Drought history and impacts on the northern margins of the Great Plains

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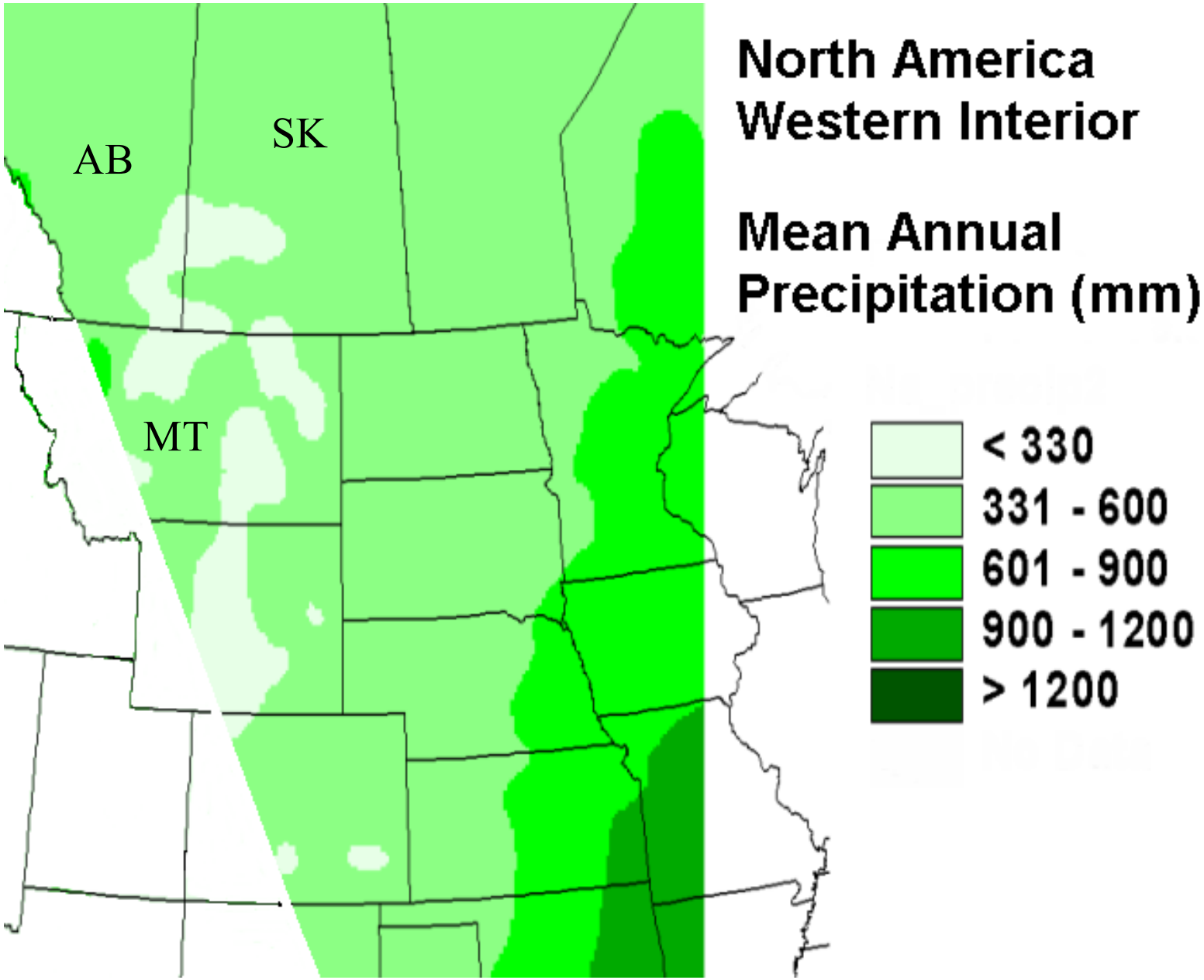
AMQUA 2004, Lawrence, Kansas, 26-28 June 2004


AB
SK
MT
North America
Western Interior
Mean Annual
Precipitation (mm)
< 330
331 - 600
601 - 900
900 - 1200
> 1200

