

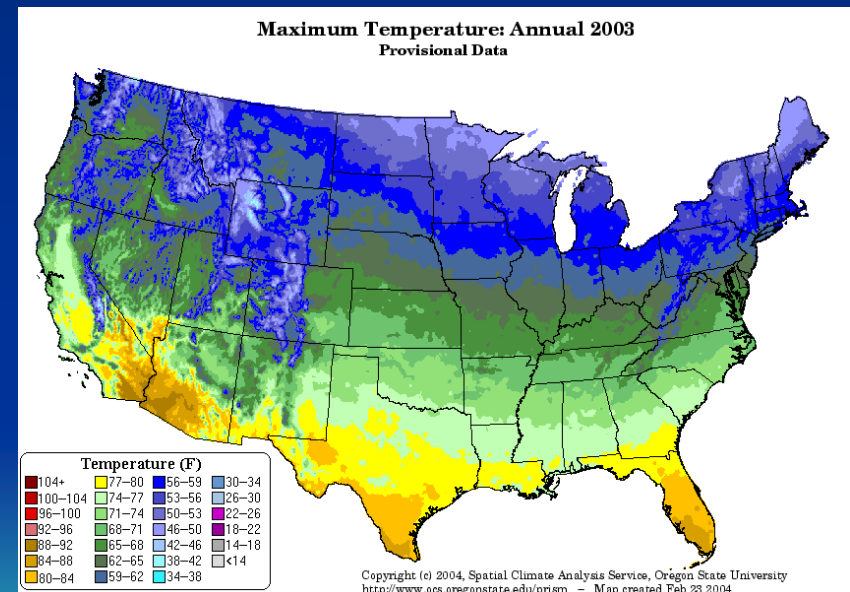
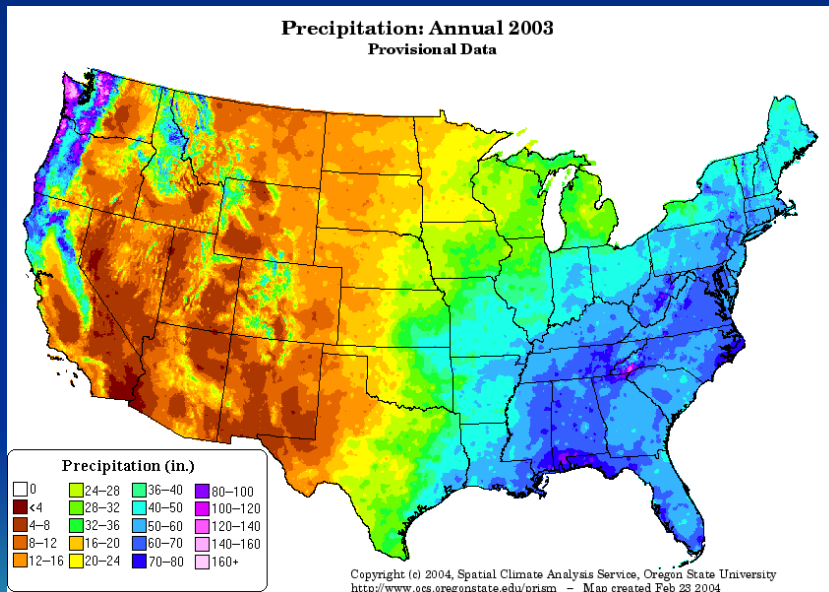
Climate Trends In the Mountains of Colorado

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Colorado Climate Center
Colorado State University
<http://ccc.atmos.colostate.edu>

A landscape photograph showing a paved road in the foreground leading towards a town nestled in a valley. The town is surrounded by green hills and dense evergreen forests. A vibrant rainbow arches across the sky above the town, set against a backdrop of soft, grey clouds. The overall scene captures a serene and scenic view of a Colorado town.

Key Features of Colorado Climate

Some will apply to other states

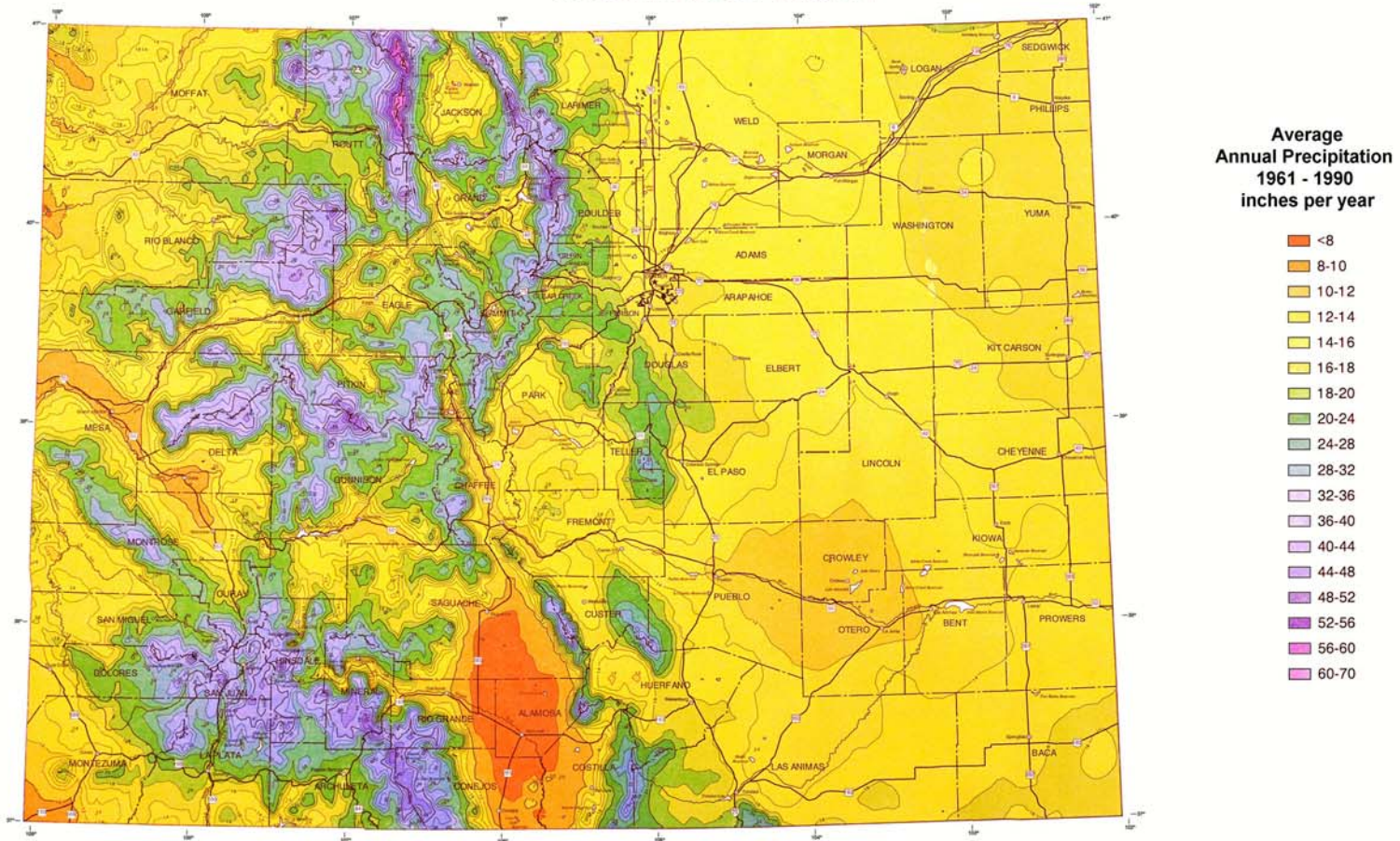


Spatial patterns of precipitation

U.S. DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

COLORADO ANNUAL PRECIPITATION



Made in cooperation with Oregon State University

Data Sources: NOAA Cooperative Station Network (1961-1990 climate observations, NCEP (NCEP/NCAR) Station normals and experimental data accessed by regional and state climatologists and designated observers
 Digital Elevation Model: The PRISM DEM is derived from a 15 arc second Contour Mapping Agency (CMA) Digital Terrain Elevation Dataset (DTED) obtained from the NCEP Data Center

Estimation Technique: Gridded estimates were derived from station point values using the PRISM model developed at Oregon State University
 The resulting grid was approximately 400 m (about 0.25 miles) and was resampled to 300 m using a Gaussian filter
 Climate Dataset: April 1998 Albers Equal Area Projection, 96°W to 107°W, 34°N to 42°N

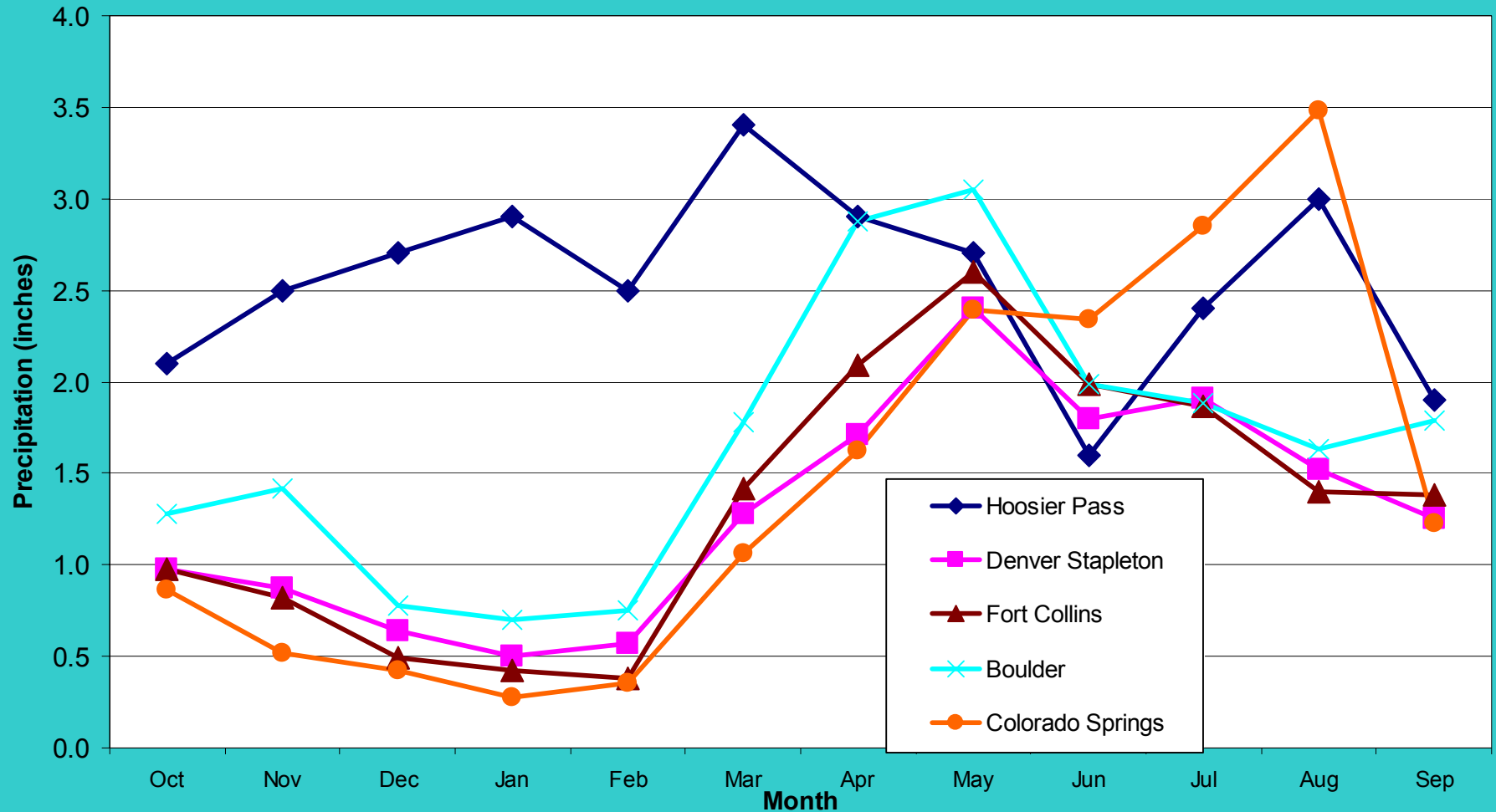


SCALE 1:1,185,000

SOURCE NOTE
 Users are cautioned that contour maps do not exactly match station observed precipitation
 necessarily in regions with significant precipitation gradients and/or areas topography
 April 1998, 10/20/98

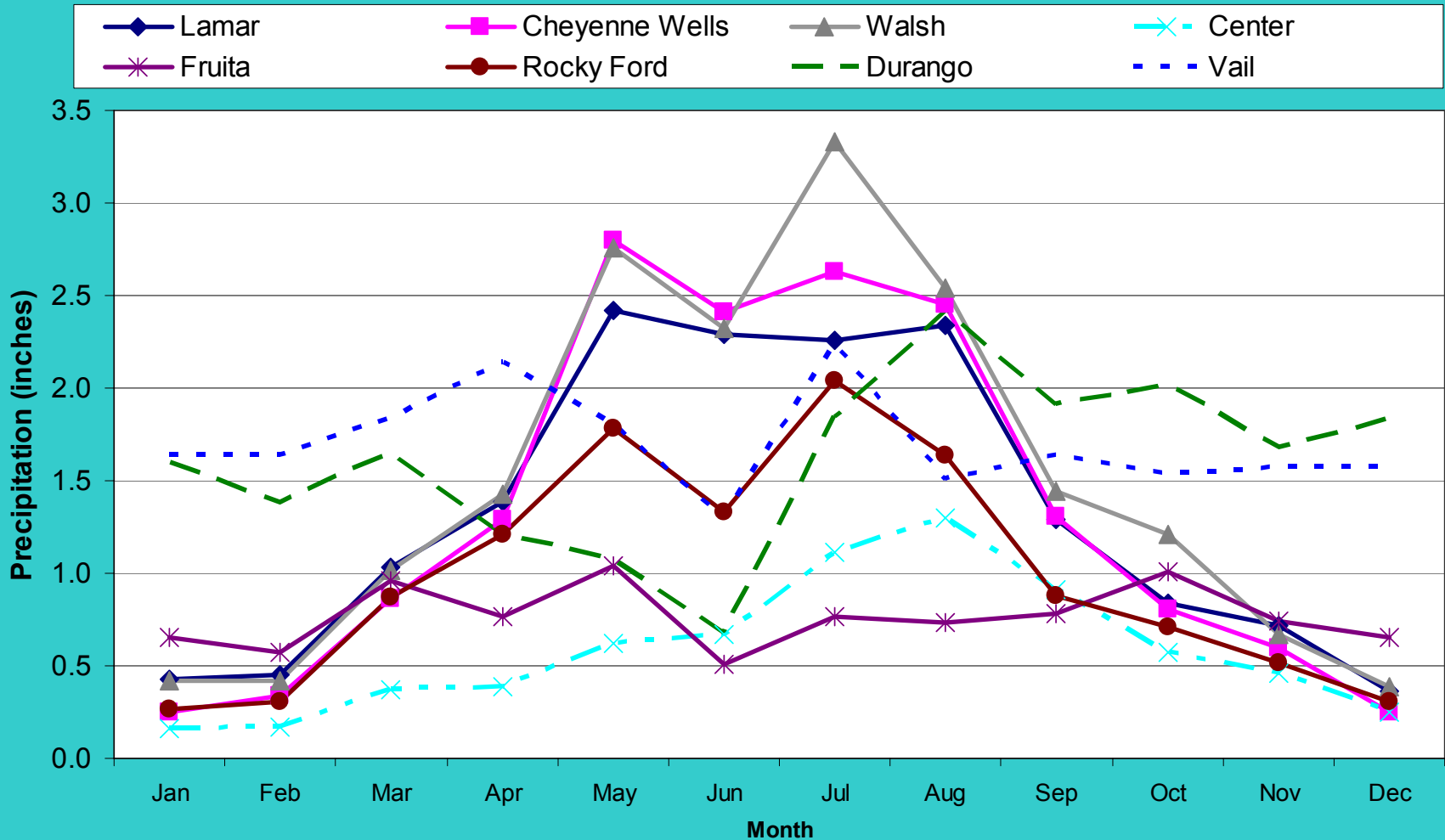
USGS/ARCS National Cartography & Geographic Center, Fort Worth, TX, 1998

