

Overview of Predicted Climate Changes in BC

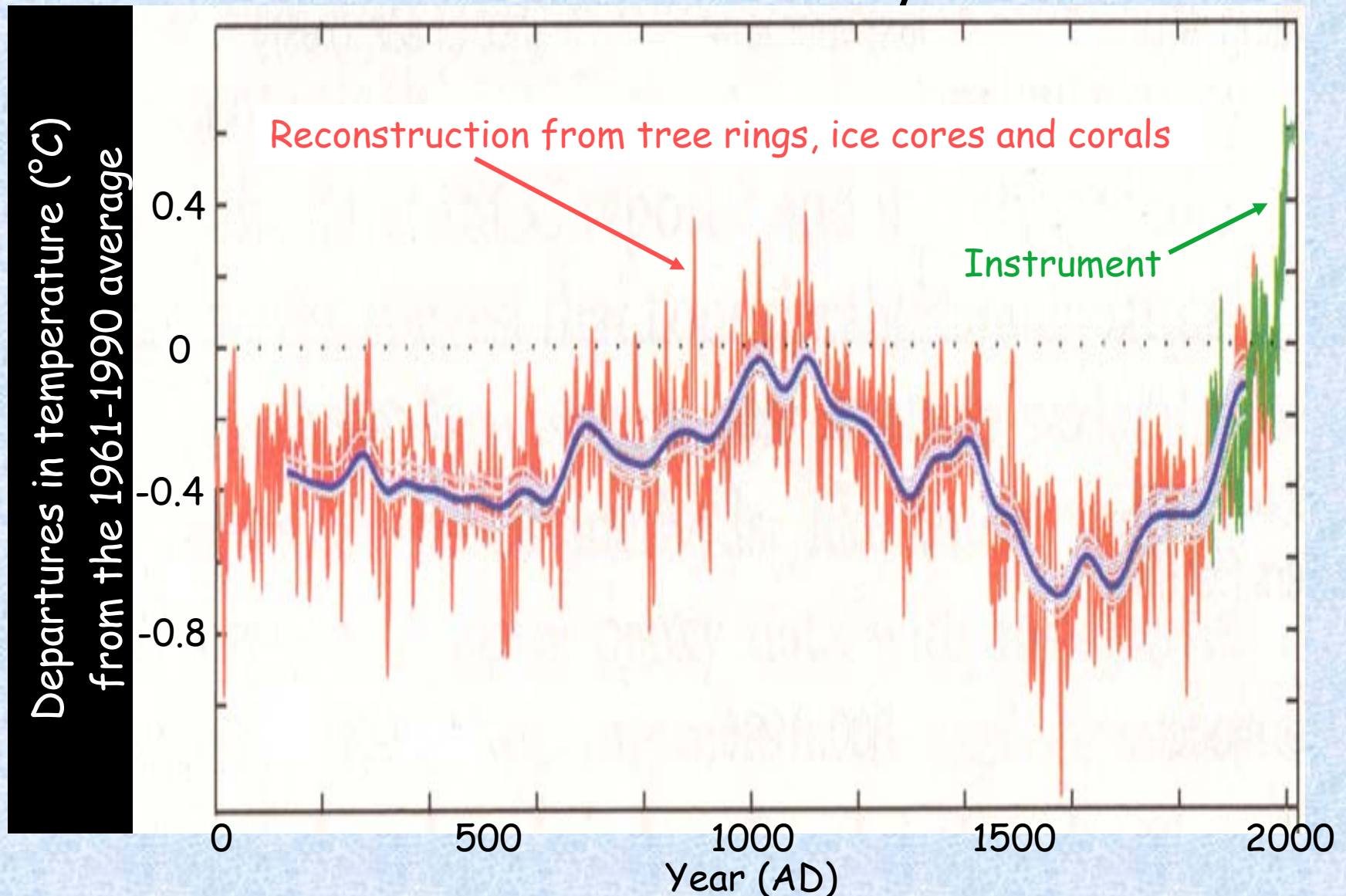
Dave Spittlehouse,
Research Branch, BC Min. Forest & Range, Victoria, BC