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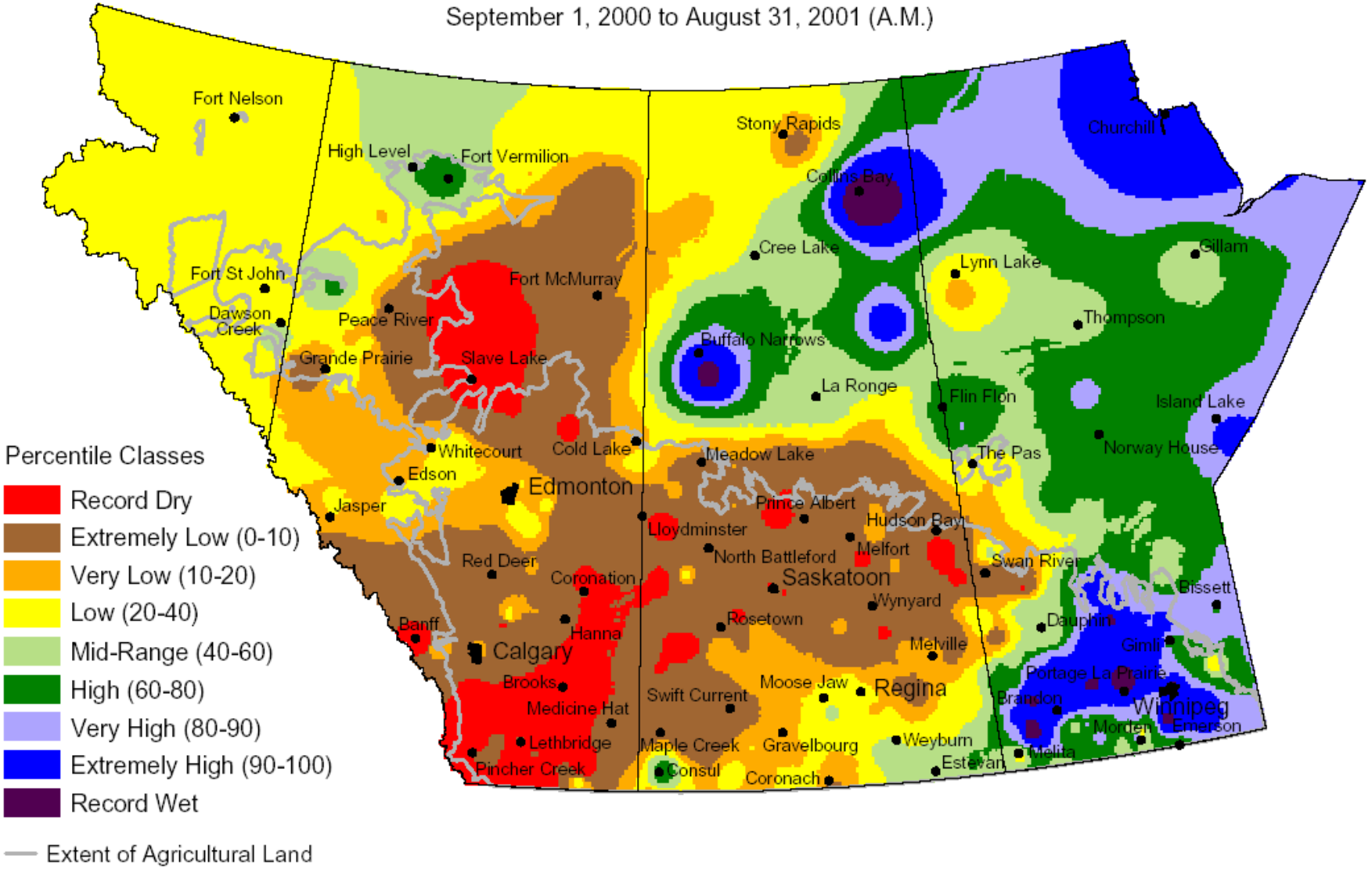
Current Precipitation Compared to Historical Distribution

September 1, 2000 to August 31, 2001 (A.M.)



Percentile Classes

- Record Dry
- Extremely Low (0-10)
- Very Low (10-20)
- Low (20-40)
- Mid-Range (40-60)
- High (60-80)
- Very High (80-90)
- Extremely High (90-100)
- Record Wet

— Extent of Agricultural Land

Prepared by PFRA (Prairie Farm Rehabilitation Administration) using data from the Timely Climate Monitoring Network and the many federal and provincial agencies and volunteers that support it.

Canada

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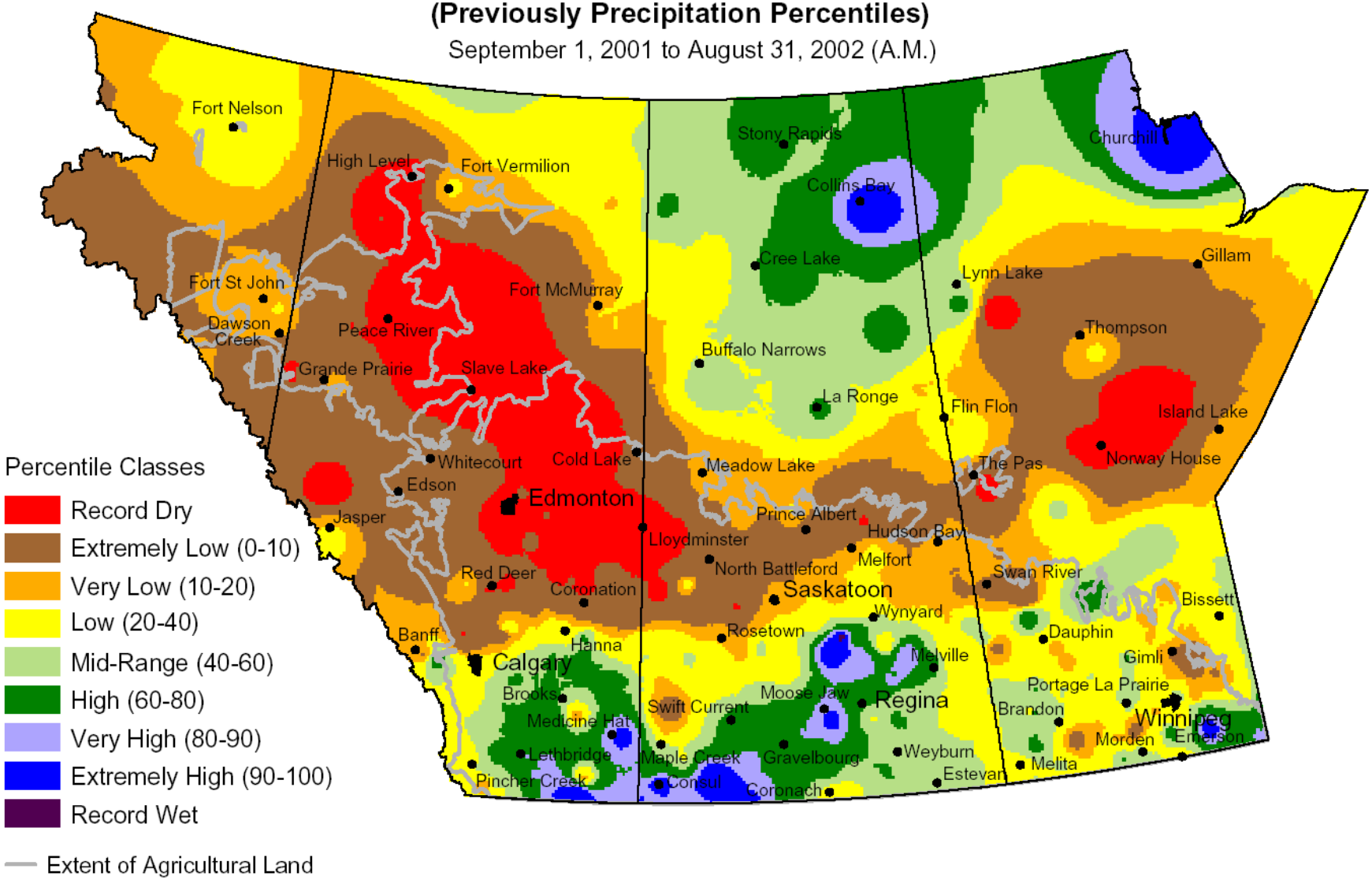
Current Precipitation Compared to Historical Distribution