Front Range Monthly Average Precipitation

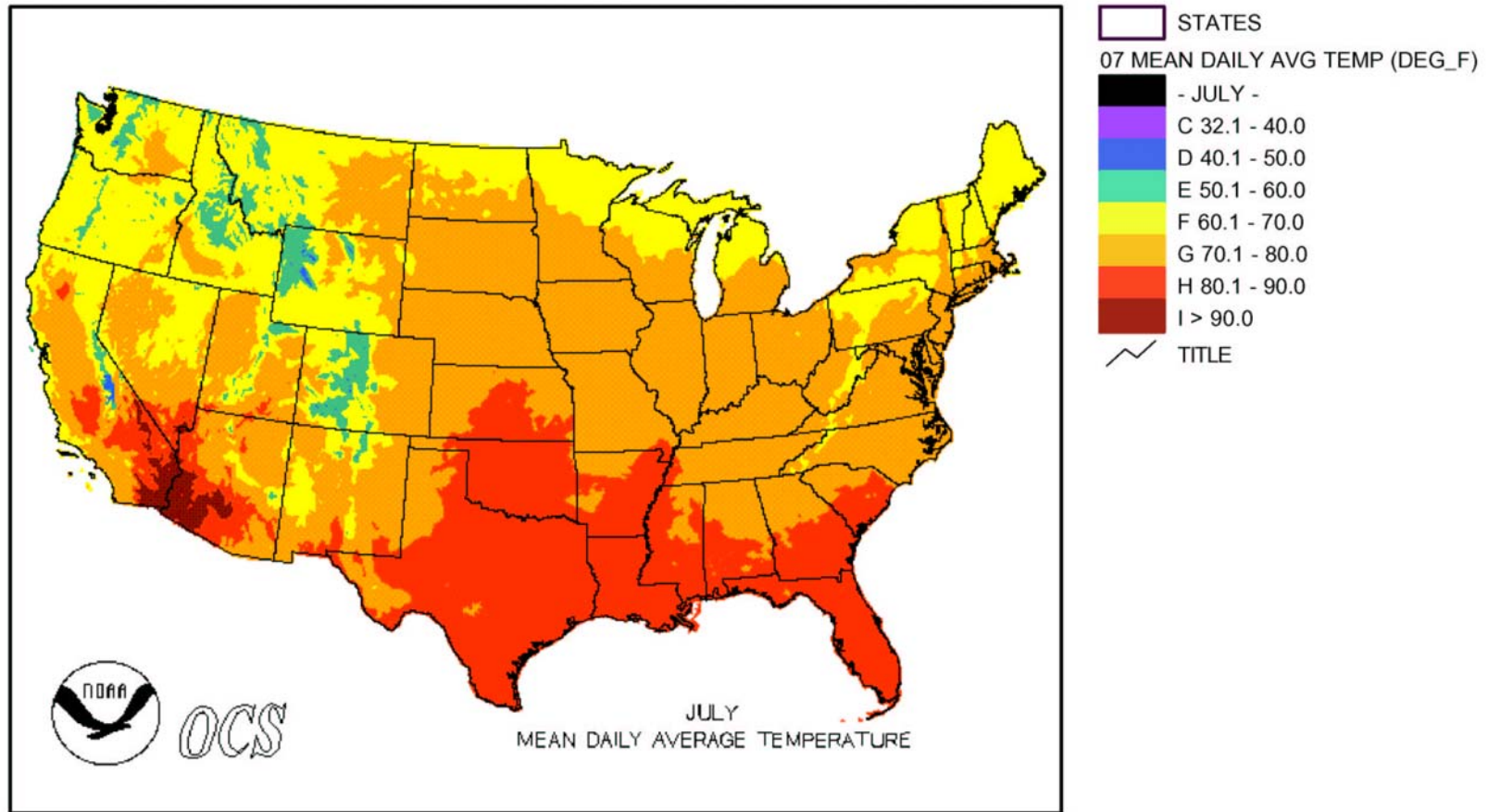


Seasonality of Precipitation

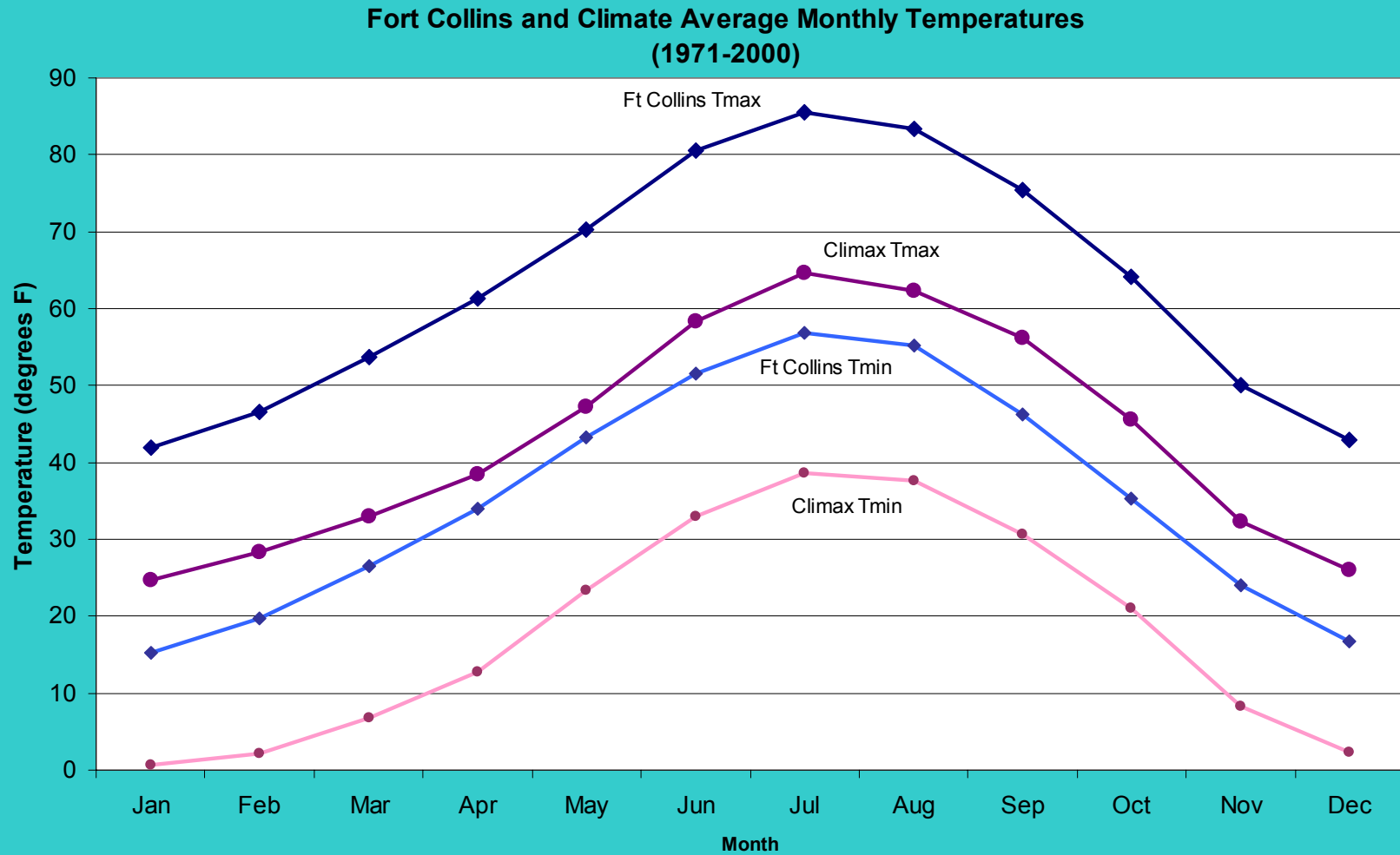
Monthly Average Precipitation



Spatial patterns of temperature

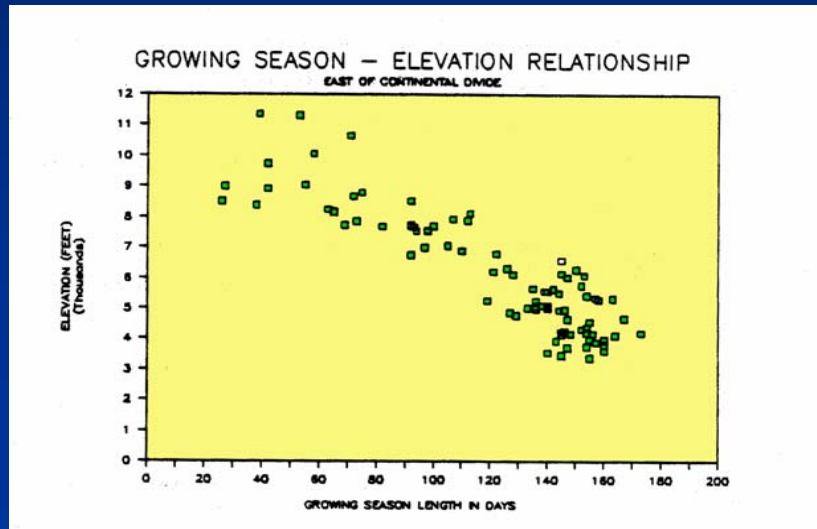


Seasonality of Temperature

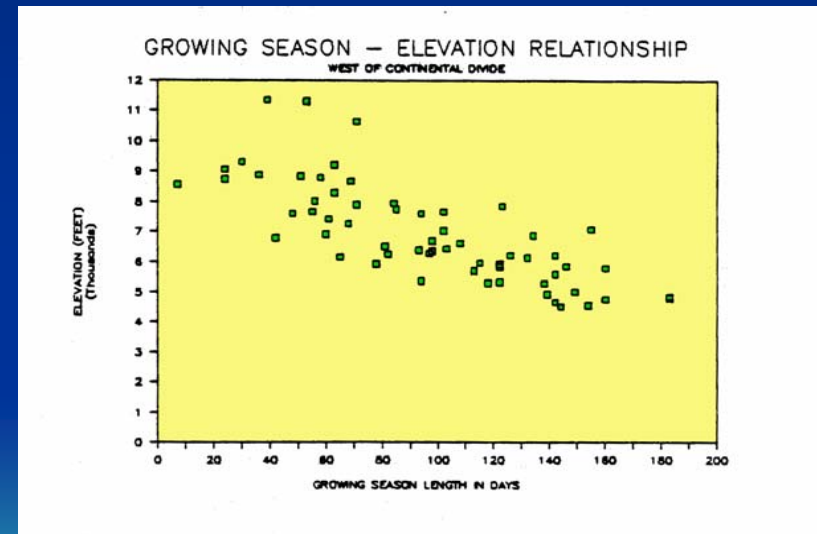


Growing Season and Growing Degree Days

- Important for vegetation applications



East of Continental Divide



West of Continental Divide

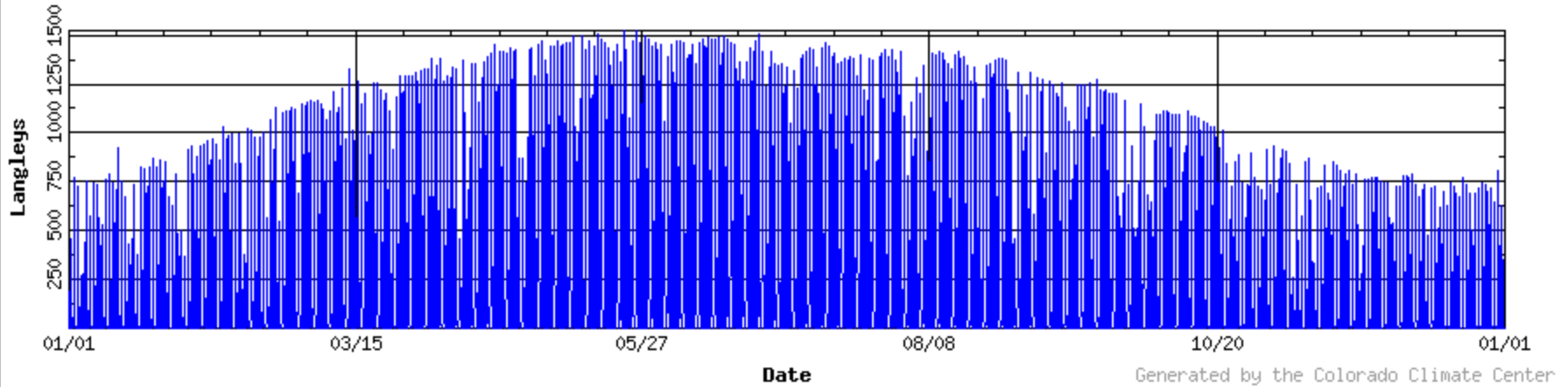
Other Key Elements



Solar radiation

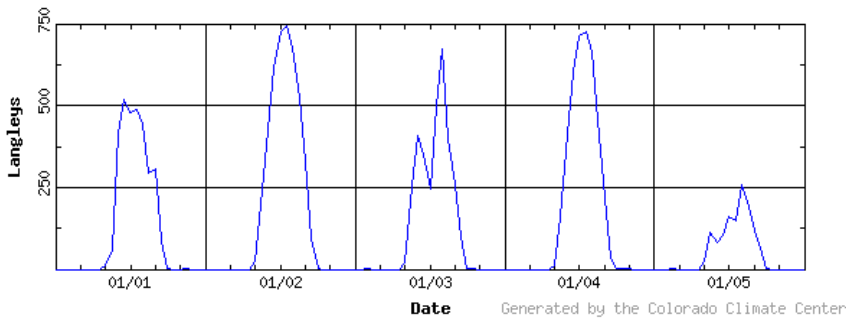
Olathe - 365 days

Solar Radiation for OTH01 (01-01-2002 - 01-01-2003)



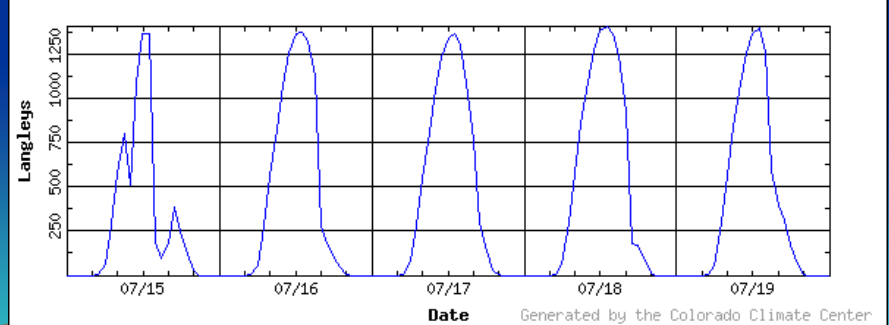
Winter Period

Solar Radiation for OTH01 (01-01-2003 - 01-06-2003)



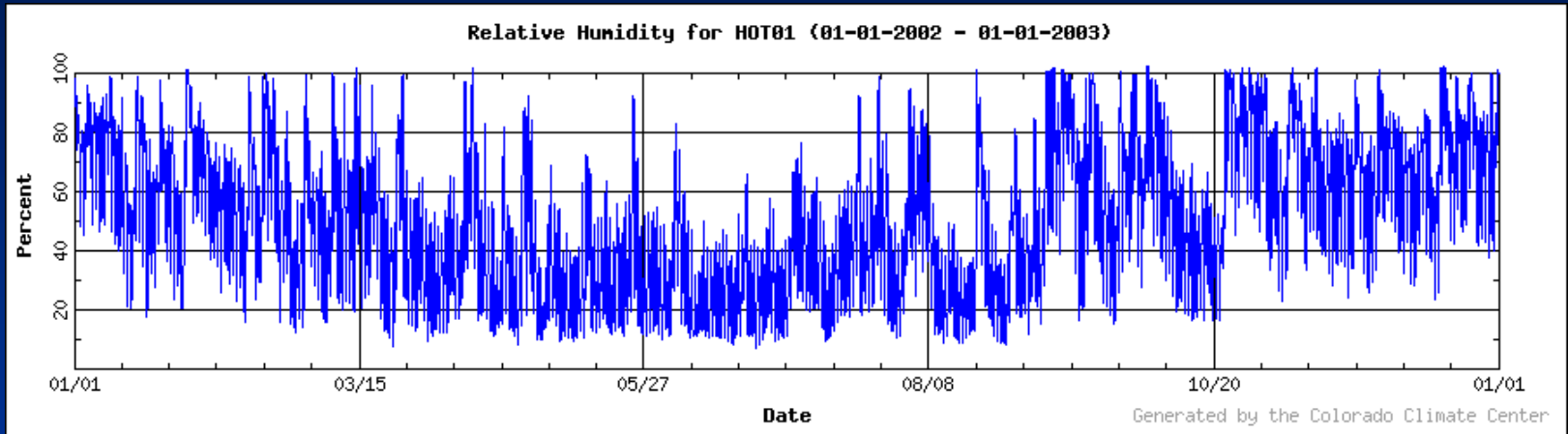
Summer Period

Solar Radiation for OTH01 (07-15-2003 - 07-20-2003)