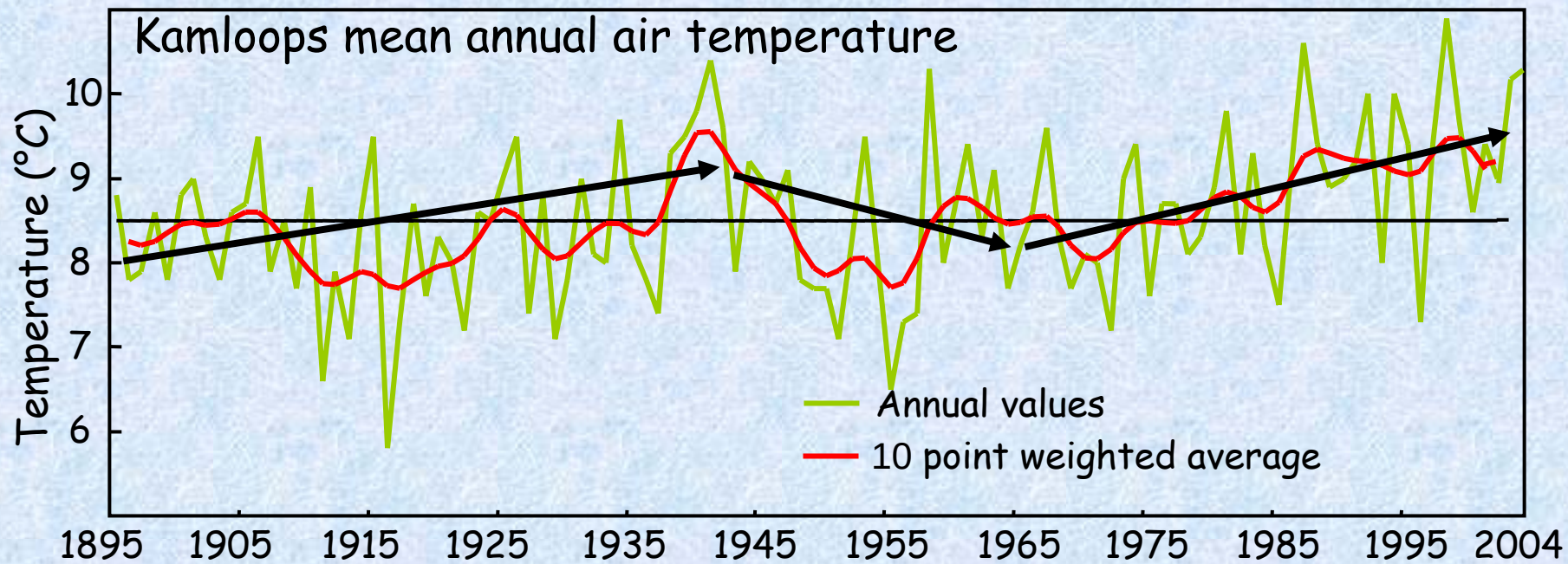
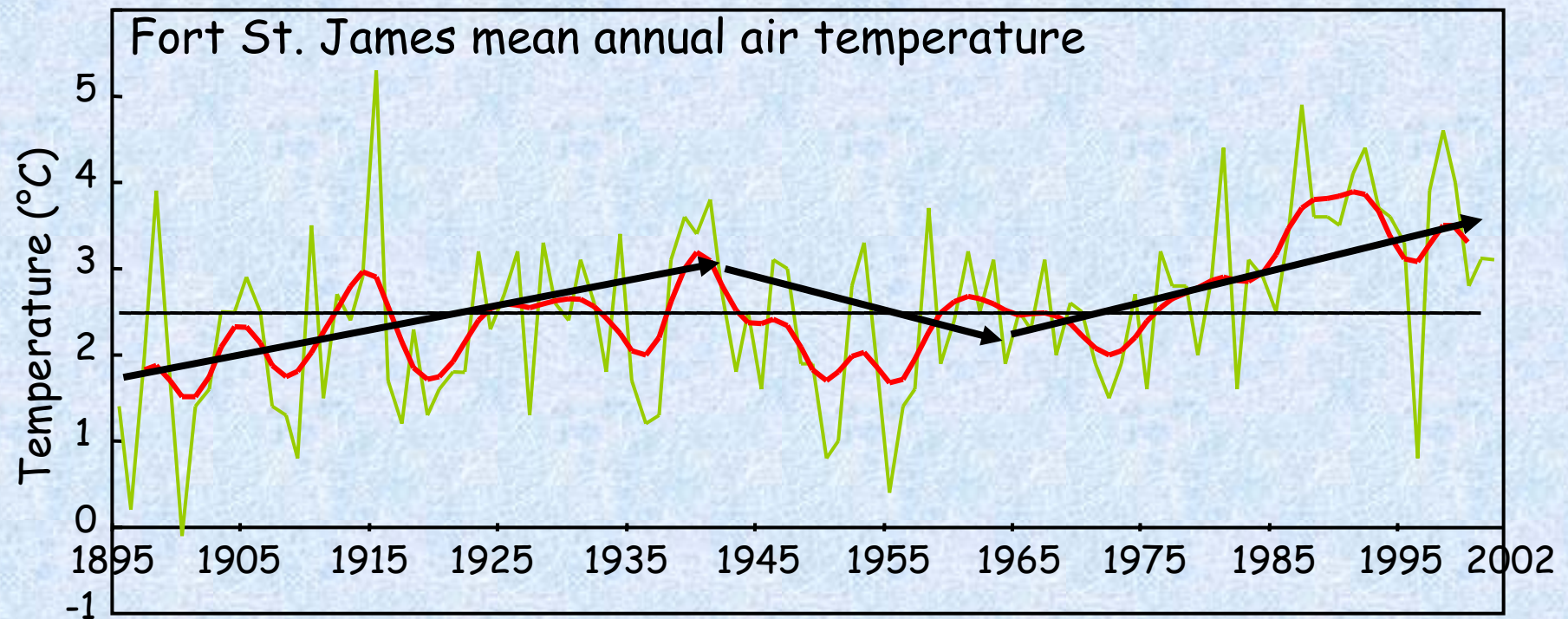
Messages