(Previously Precipitation Percentiles)

September 1, 2001 to August 31, 2002 (A.M.)



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Canada


Near Outlook, Saskatchewan, May 2, 2002

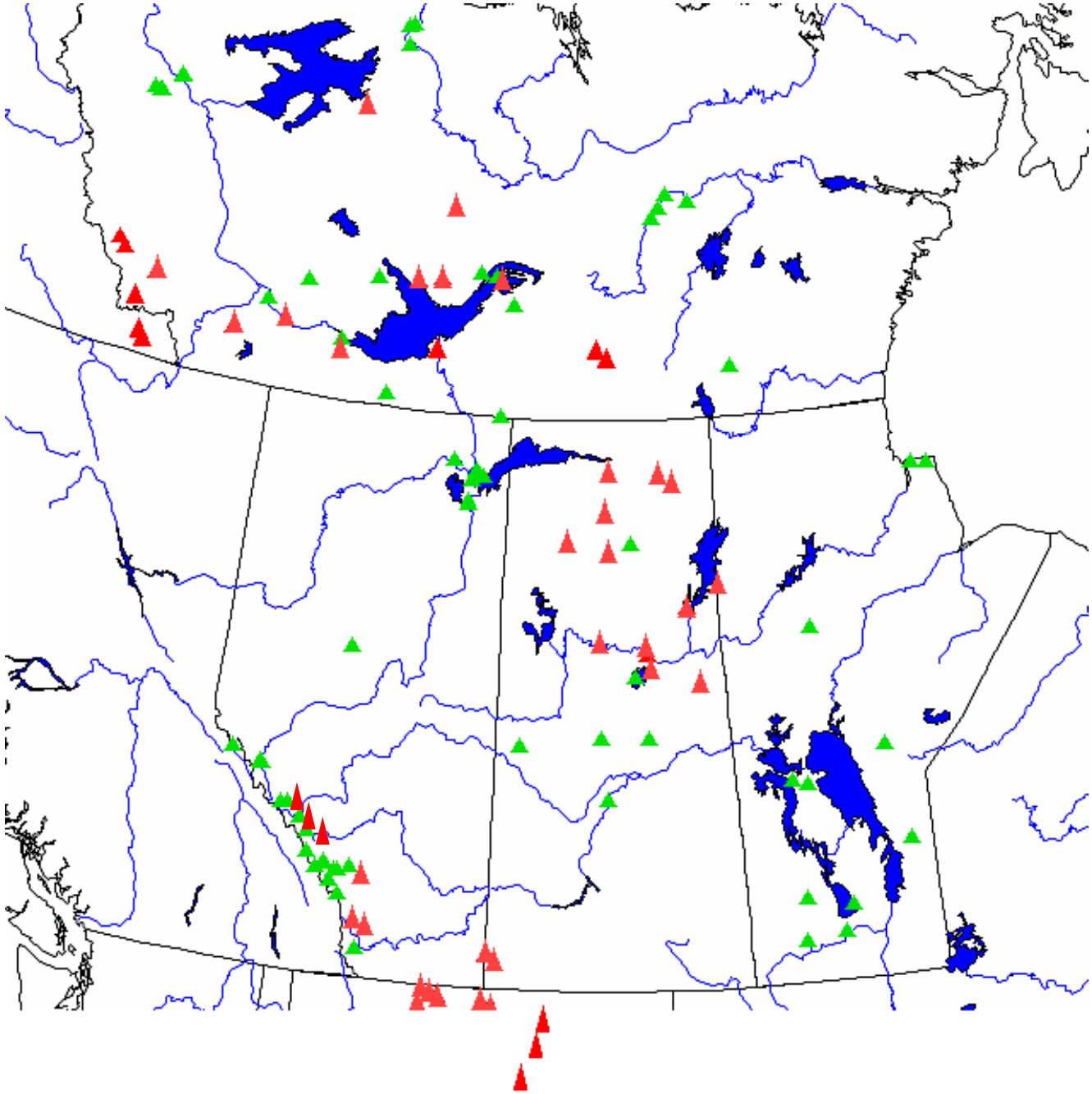
Saskatoon (1908-2002)