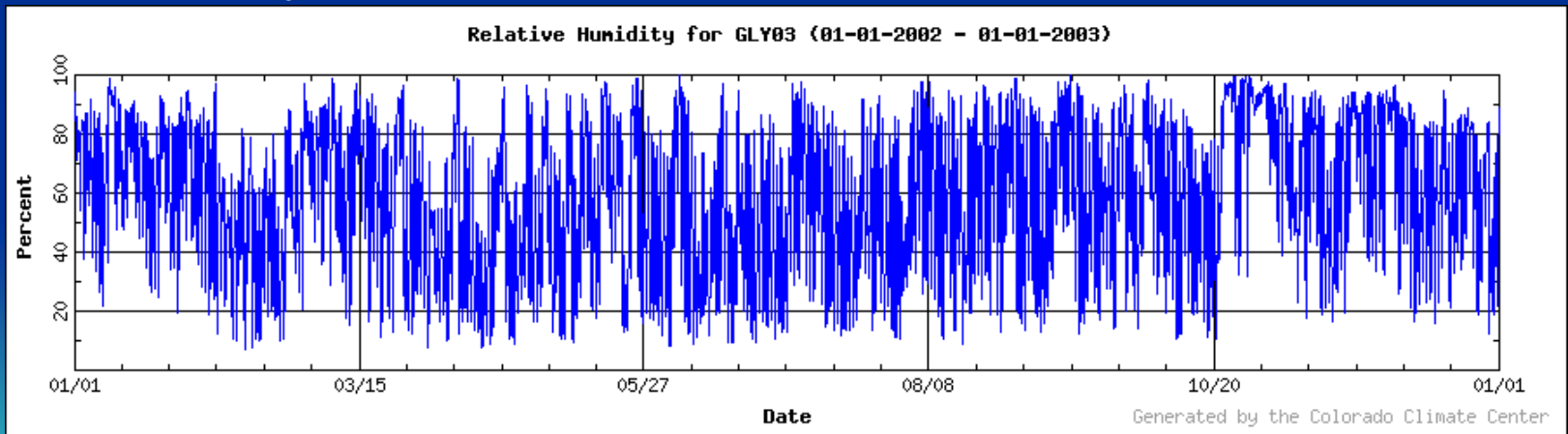


Humidity

Hotchkiss

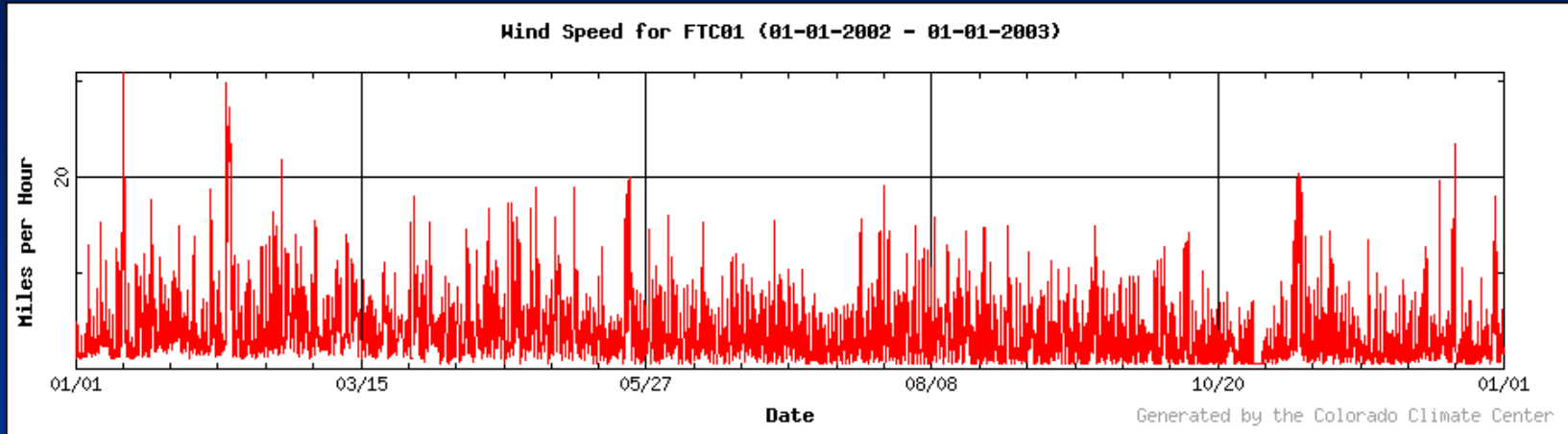


Greeley

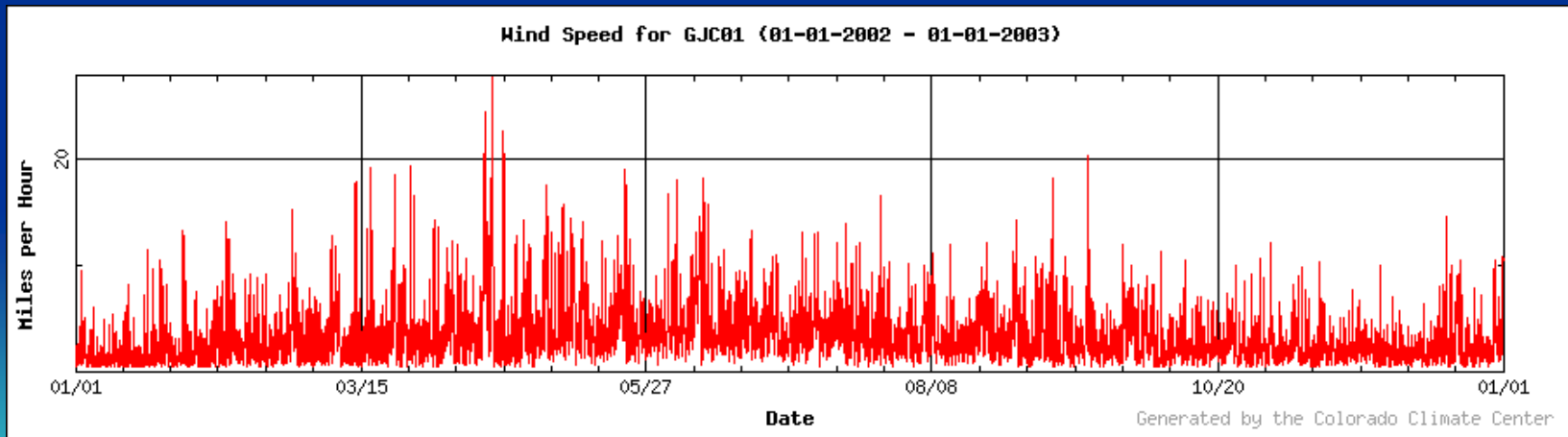


Wind

Fort Collins



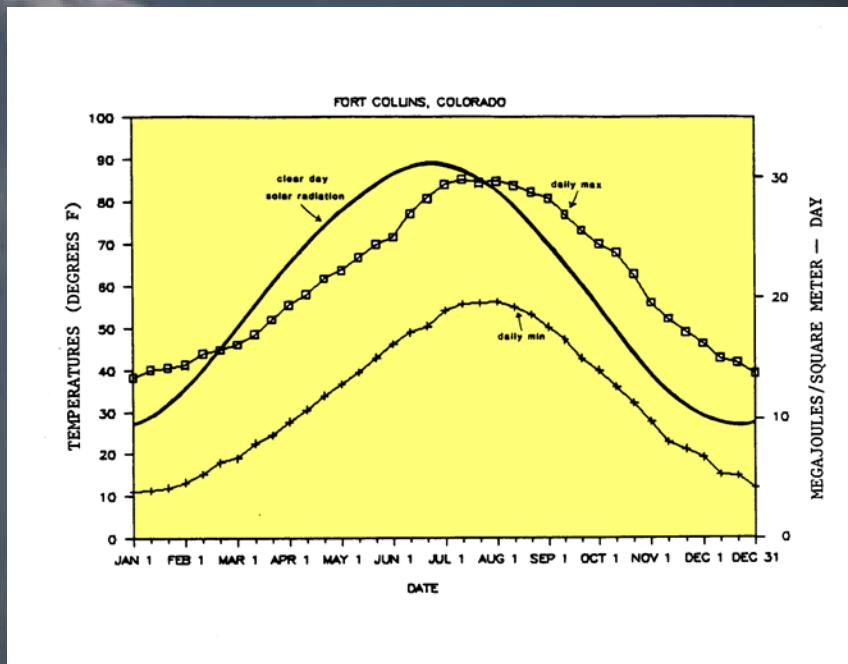
Grand Junction



Variability of Climate



Solar – Very Stable



Wind

- Variable on a daily basis, but quite stable when averaged
- Mountain induced wind patterns

Downslope
Wind Flow

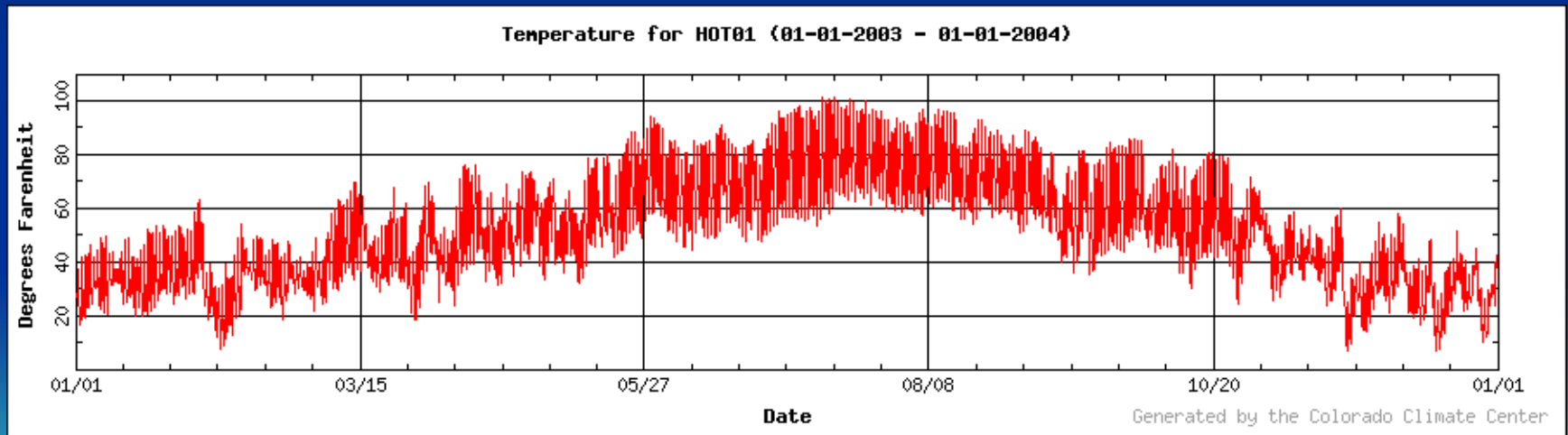
Upslope
Wind Flow



Temperature

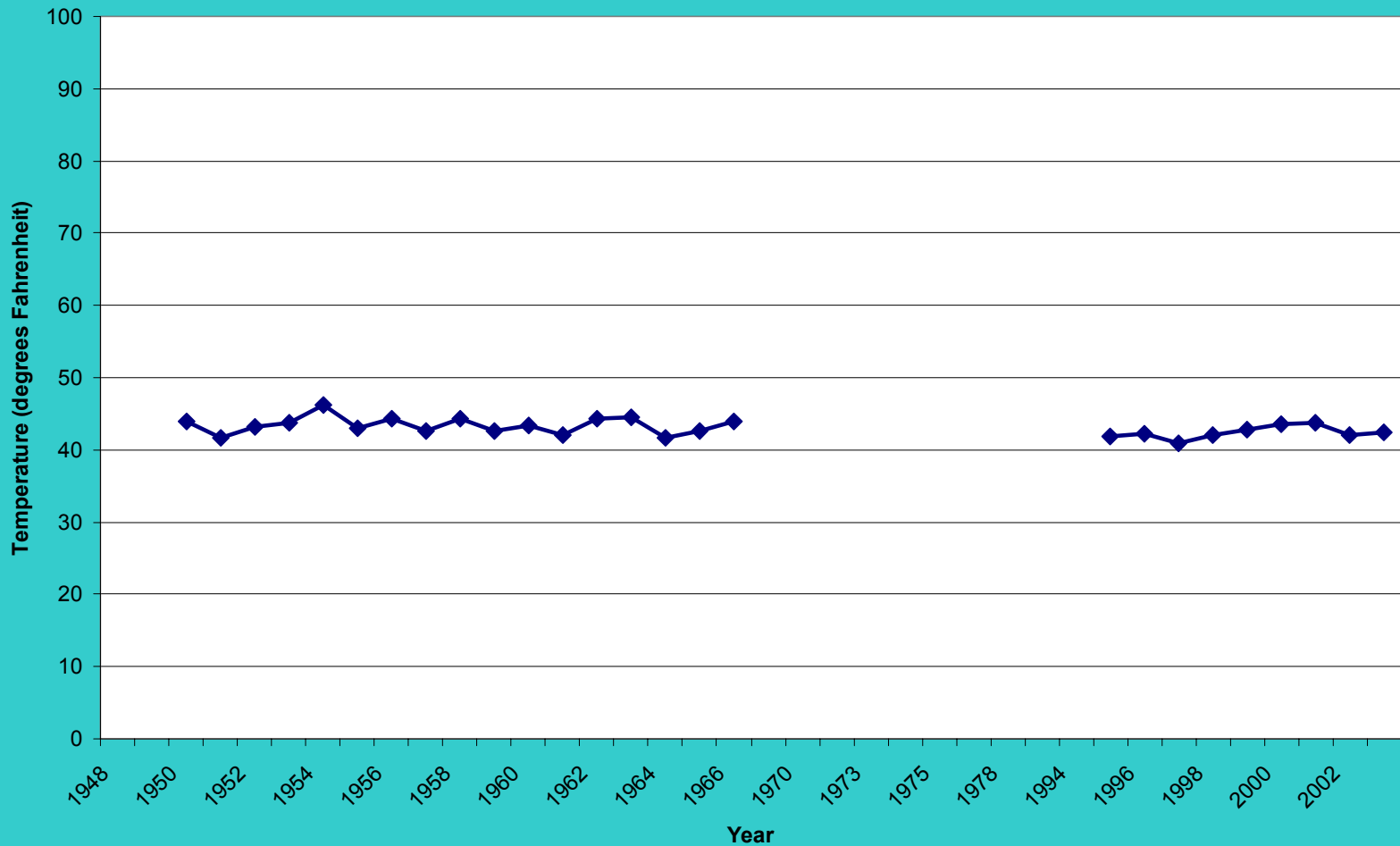
- Also highly variable on a daily basis but surprisingly stable when averaged.