- Climate has changed
- Climate is changing
- Climate will change
- Change faster than in the past
- Learn to live with it (Adaptation)

Variation in Northern Hemisphere Temperature Over the Last 2000 years



Modified from Moberg et al. 2005, Nature 433:613-617.

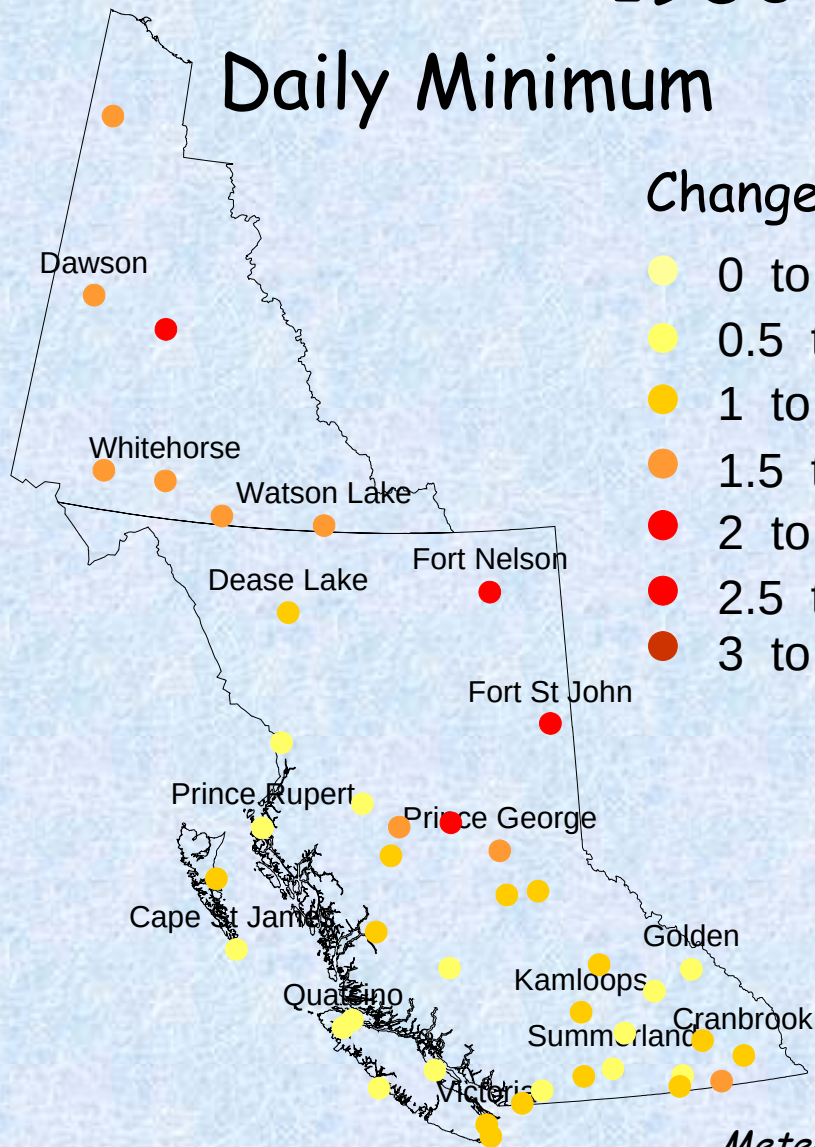
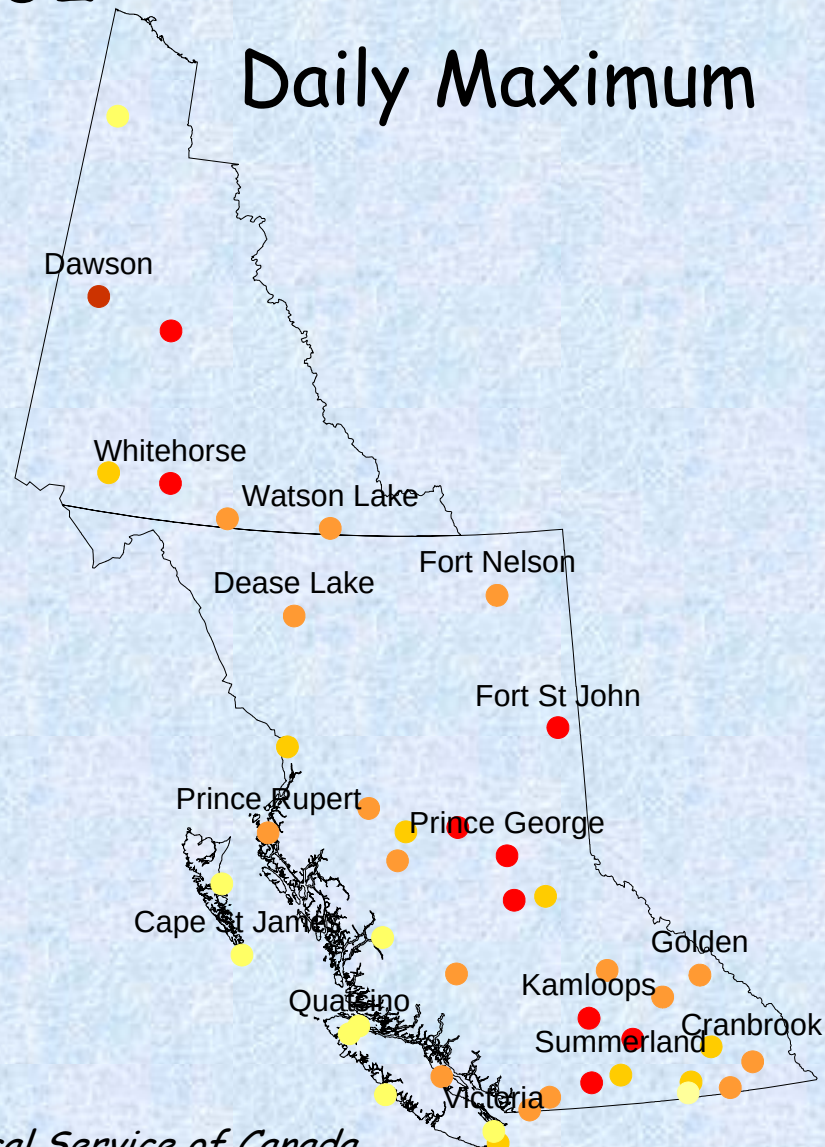