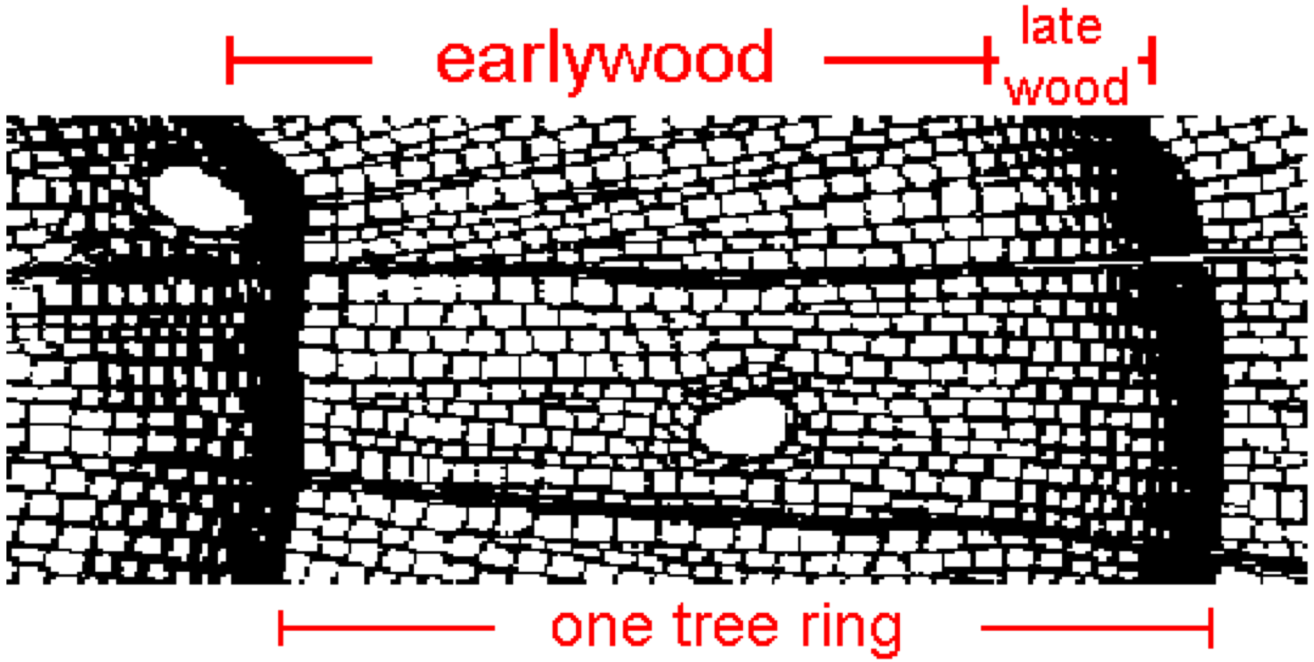
1-yr	2-yrs	3-yrs
2001	**2001-02**	**2000-02**
1952	**2000-01**	1951-53
1987	1987-88	1987-89
1960	1952-3	1999-01
1941	1964-65	1986-88

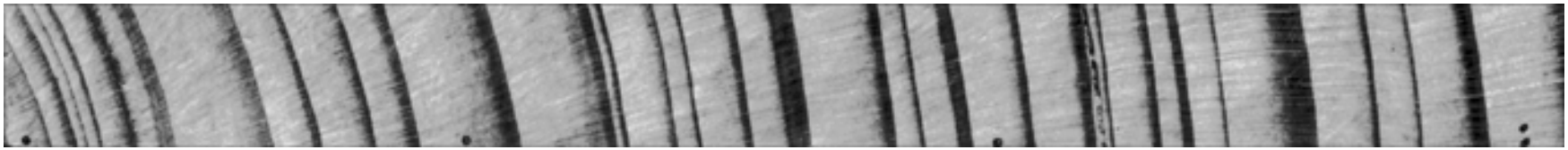
Edmonton (1883-2002)

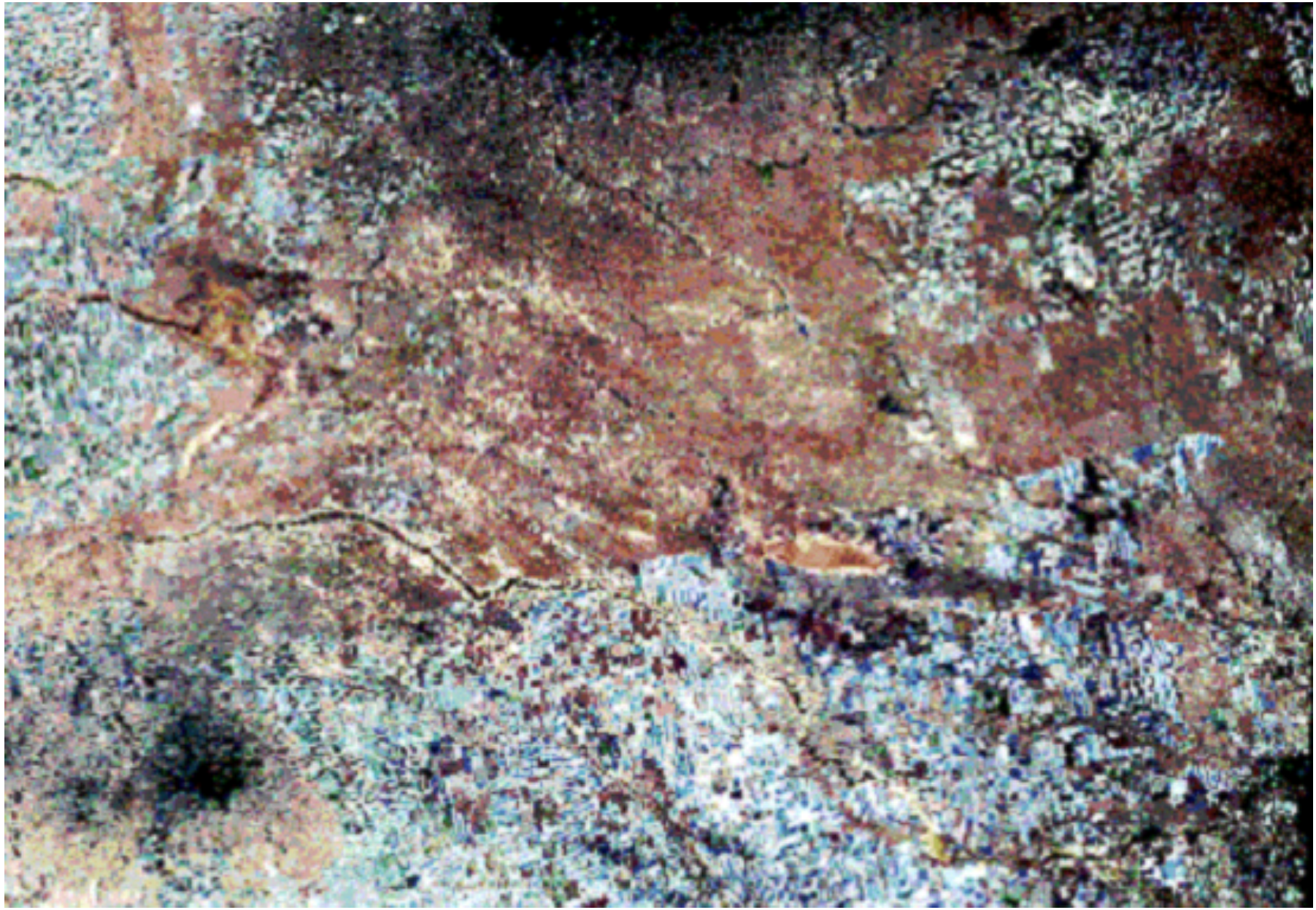
1-yr	2-yrs	3-yrs
1889	**2001-02**	1883-85
1883	1883-84	1896-98
2002	1897-98	1887-89
1898	1886-87	1885-87
1961	1949-50	**2000-02**