2003 Daily Maximum and Minimum Temperature for Hotchkiss

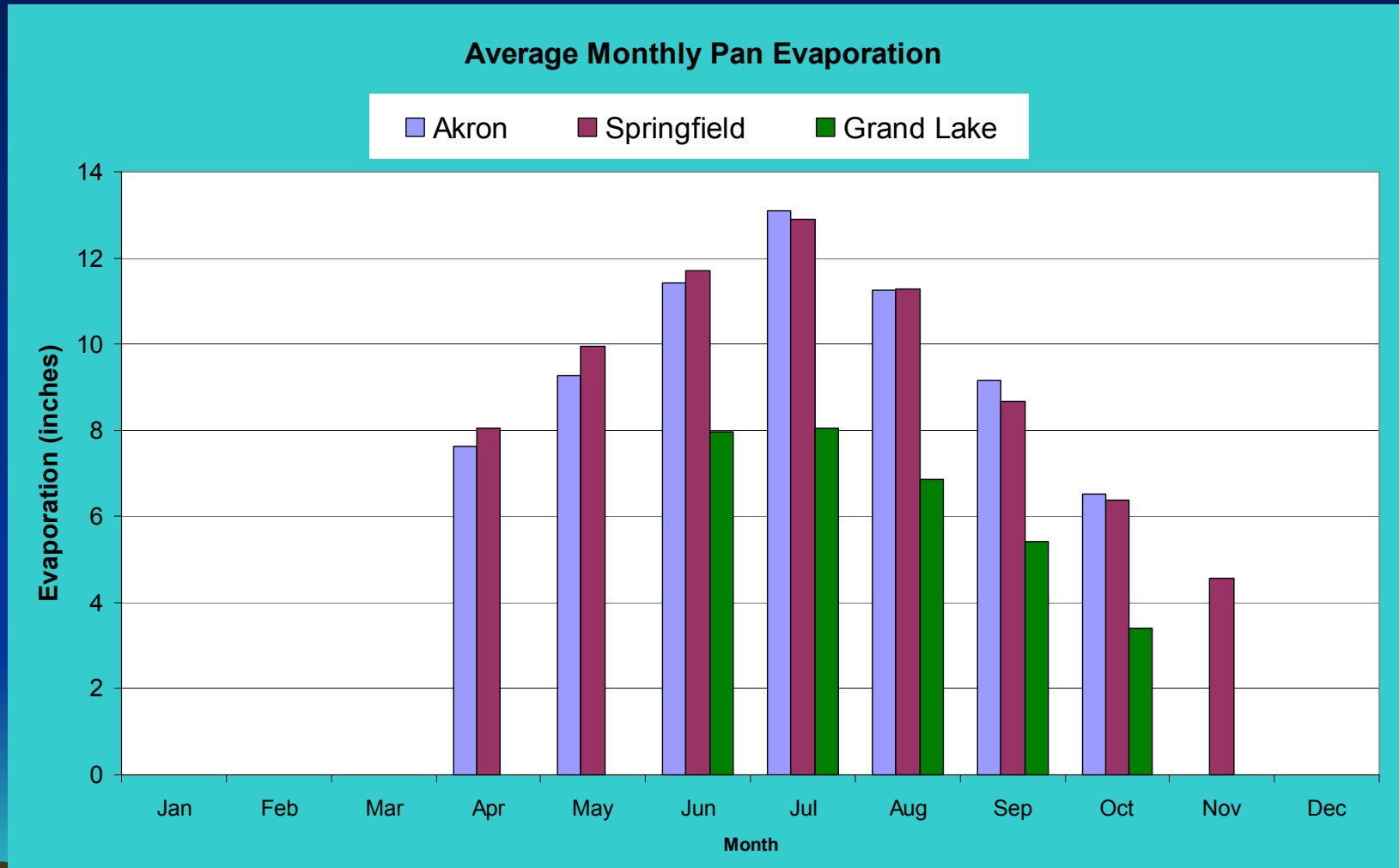


Mean Annual Temperatures

Georgetown Annual Mean Temperatures



Monthly Average Pan Evaporation



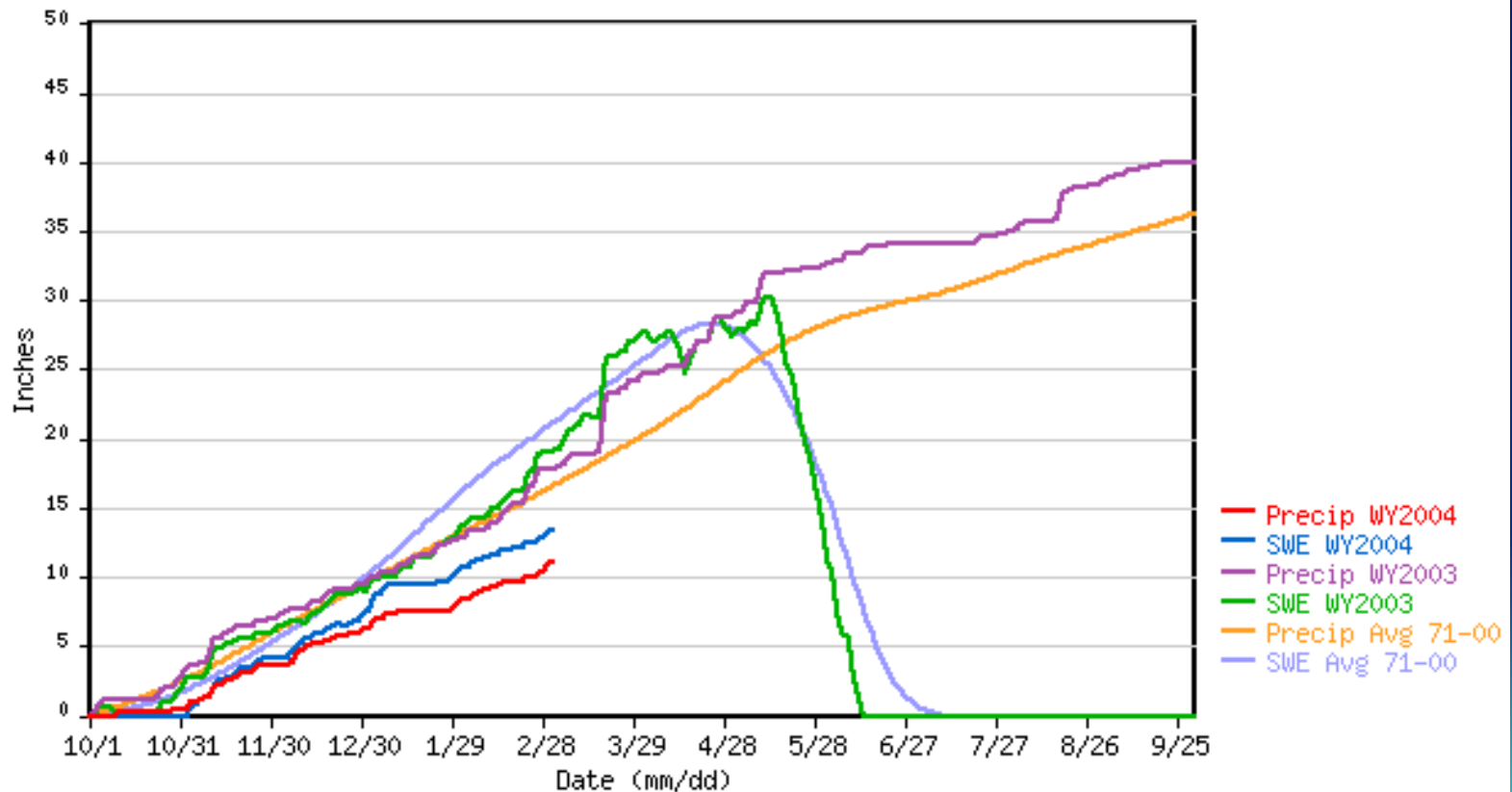
And, then the Daddy of them all – PRECIPITATION!



SNOTEL Accumulated Precipitation

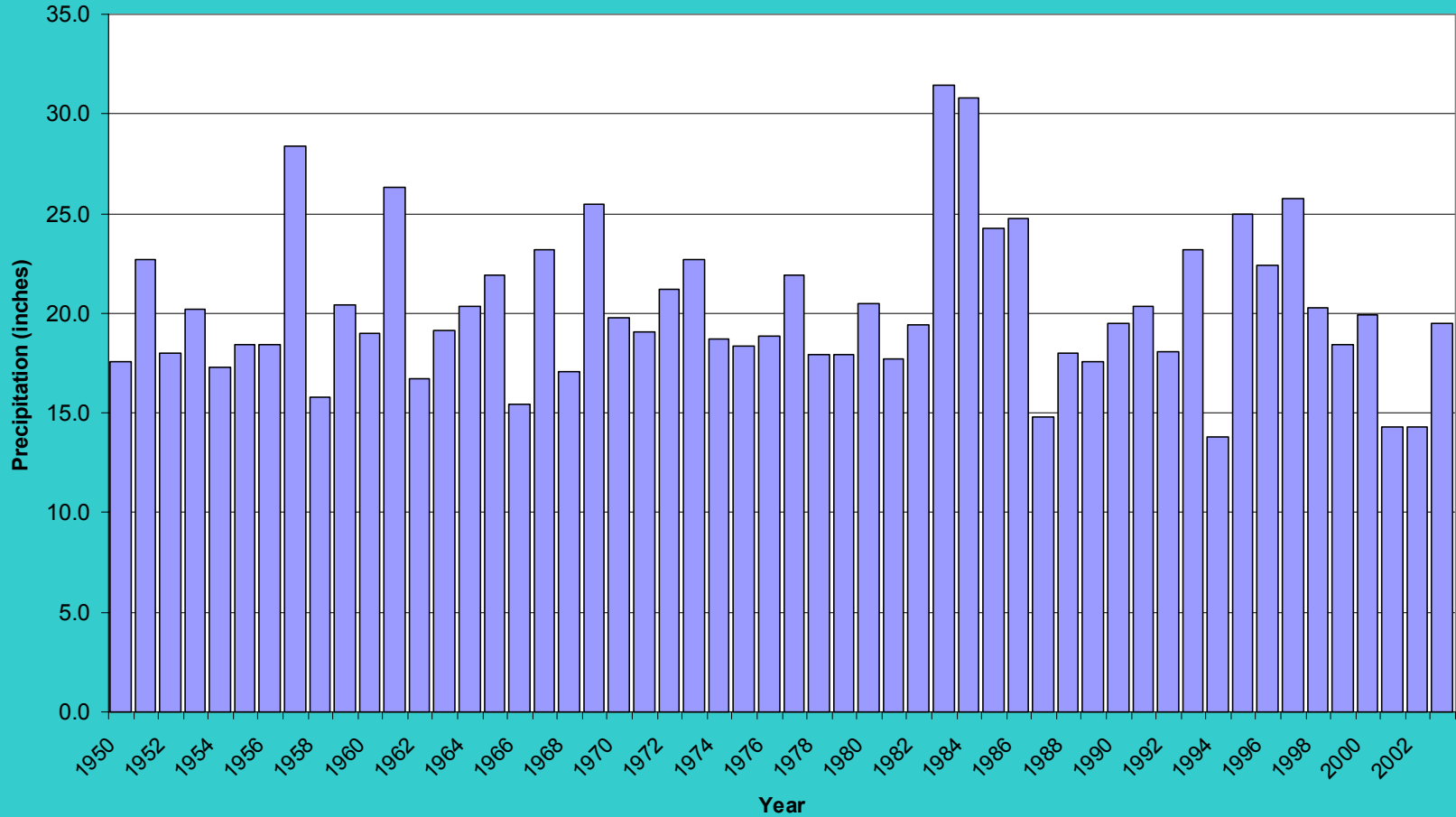
05J10S -LAKE IRENE SNOTEL as of 03/02/2004

*** Provisional Data, Subject to Change ***



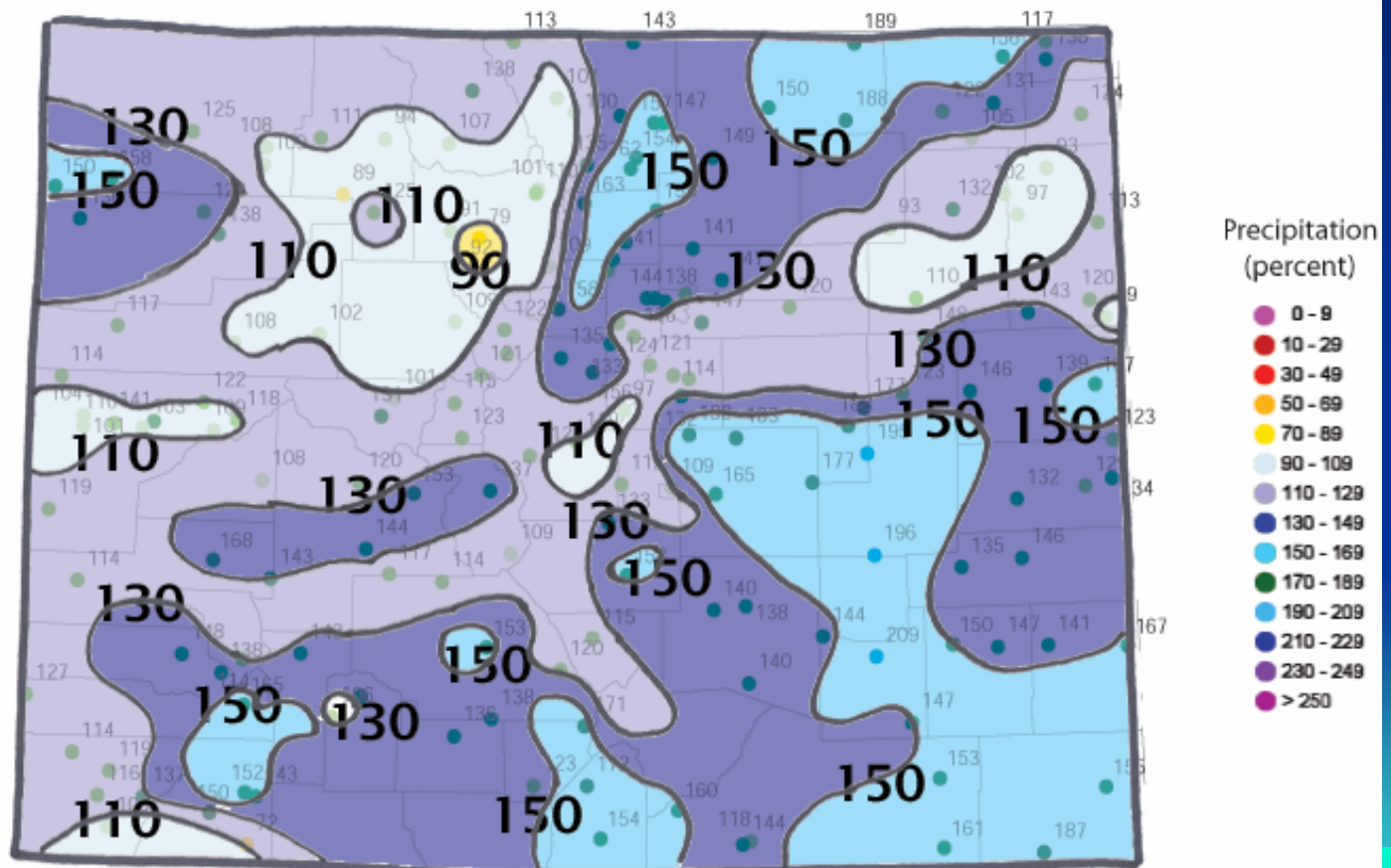
Annual Precipitation

Grand Lake 1NW Annual Precipitation
(1950-2003)



1999 Water Year Precipitation

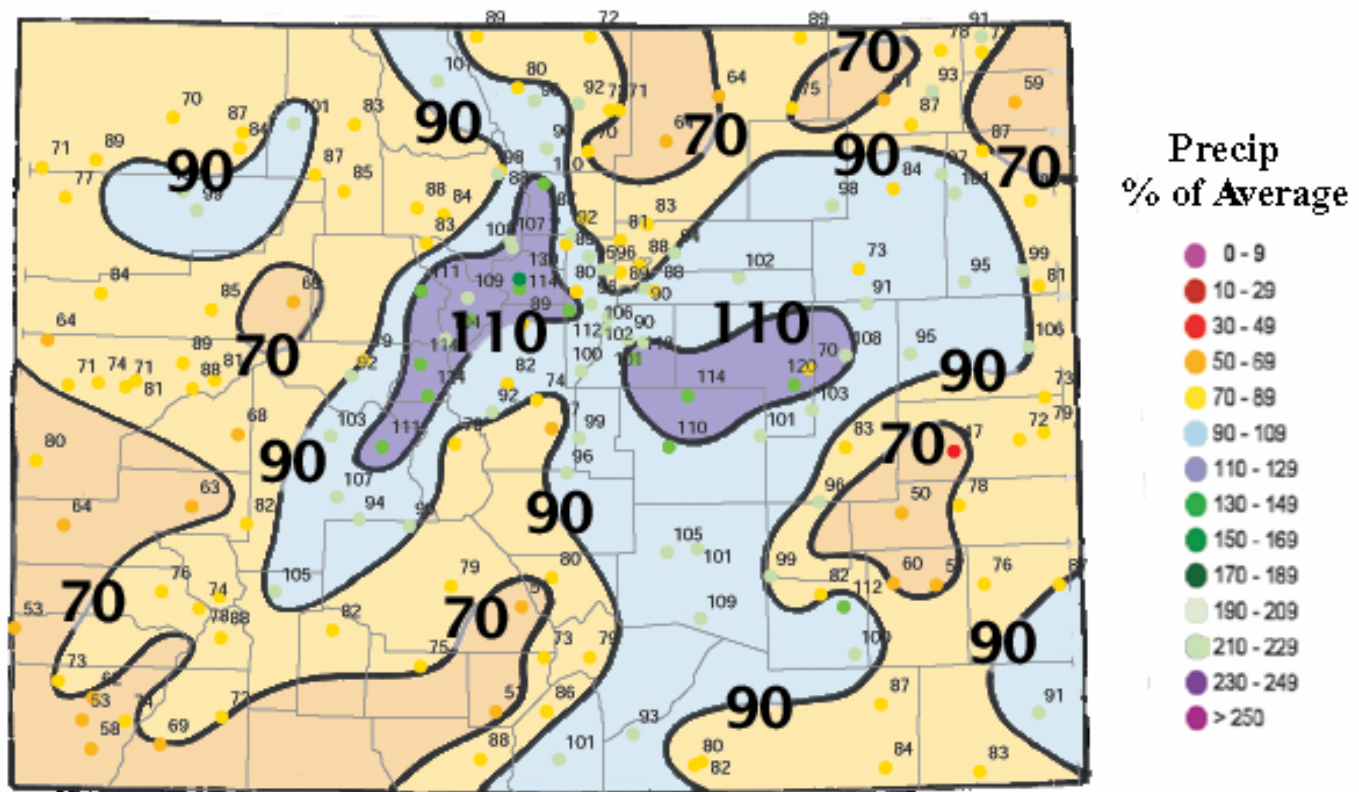
Water Year 1999
(Oct. 1998-Sept. 1999)
Precipitation Percent of Average for 1961-1990 Averages