Trends in Annual Temperature 1950-2002

Daily Minimum

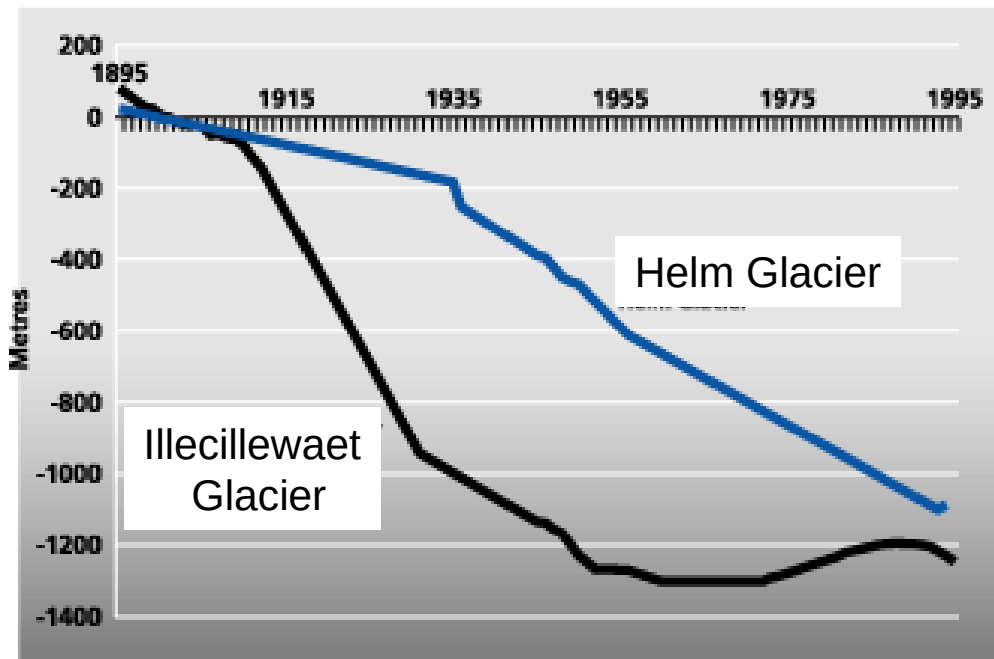
Daily Maximum

Change ($^{\circ}\text{C}$)

