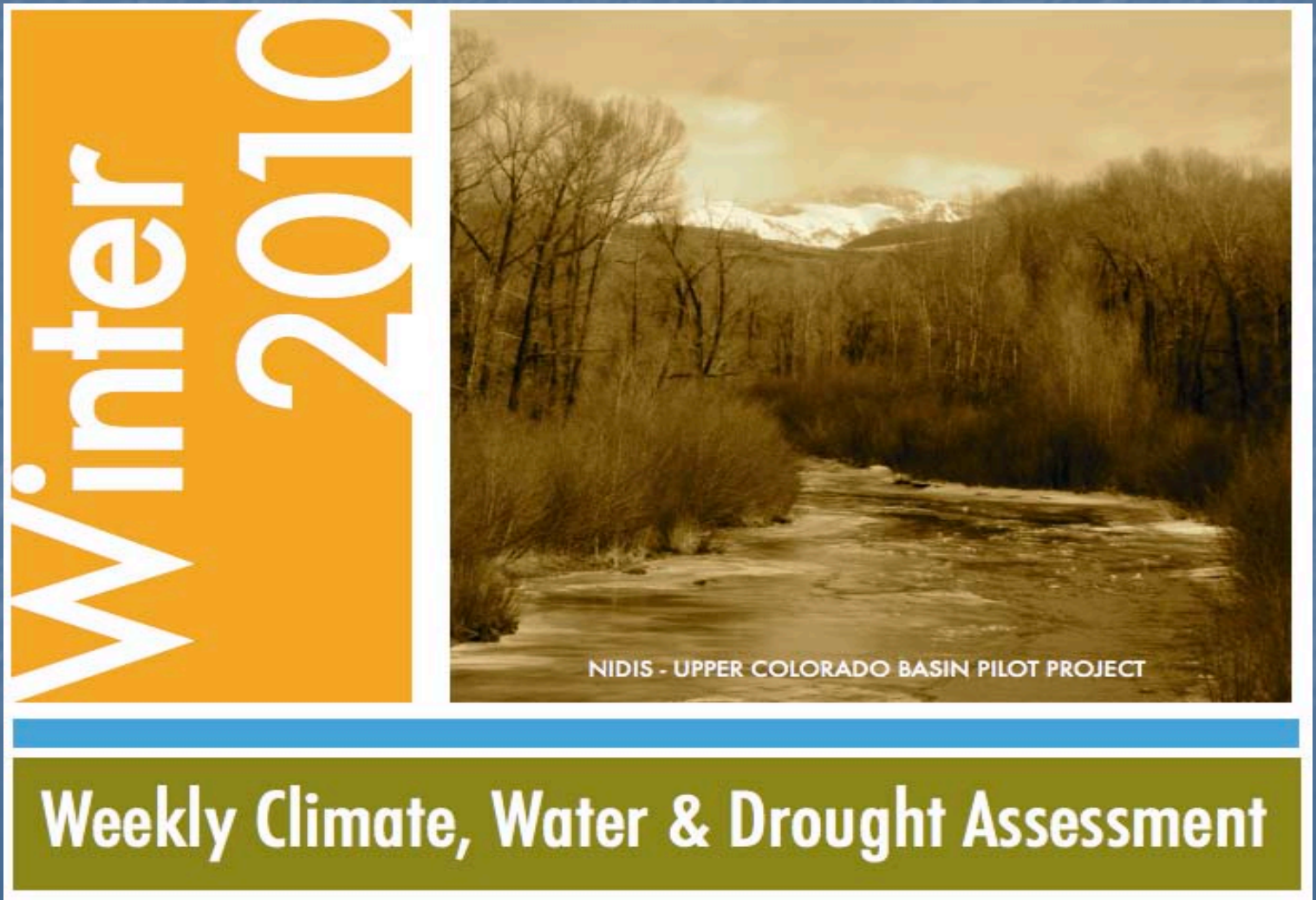
Colorado Climate Center

Colorado State University
Knowledge to Go Places

Some Other Opportunities

- National Integrated Drought Information System Upper Colorado River Basin Pilot Project (Drought Early Warning)
- CoCoRaHS (rain gauges for everyone)
- 2012 Water

Weekly “mini webinars” and e-updates assess changing precipitation and water supply conditions