2000 Water Year Precipitation

Water Year 2000
(Oct. 1999 - Sept. 2000)

Precipitation Percent of Average for 1961-1990 Averages

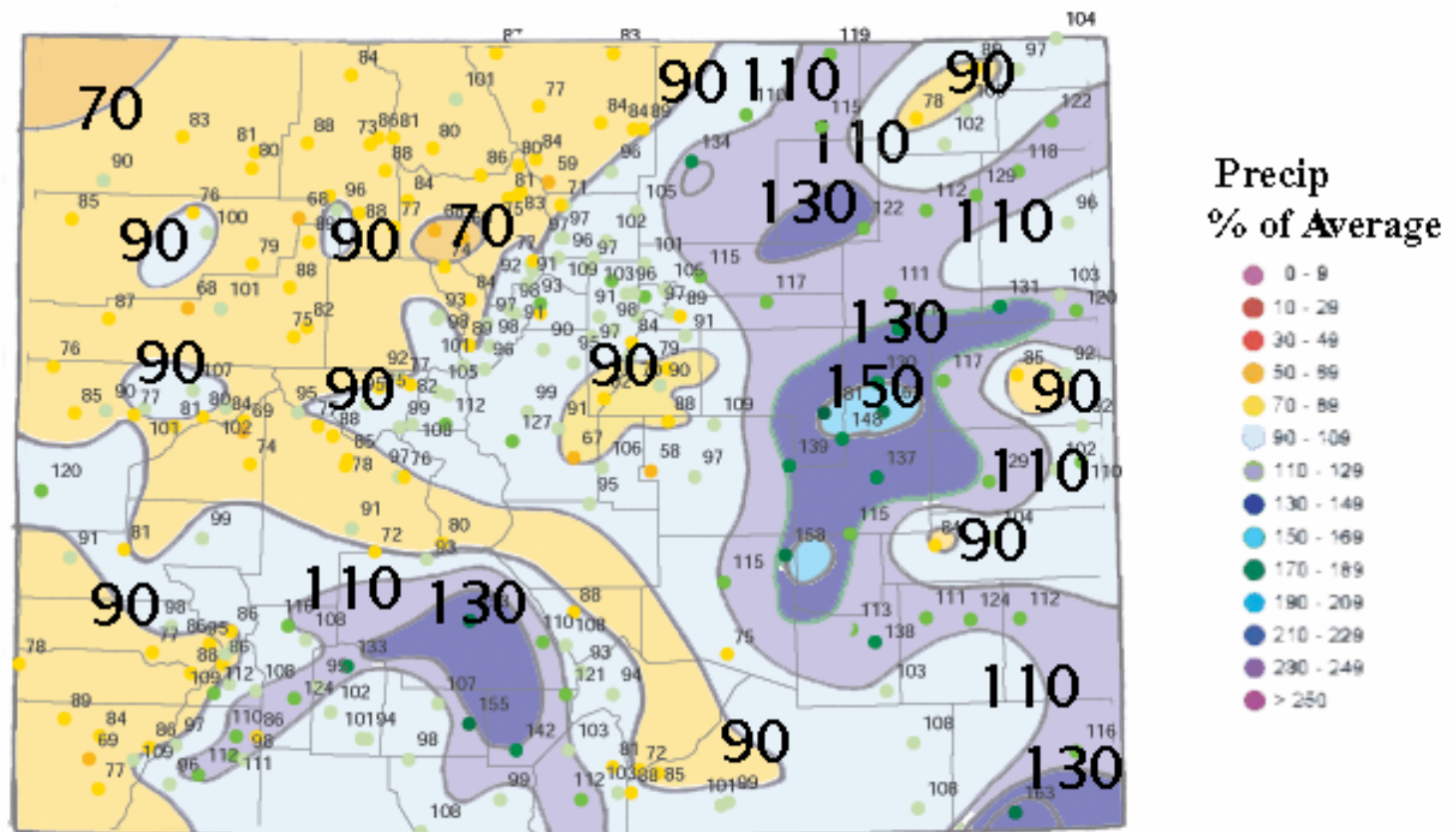


2001 Water Year Precipitation

Water Year 2001

(Oct. 2000 - Sept. 2001)

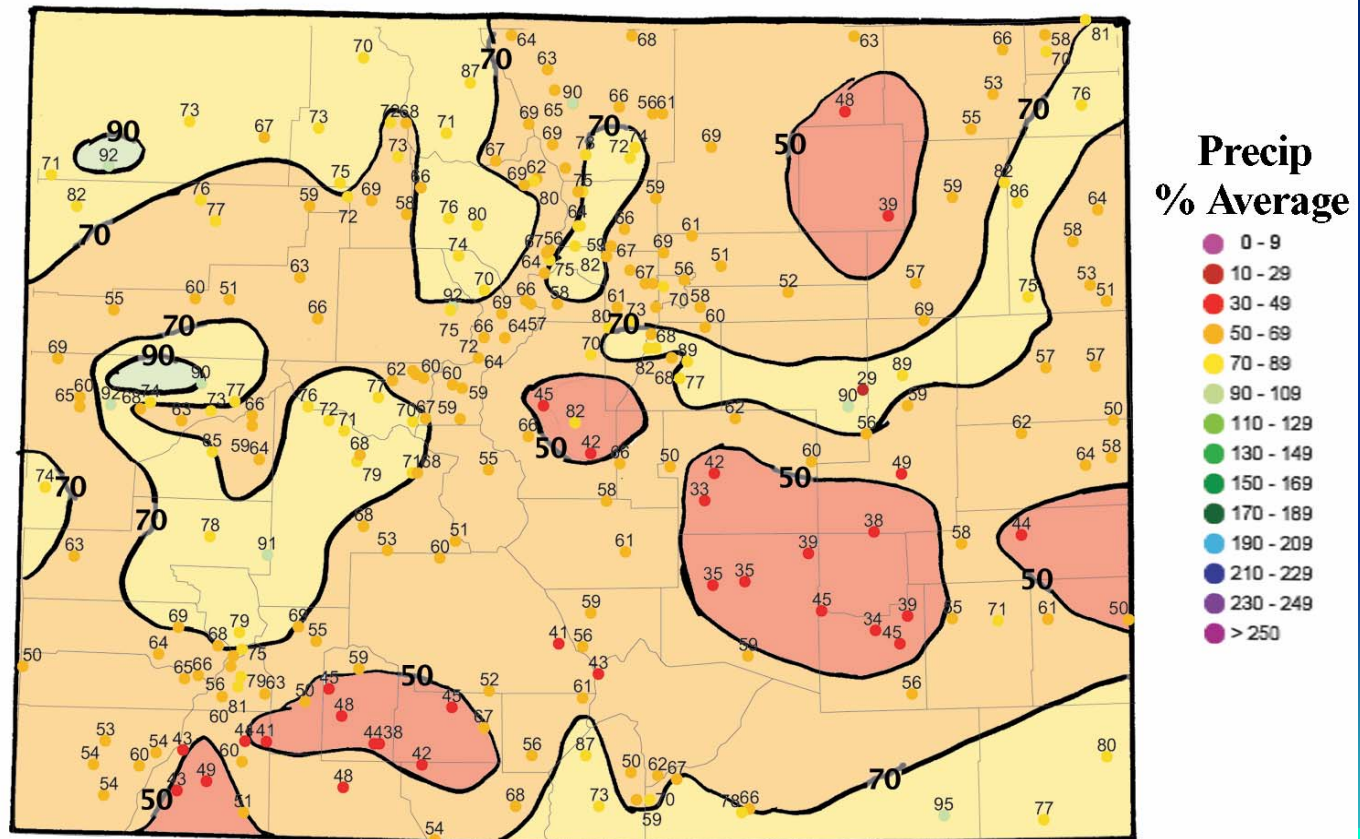
Precipitation Percent of Average for 1961-1990 Averages



2002 Water Year Precipitation

Water Year 2002
(Oct. 2001 - Sept. 2002)

Precipitation Percent of Average for 1961-1990 Averages

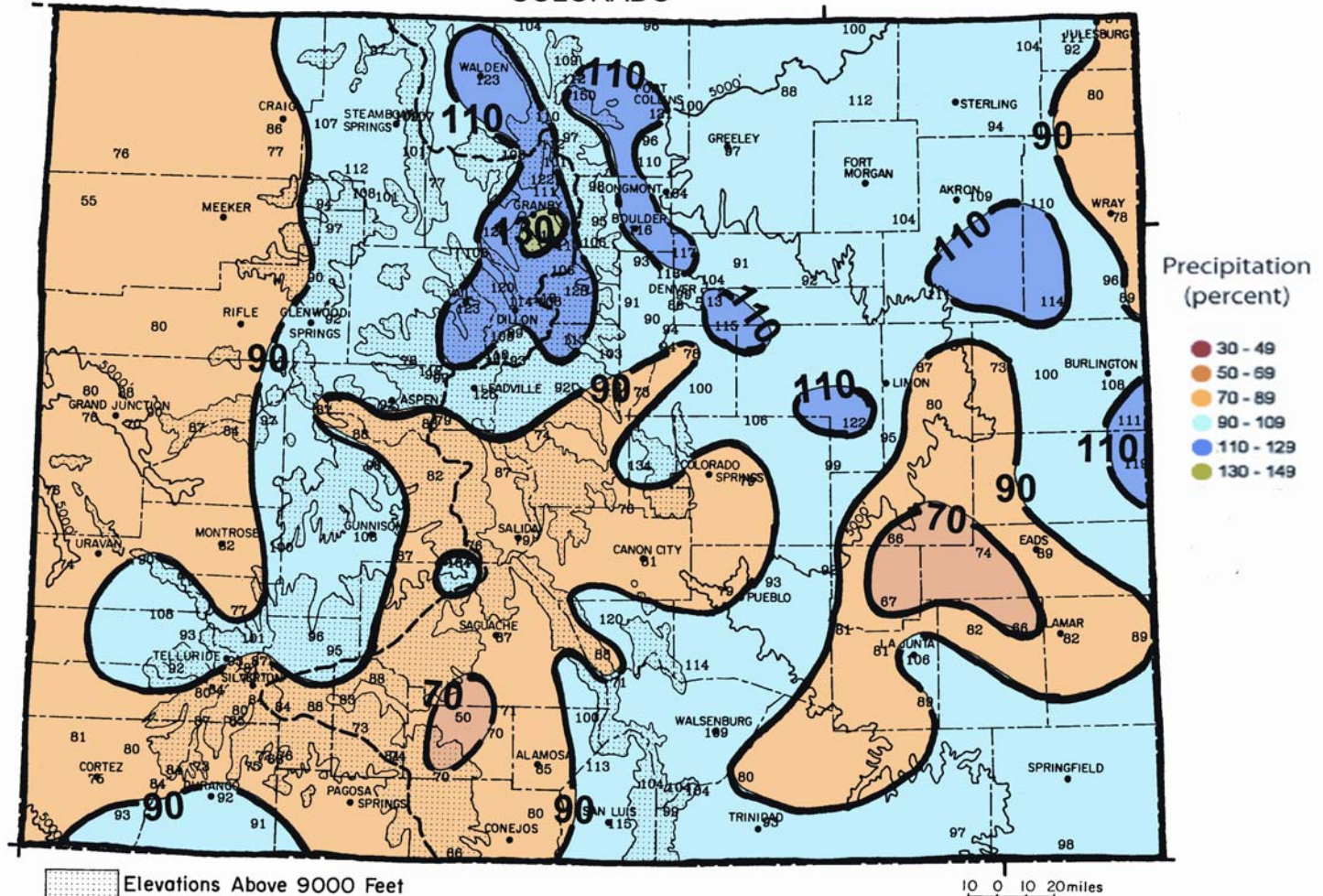


2003 Water Year Precipitation

Water Year 2003

October 2002 - September 2003 precipitation
as a percent of the 1971-2000 average.