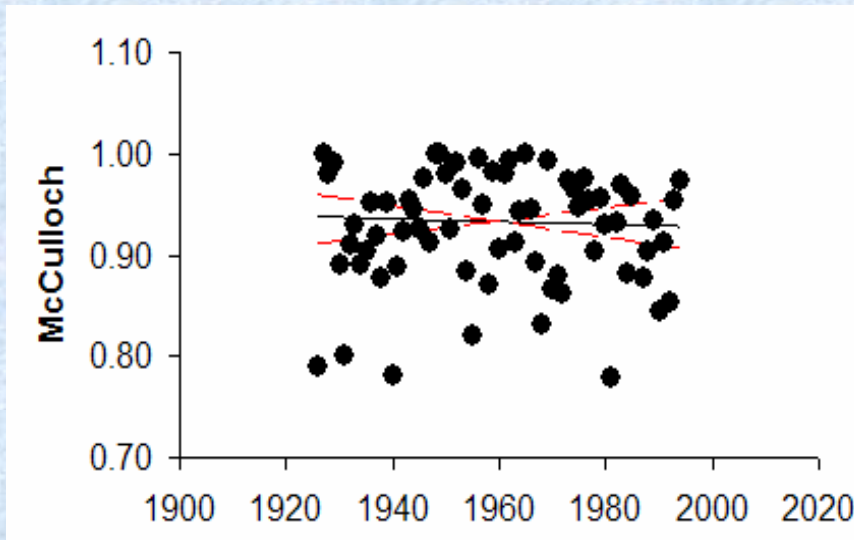
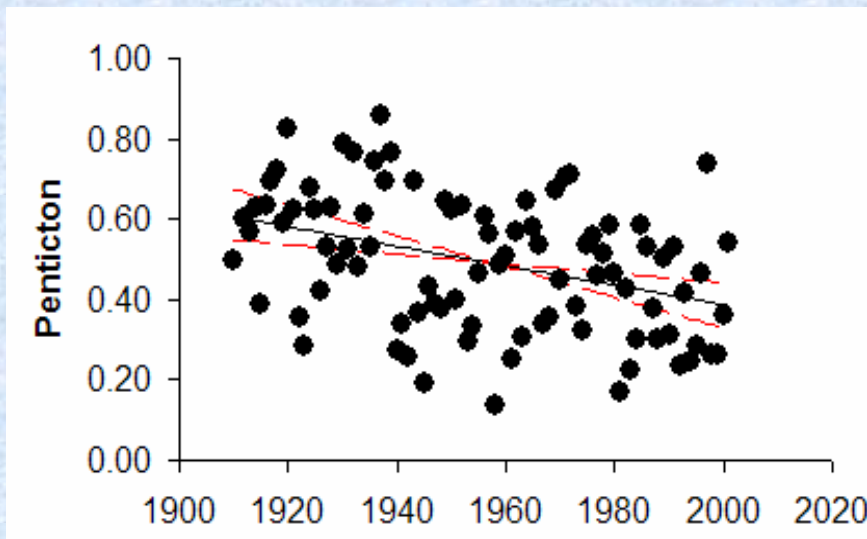


Meteorological Service of Canada

Retreat of Glaciers



Trend in Snowfall



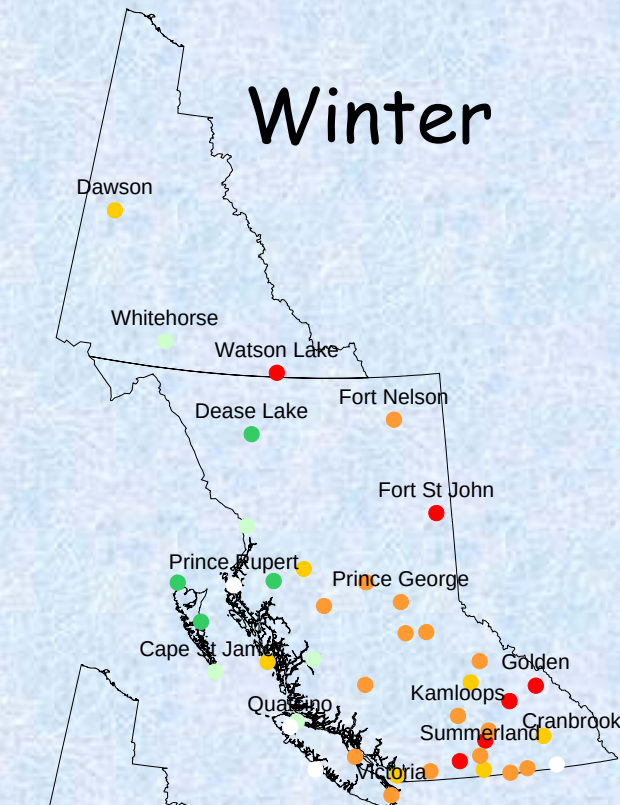
- Fraction of precipitation that falls as snow
- Based on Nov-Mar snow and precip.
- McCulloch - 1250m
Penticton - 344m