Tree-Ring Chronologies

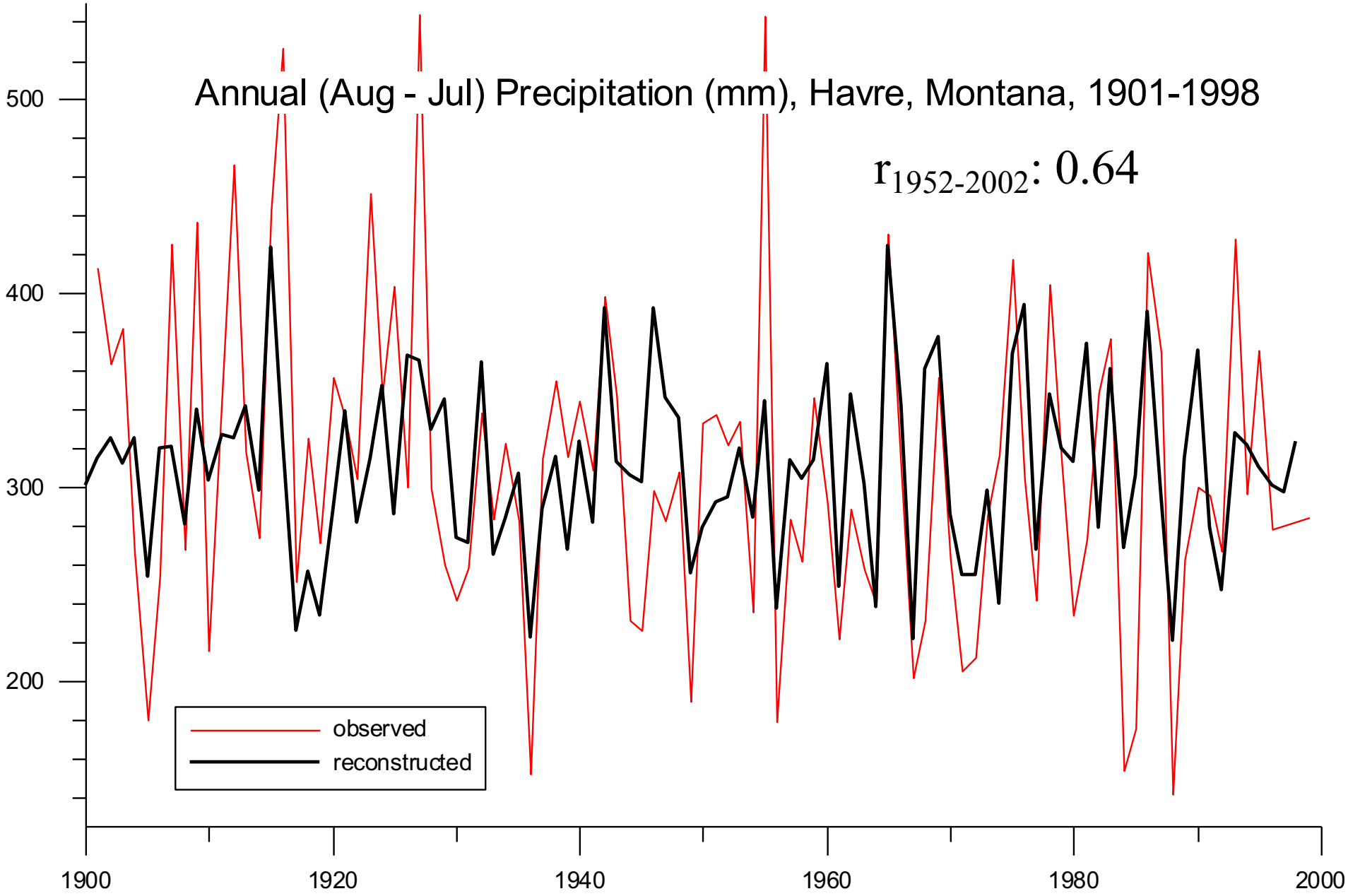


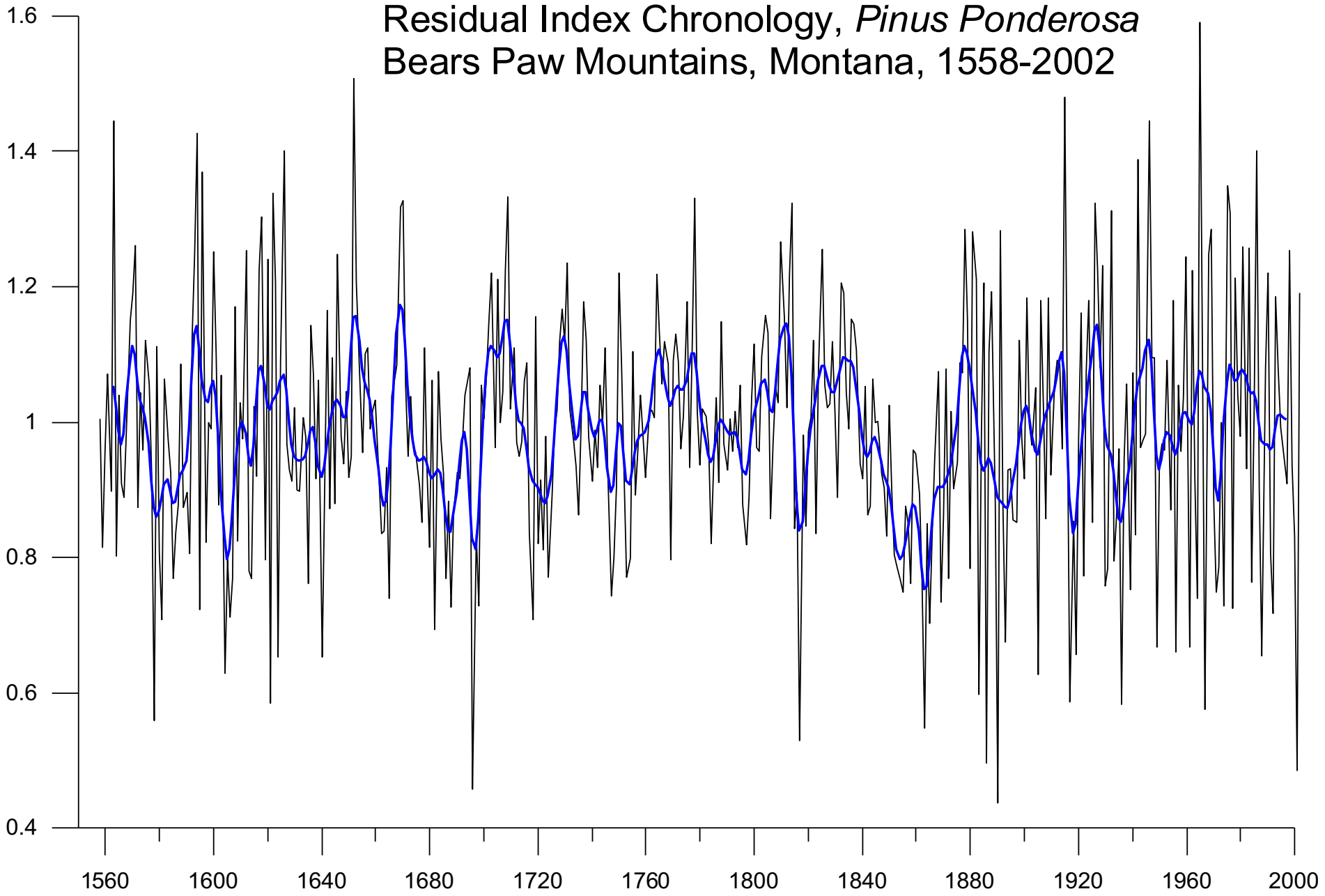

earlywood
late wood
one tree ring

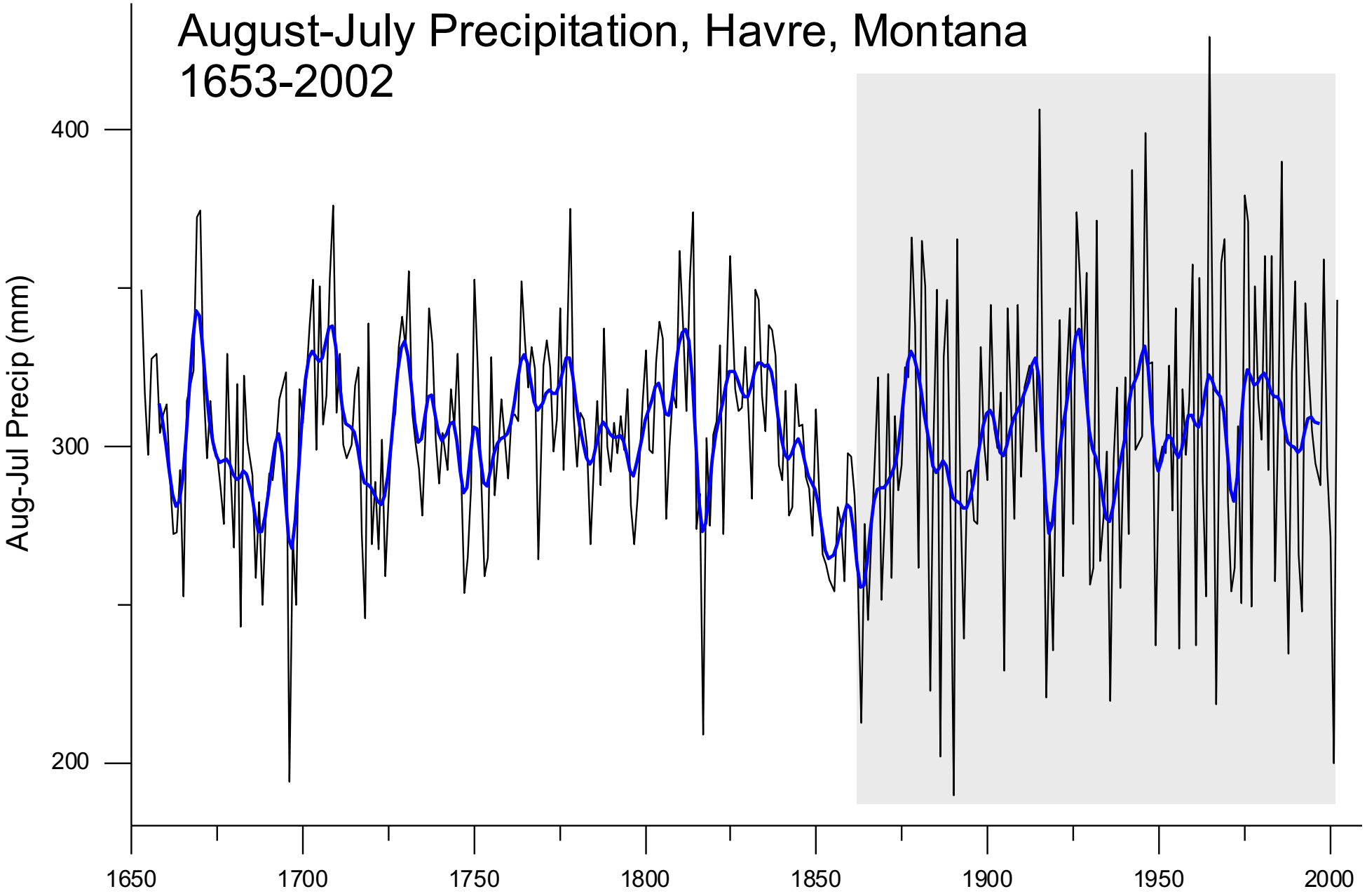


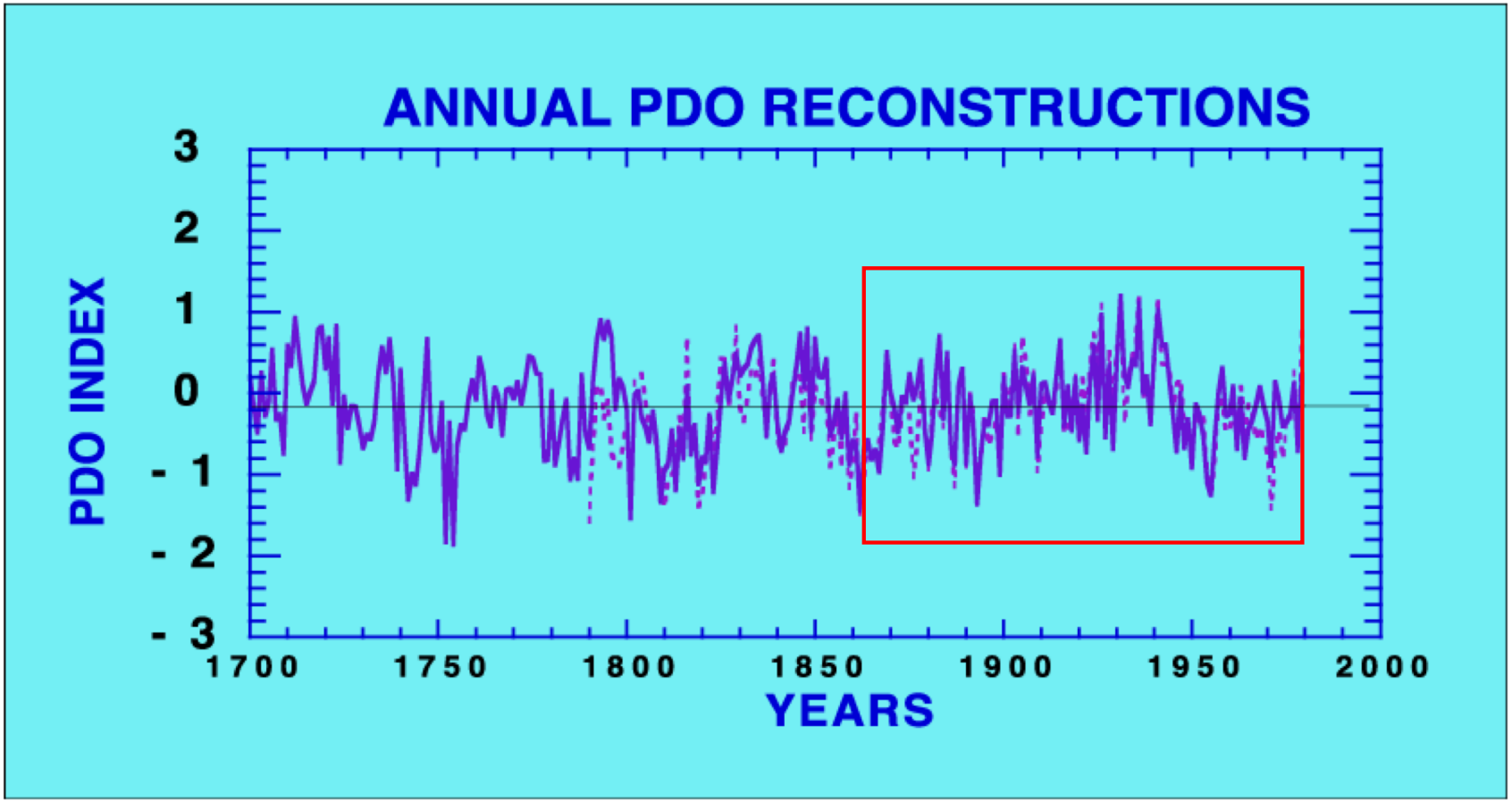


Landsat 7, July, 2000


Annual (Aug - Jul) Precipitation (mm), Havre, Montana, 1901-1998