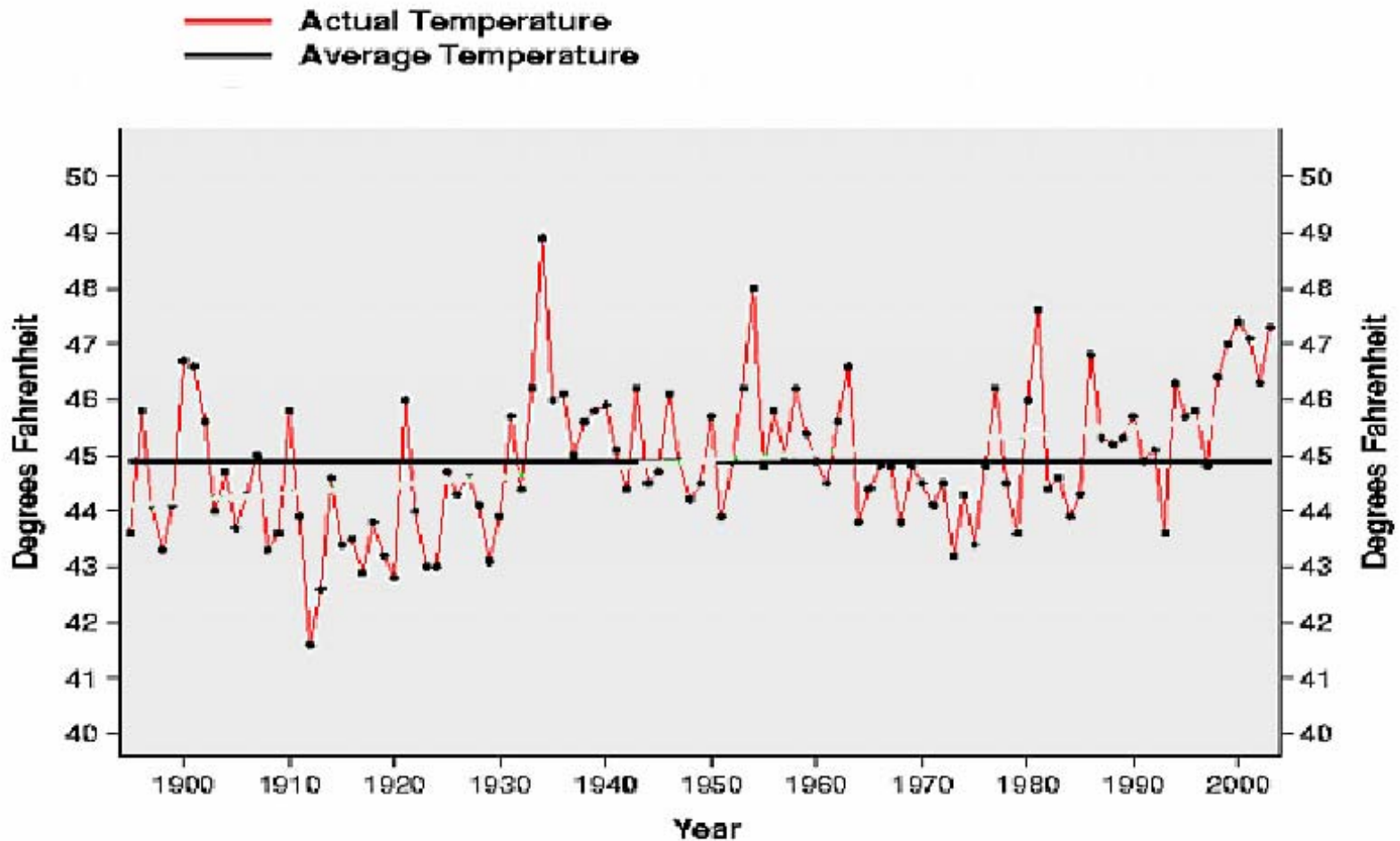
COLORADO



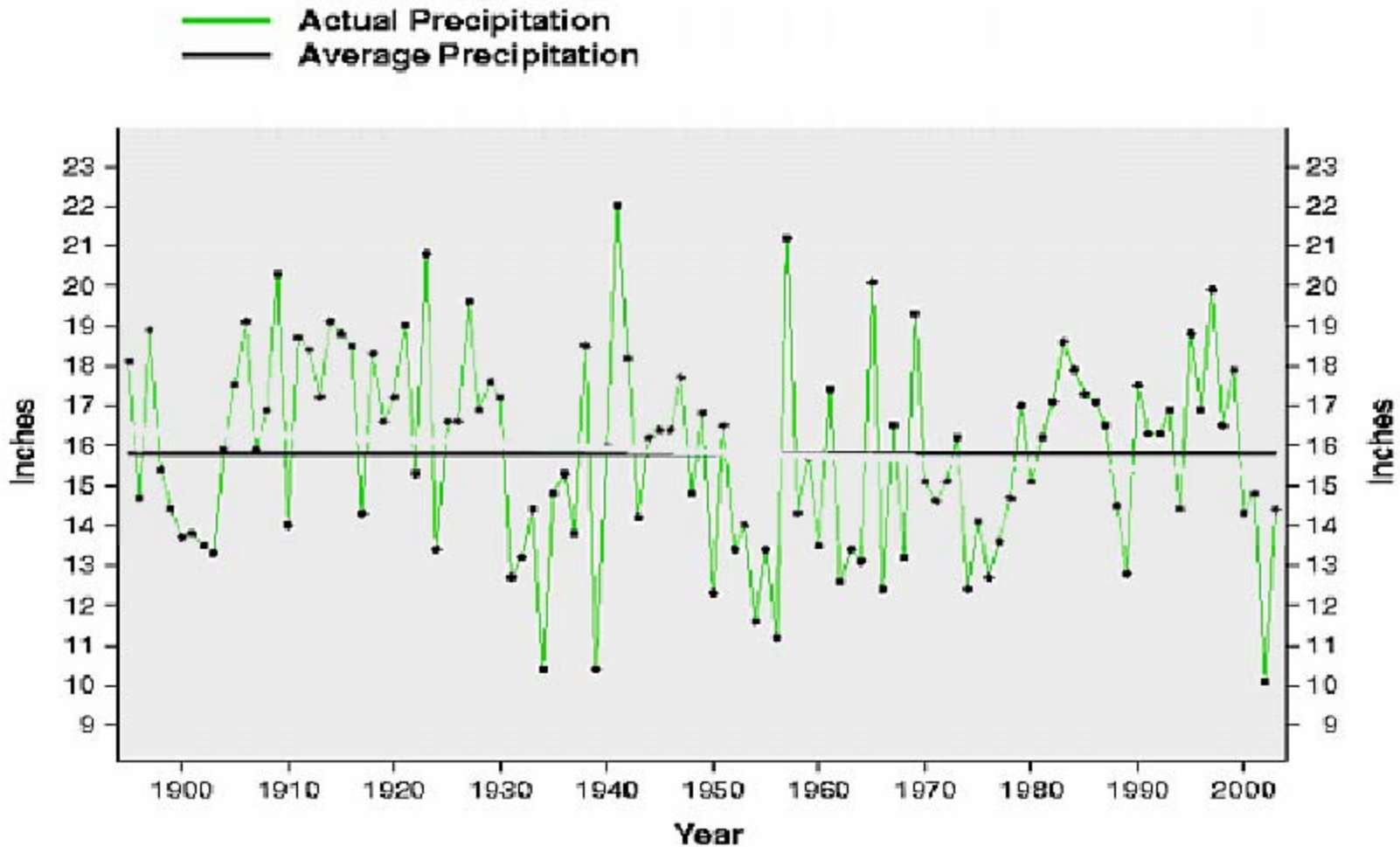
So, where is our climate headed?



Colorado Annual temperatures

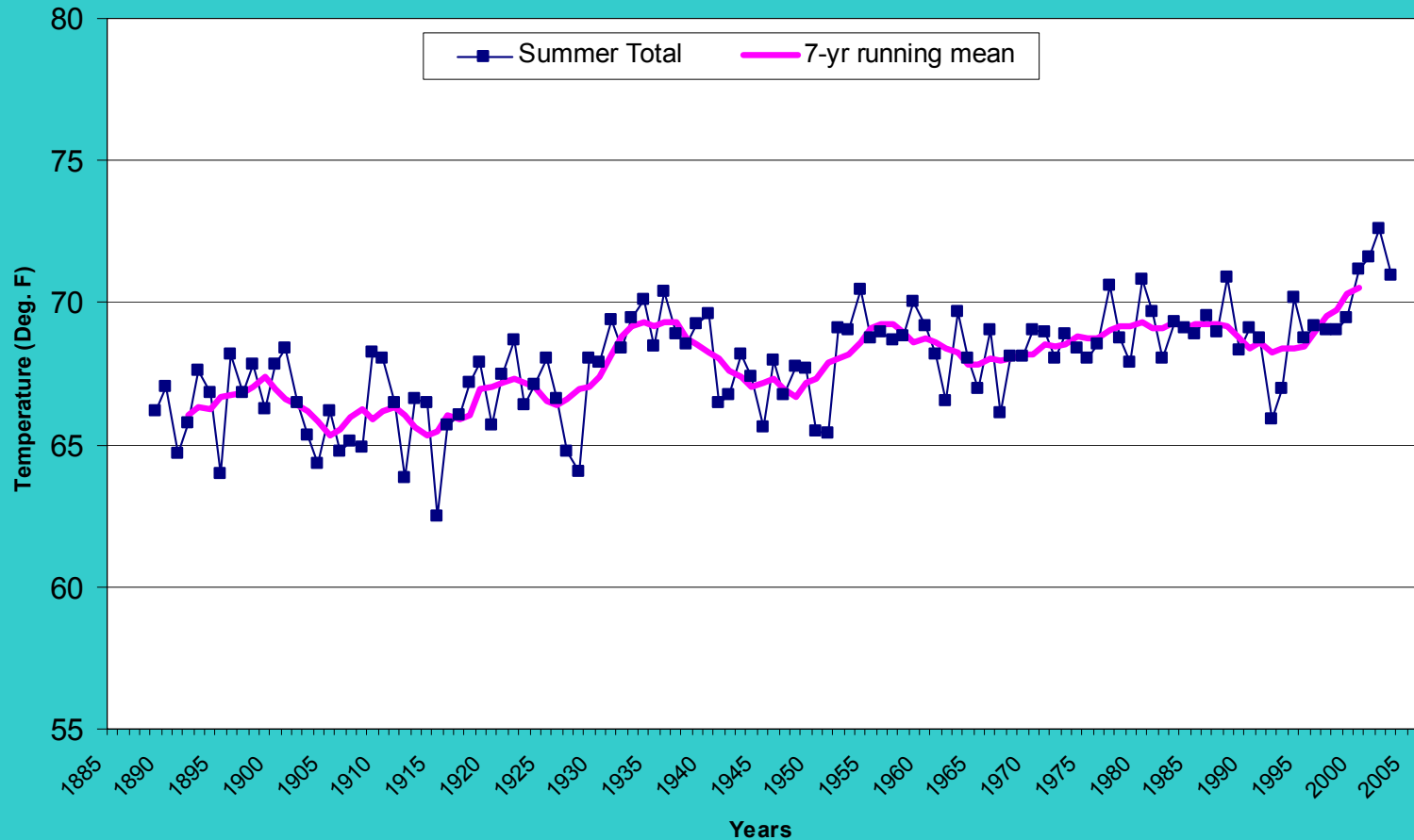


Colorado Annual Precipitation



Fort Collins Summer Temperatures

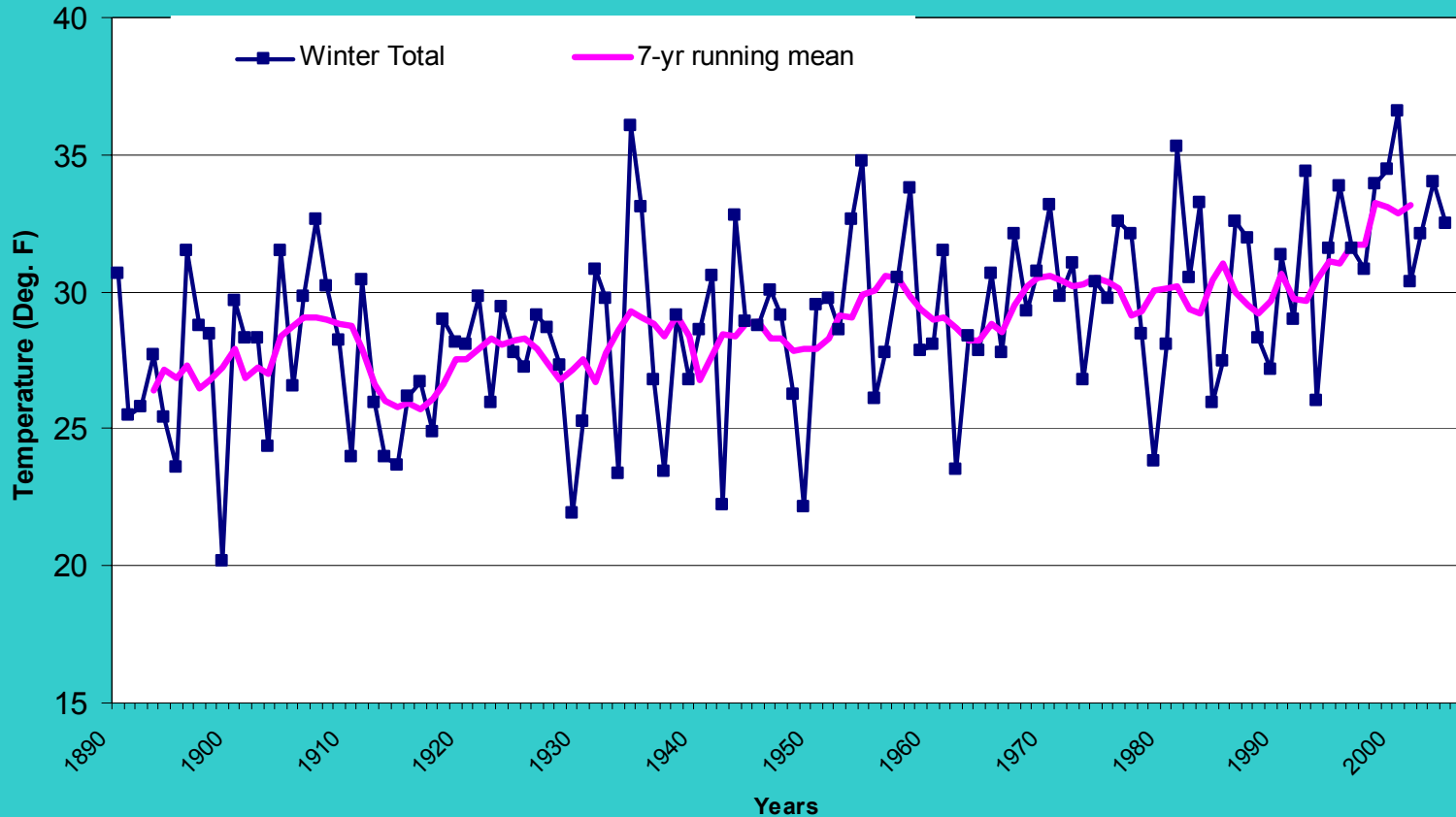
Fort Collins Summer Average Temperature
(June - August)



25 deg scale

Fort Collins Winter Temperature

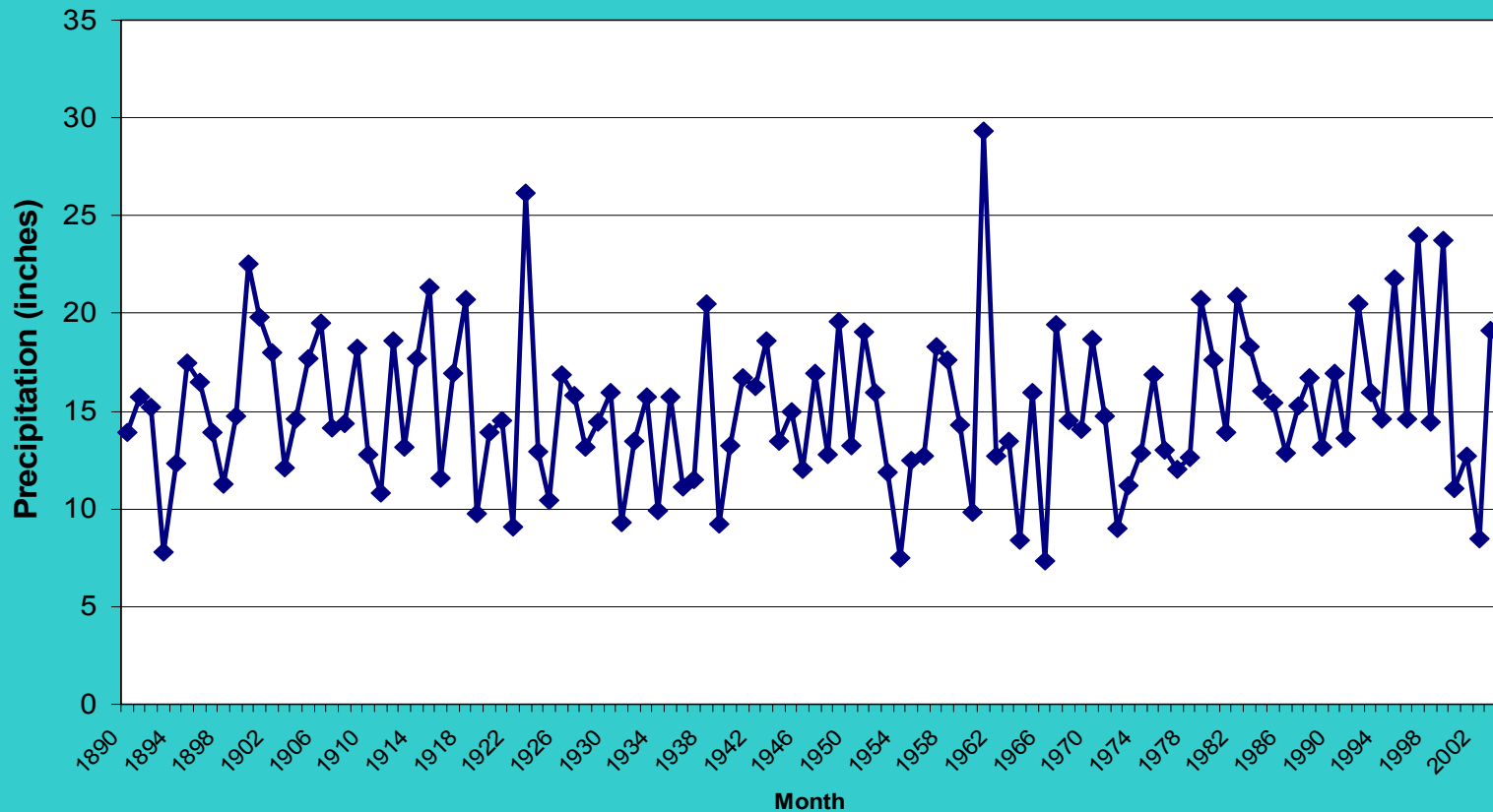
Fort Collins Winter Average Temperature
(December - February)