Trends in Seasonal Precipitation 1950-2002

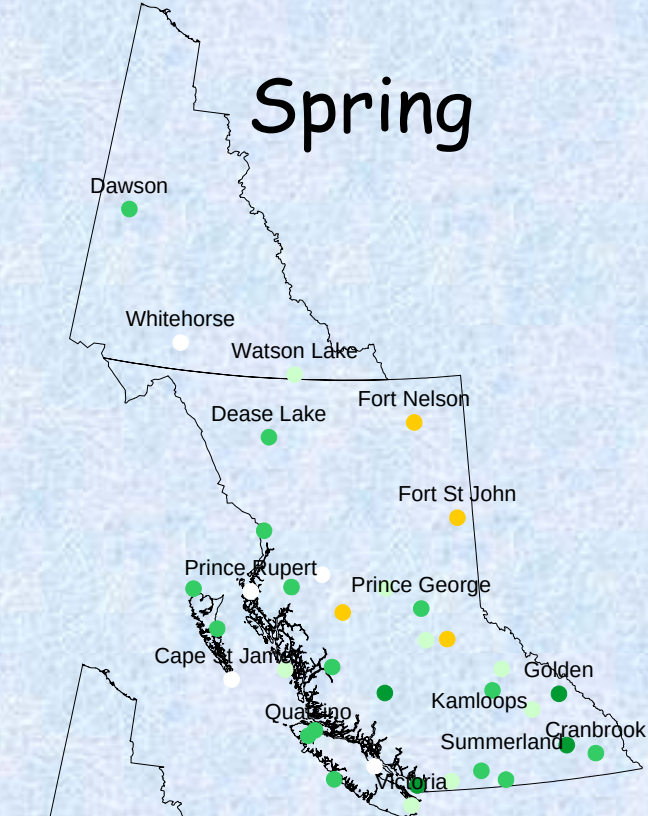
Percent change