Please visit our display table or give me your business card if you would like to be added to the list

or just go to

http://ccc.atmos.colostate.edu/drought_webinar.php

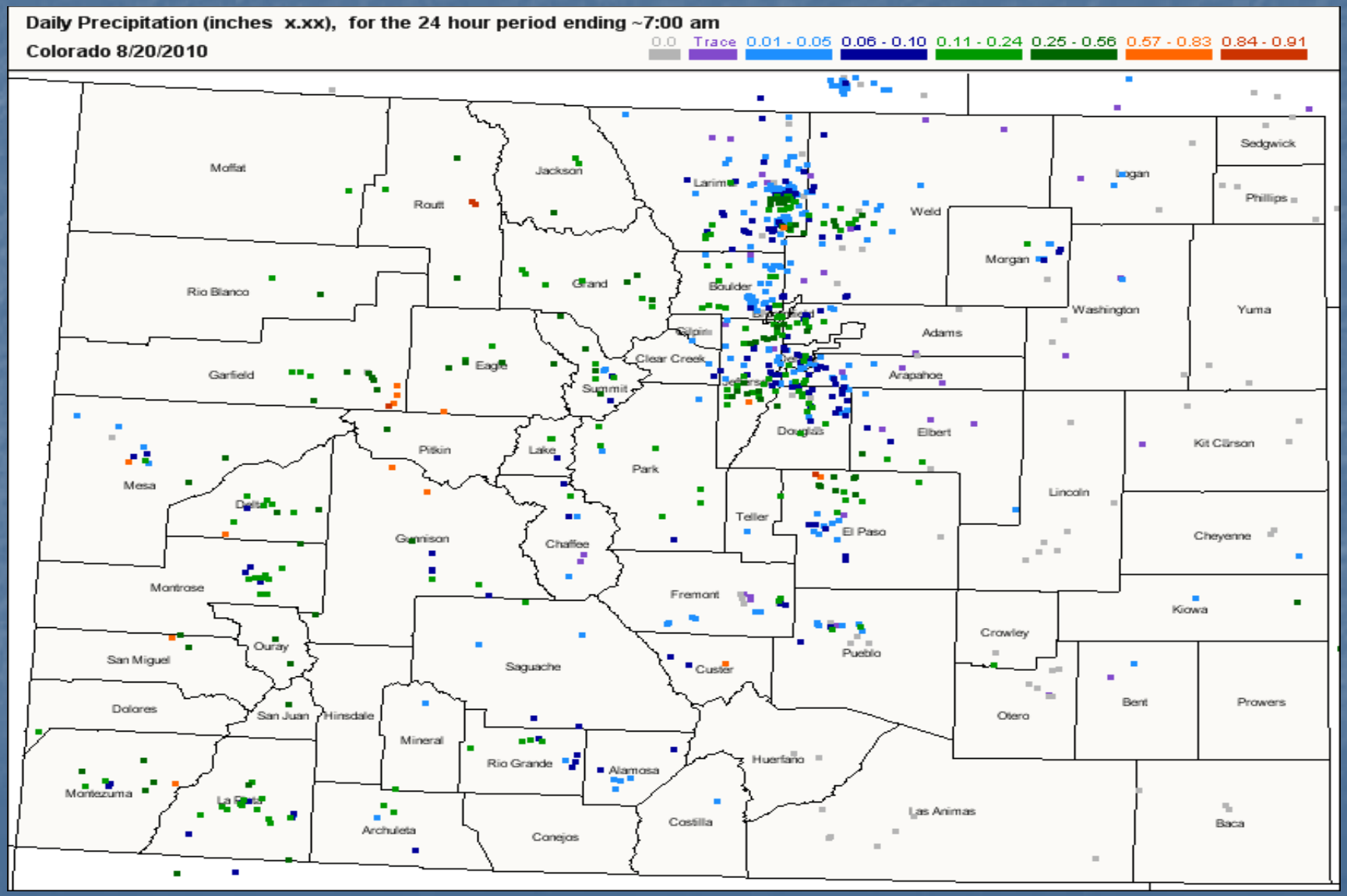
Community Collaborative Rain, Hail and Snow Network