$r_{1952\text{-}2002}$: 0.64
500
400
300
200
observed
reconstructed
1900
1920
1940
1960
1980
2000

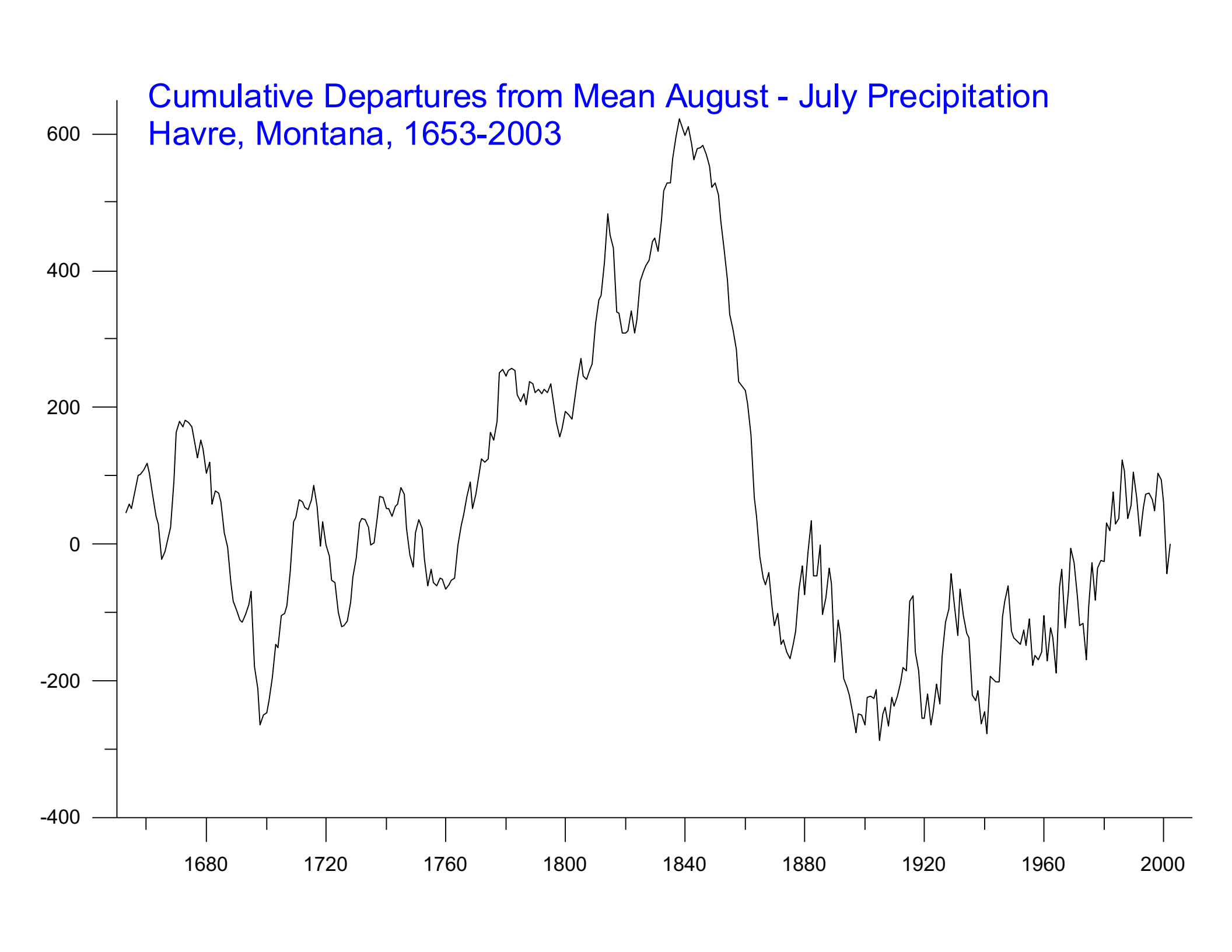

Residual Index Chronology, *Pinus Ponderosa*
Bears Paw Mountains, Montana, 1558-2002
1.6
1.4
1.2
1
0.8
0.6
0.4
1560
1600
1640
1680
1720
1760
1800
1840
1880
1920
1960
2000


August-July Precipitation, Havre, Montana
1653-2002
Aug-Jul Precip (mm)
400
300
200
1650
1700
1750
1800
1850
1900
1950
2000



http://www.ldeo.columbia.edu/res/fac/trl/northpacific/pdorecon.html

"a shift towards less pronounced interdecadal variability … after about the middle 1800s" (**D'Arrigo**, *et al*., 2001. Tree-ring estimates of Pacific decadal climate variability. Climate Dynamics)


Cumulative Departures from Mean August - July Precipitation
Havre, Montana, 1653-2003
600
400
200
0
-200
-400
1680
1720
1760
1800
1840
1880
1920
1960
2000