Use 25 deg scale

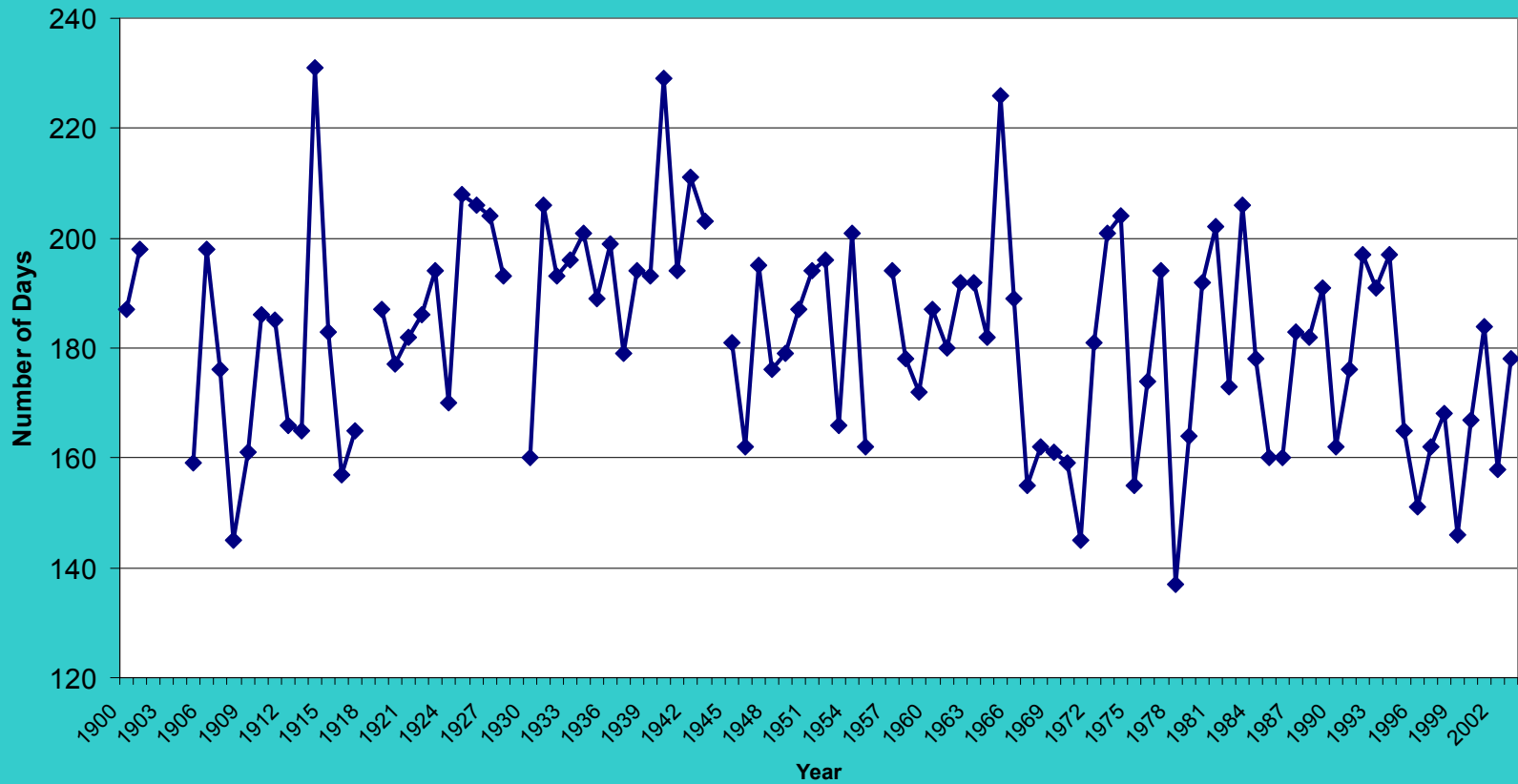
Fort Collins Water Year Precipitation

**Fort Collins Total Water Year Precipitation
(1890 through 2003)**



Grand Junction Growing Season

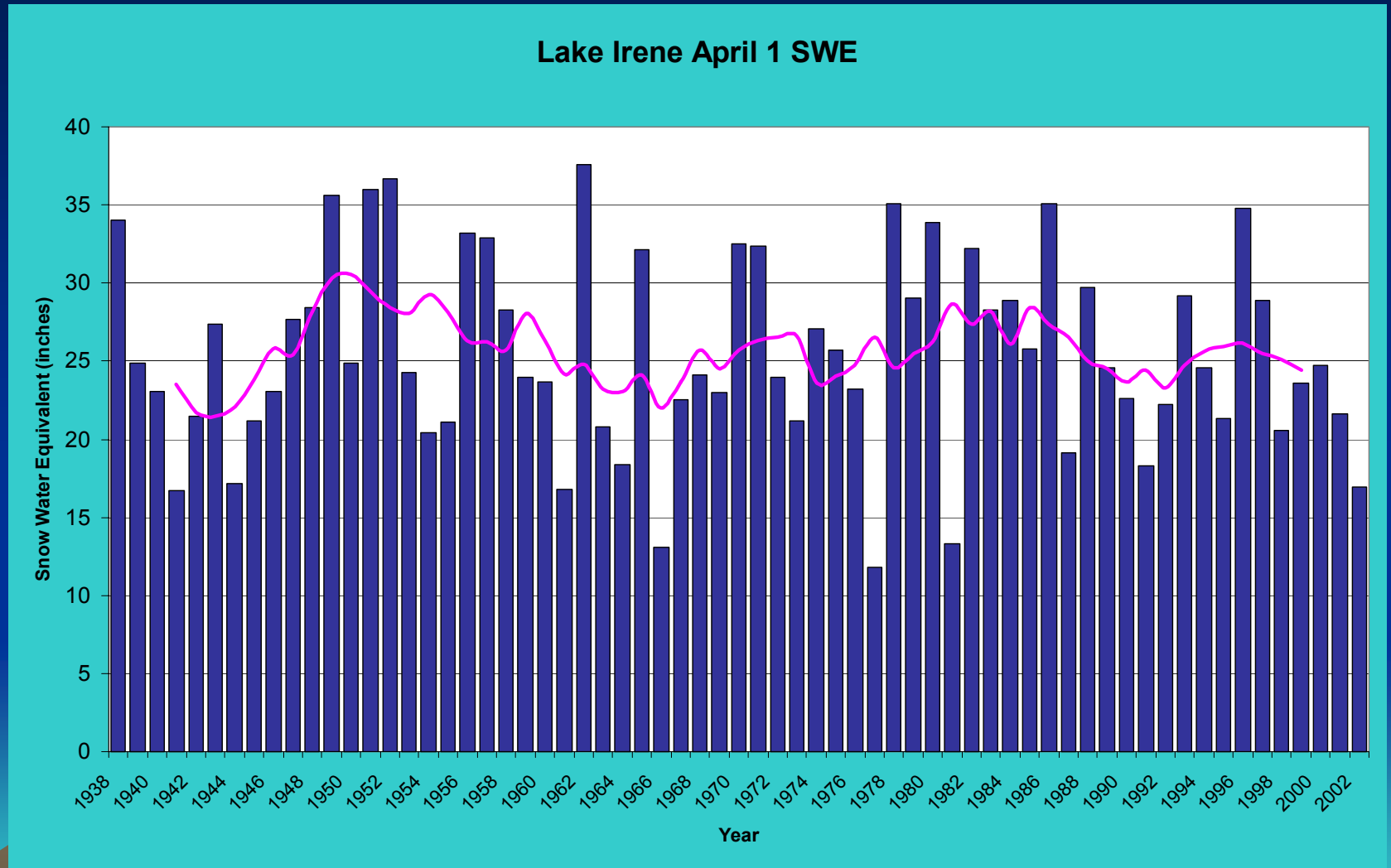
Grand Junction WSO
Growing Season Length (1900-2003)



An aerial photograph of a mountain range with a river valley. The mountains are rugged and rocky, with some sparse vegetation. A river flows through the valley, creating a winding path. The sky is clear and blue. The text "What About Our Mountains?" is overlaid in the center of the image.

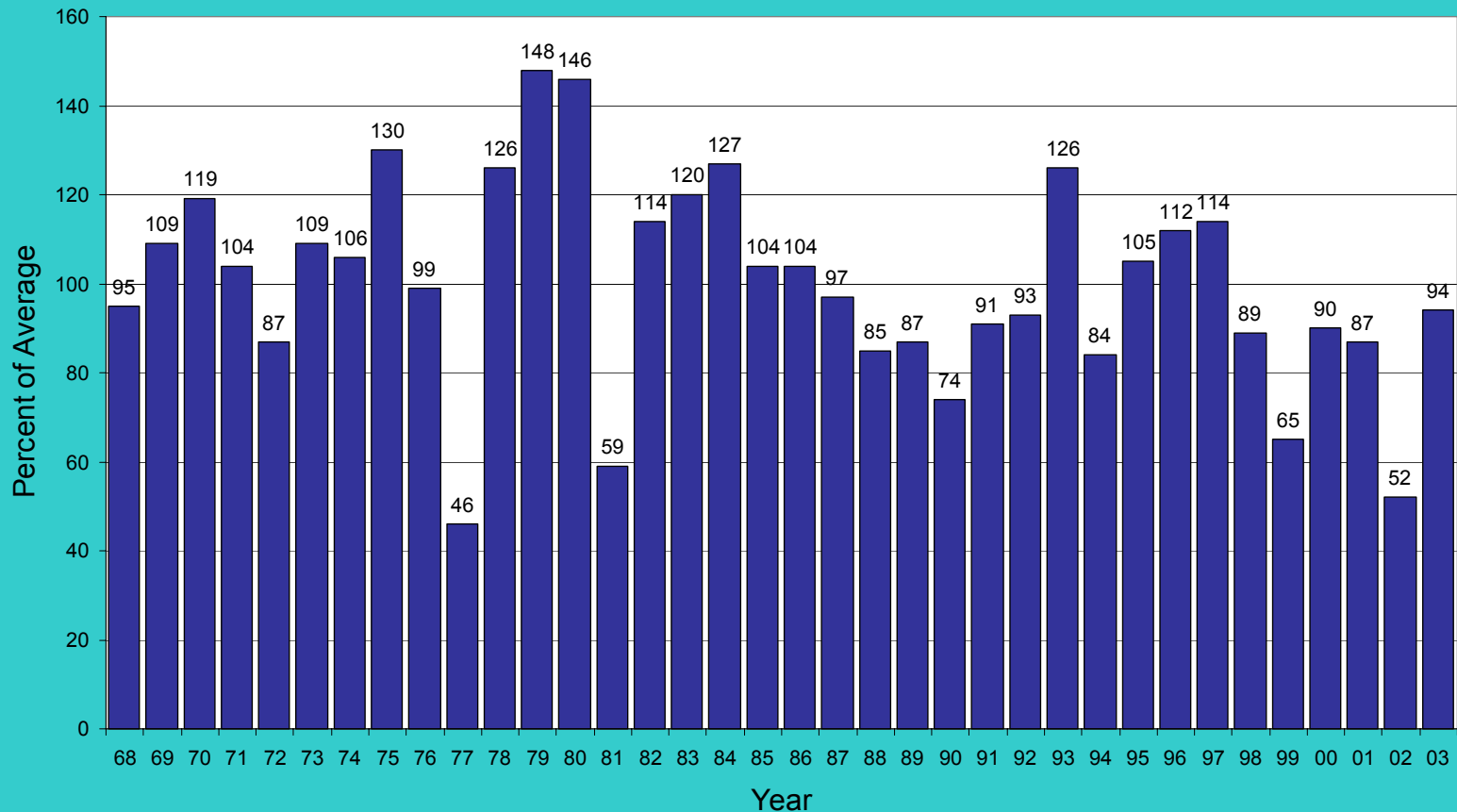
What About Our Mountains?

Lake Irene April 1 SWE



April 1 Statewide SWE

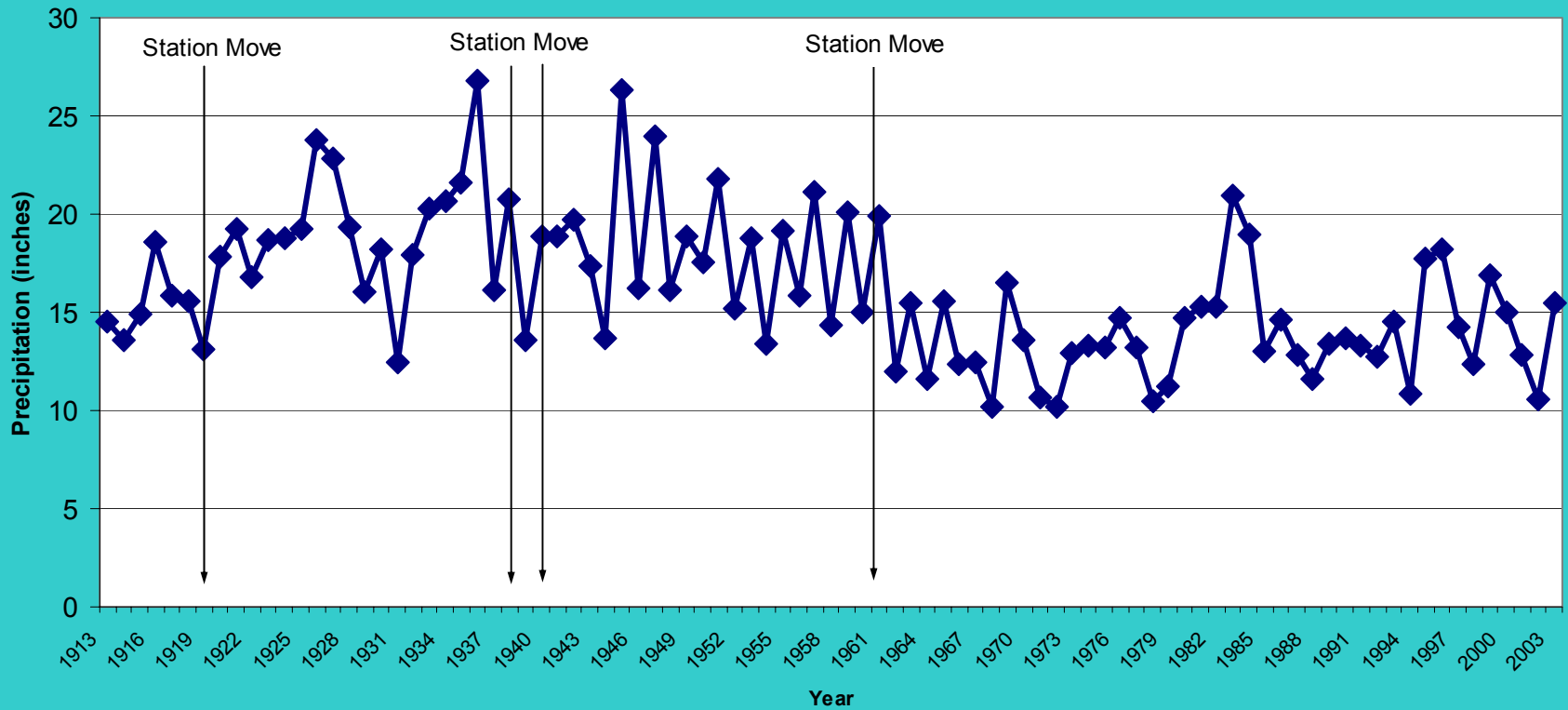
APRIL 1 SNOWPACK COLORADO STATEWIDE



Data provided by the NRCS, Snow Survey Division.

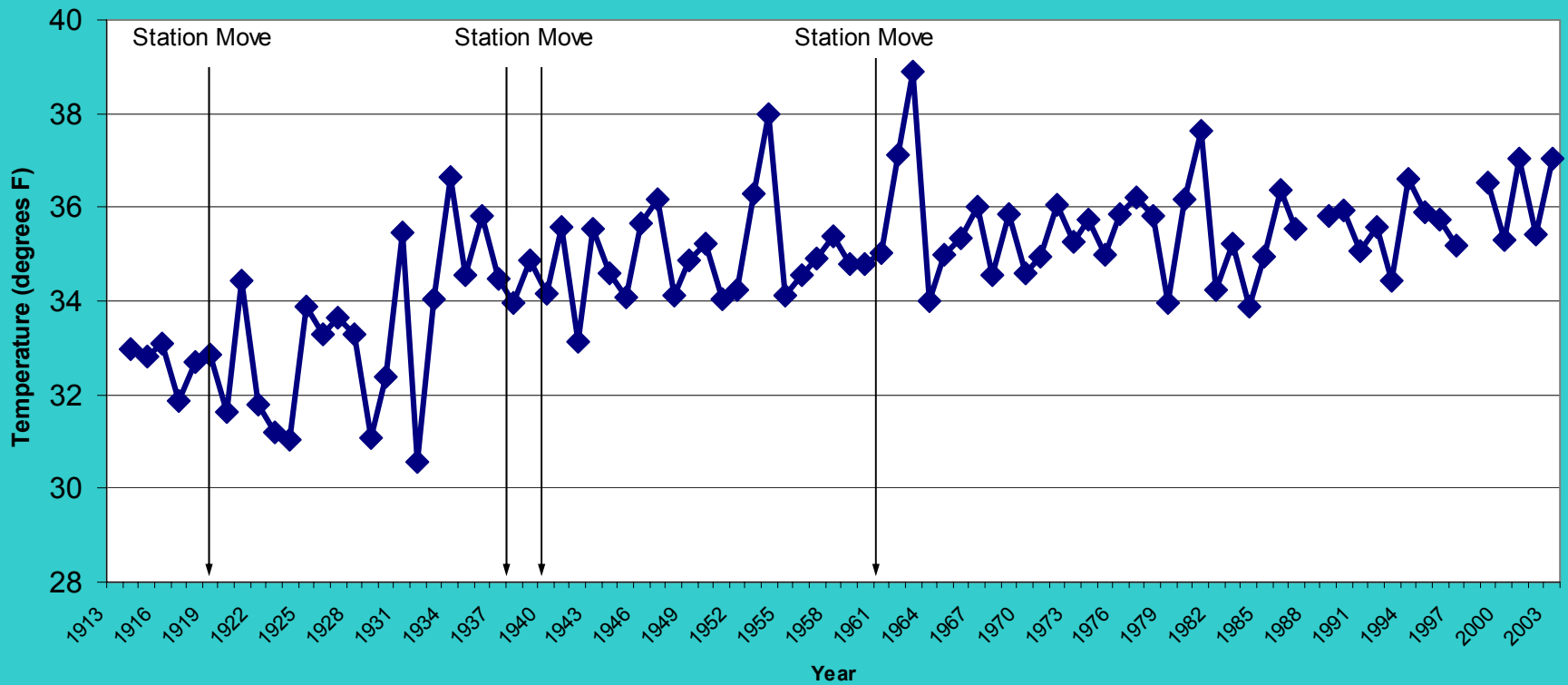
Dillon Precipitation History

Dillon, Colorado
Yearly Precipitation Totals (1913-2003)