-- when in doubt, just get out and measure --

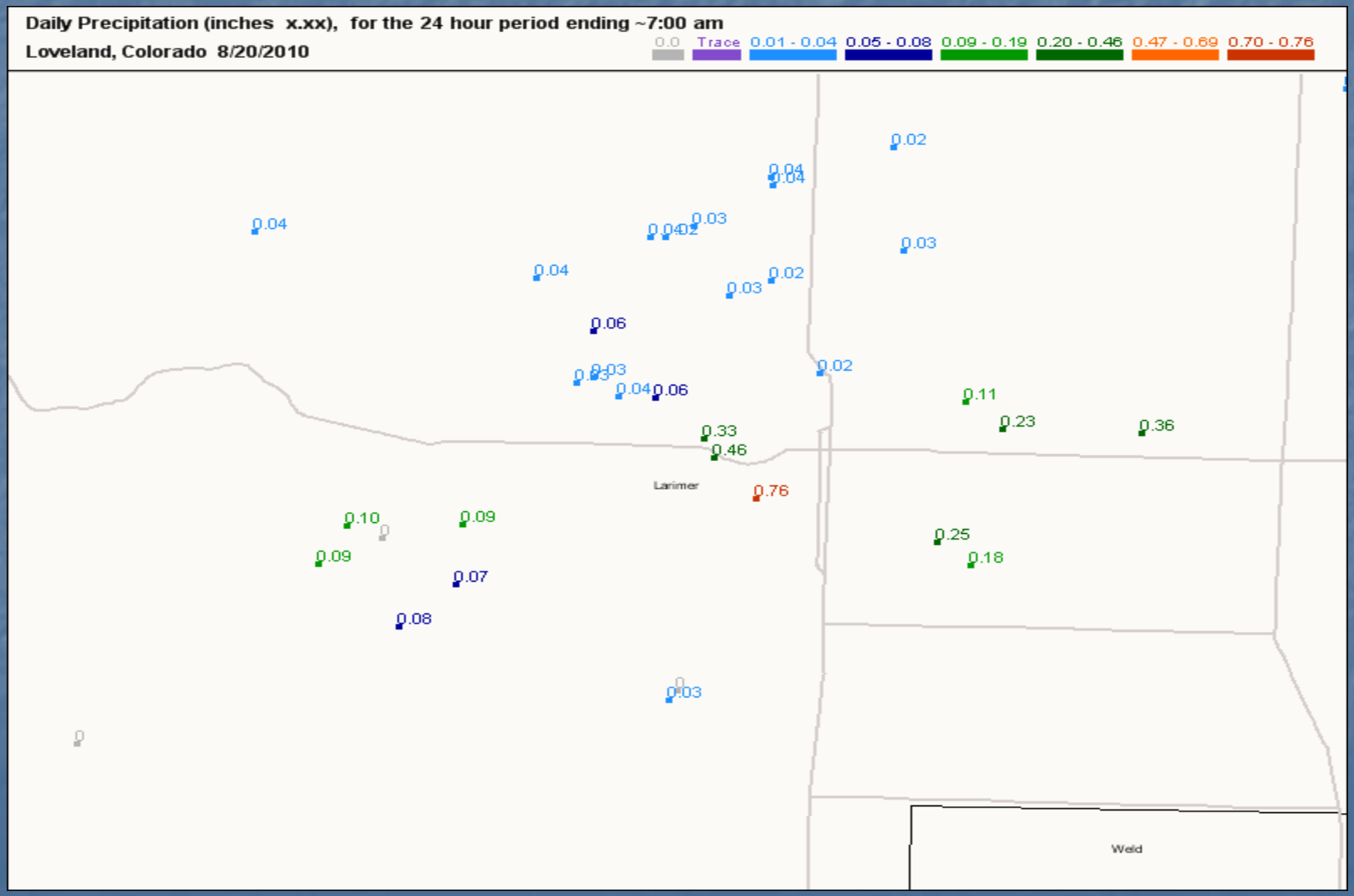
CoCoRaHS

Community Collaborative Rain, Hail & Snow Network

Our nice rain last week (Measured Friday AM 8/20/2010)



And don’t think we don’t need you just because we already have 800



For information and to volunteer, visit the CoCoRaHS Web Site

http://www.cocorahs.org

Support for this project provided by
NSF Informal Science Education Program,
NOAA Environmental Literacy Program
and
many local charter sponsors.

And Finally -- -- Coming Sooner than you think

2012 Water

- Our contribution to this collaborative effort -- -- a rain gauge at every school in Colorado helping our teachers and youth better appreciate where our water comes from
- And how about 2012 new backyard rain gauges in Colorado -- the best watched weather in the world

I'll need your help for this in whatever part of the state you serve -- so let me know

Colorado: It’s a great place
keesop your eyes open!
Photo by Lynn Kral, Loveland, January 2006

Colorado Climate Center

Data and Power Point Presentations available for downloading

http://ccc.atmos.colostate.edu

http://www.stateclimate.org

Colorado State University

Knowledge to Go Places

Colorado Climate Center