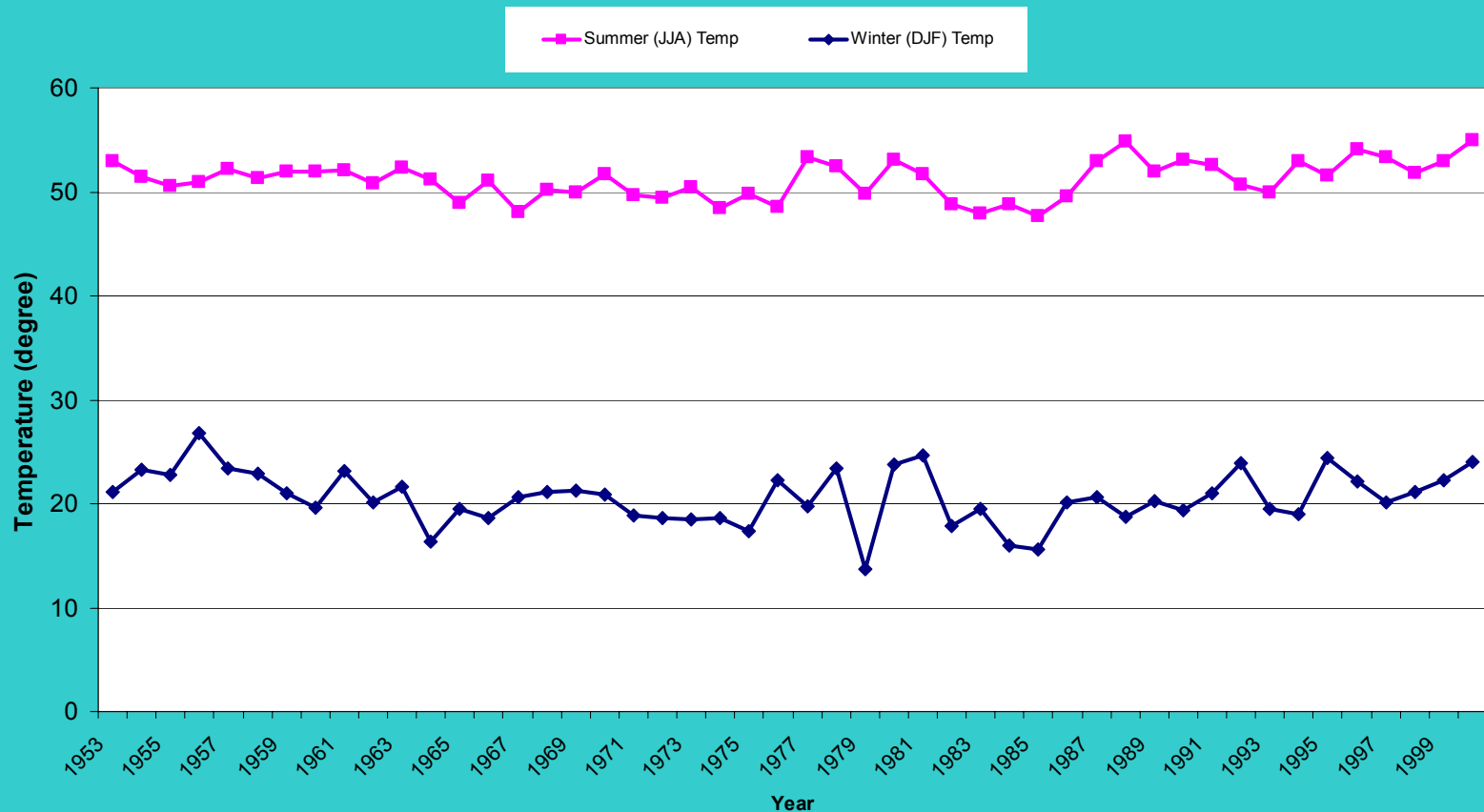
Dillon Annual Temperatures

Dillon, Colorado
Average Annual Temperature (1913-2003)



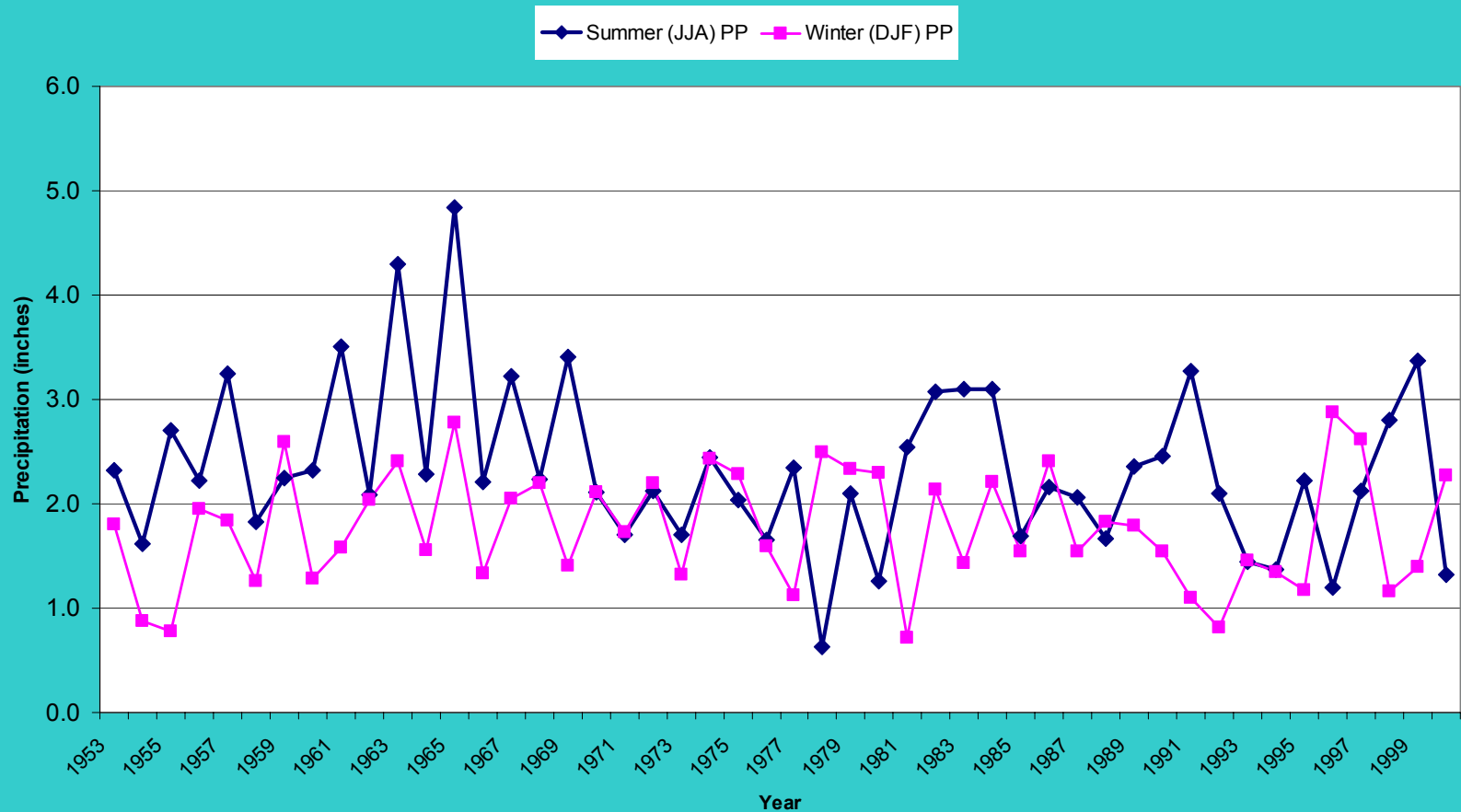
Niwot Ridge Temperature History

Niwot Ridge (C-1), Elevation 3048 m
Average Seasonal Temperatures for 1953-2000



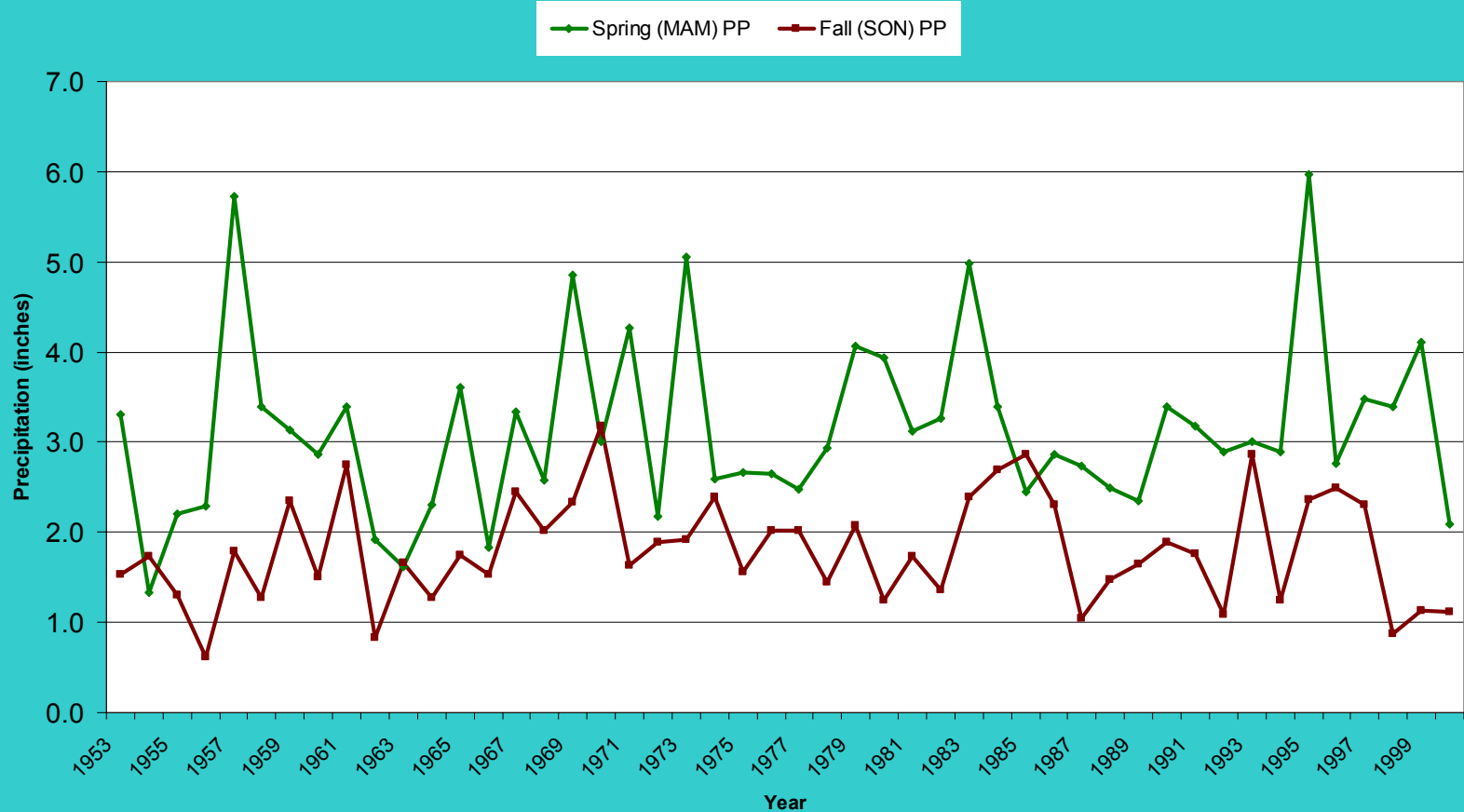
Niwot Ridge Precipitation History

Niwot Ridge (C-1), Elevation 3048 m
Seasonal Precipitation for 1953-2000



Niwot Ridge Precipitation History

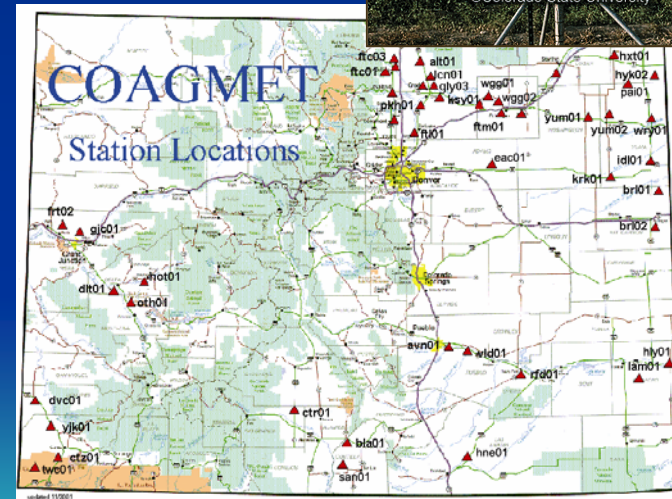
Niwot Ridge (C-1), Elevation 3048 m
Seasonal Precipitation for 1953-2000



CoAgMet

Weather Data for Agriculture

- *Automated weather stations with daily and hourly readings of:*
 - *Temperature*
 - *Humidity*
 - *Wind*
 - *Precipitation*
 - *Solar energy*
 - *Evapotranspiration*



<http://www.coagmet.com>

CoCo RaHS

Community Collaborative
Rain and Hail Study

YOU CAN HELP!



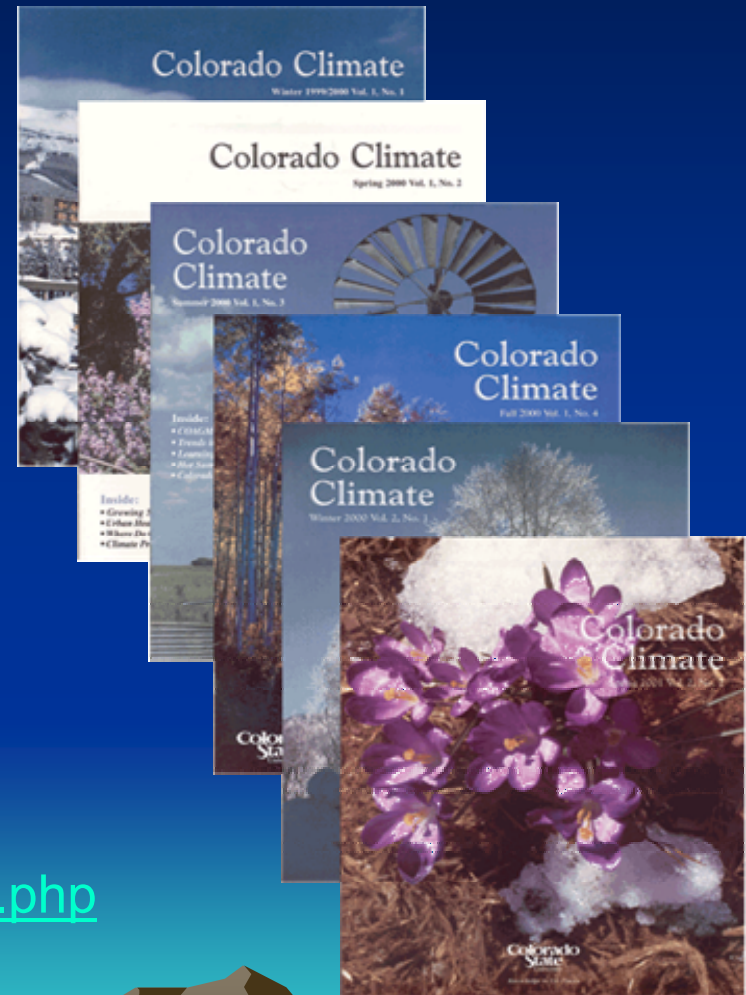
<http://www.cocorahs.org>

Sponsored in part by National Science Foundation



Colorado Climate Magazine

- *Good bedtime reading about the climate of Colorado -- recent and historic*
- *\$15/year subscription pays printing and mailing costs*



<http://ccc.atmos.colostate.edu/magazine.php>

Colorado Climate Center

Colorado State University

- *Data and Power Point Presentations available for downloading*
- <http://ccc.atmos.colostate.edu>
click on “Drought”
then click on “Presentations”