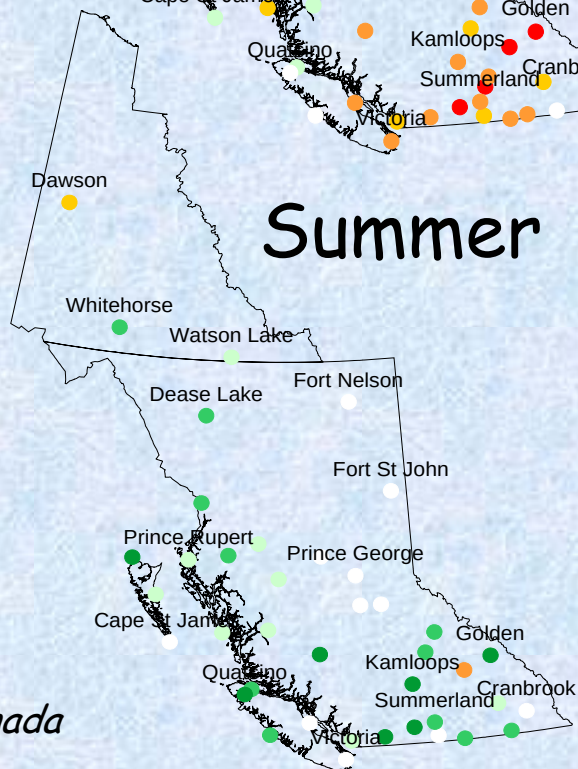
Winter



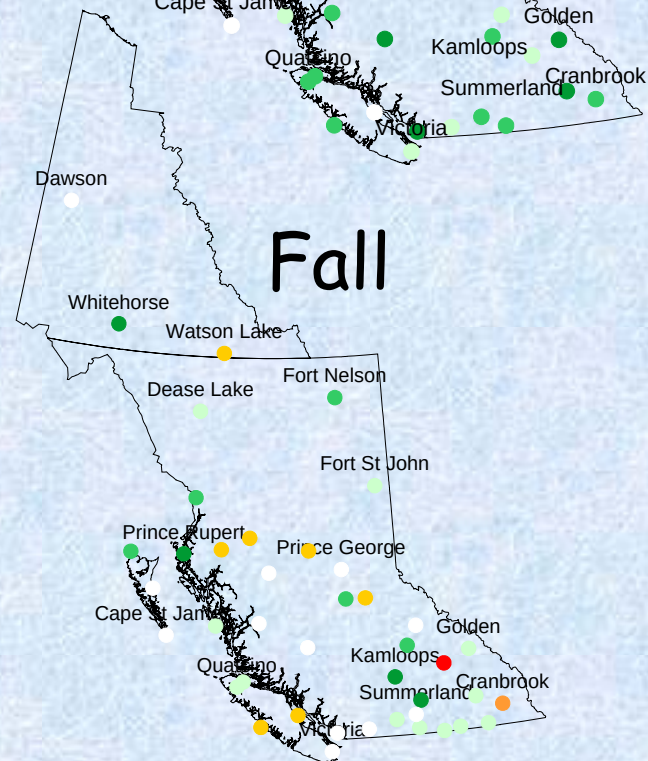
Spring

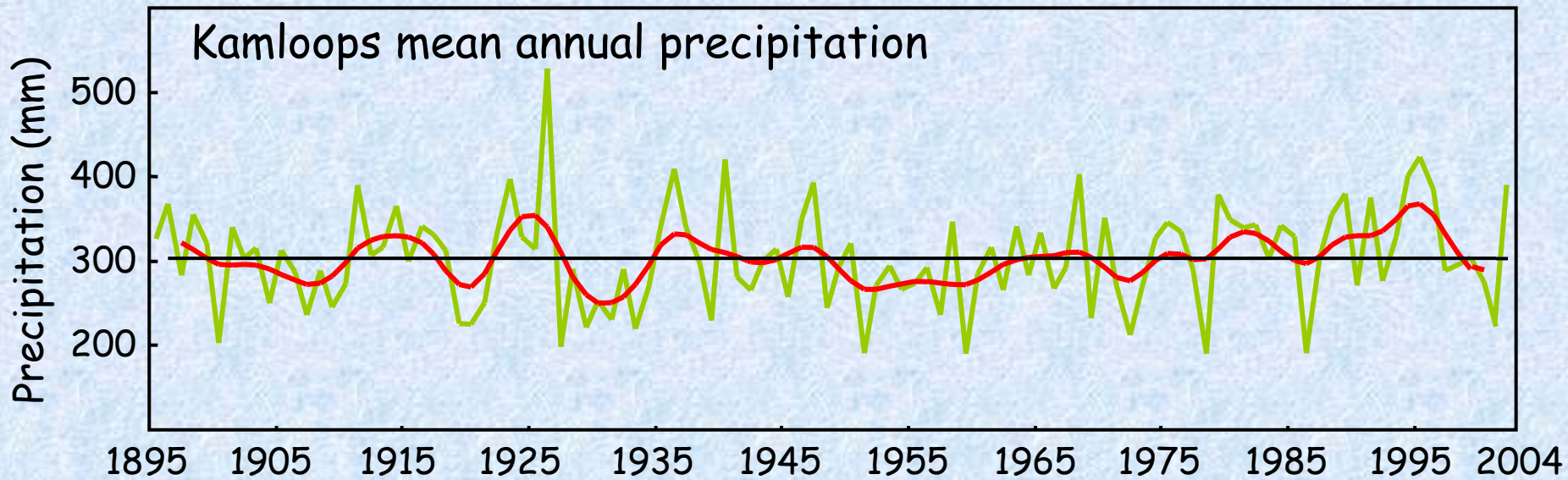
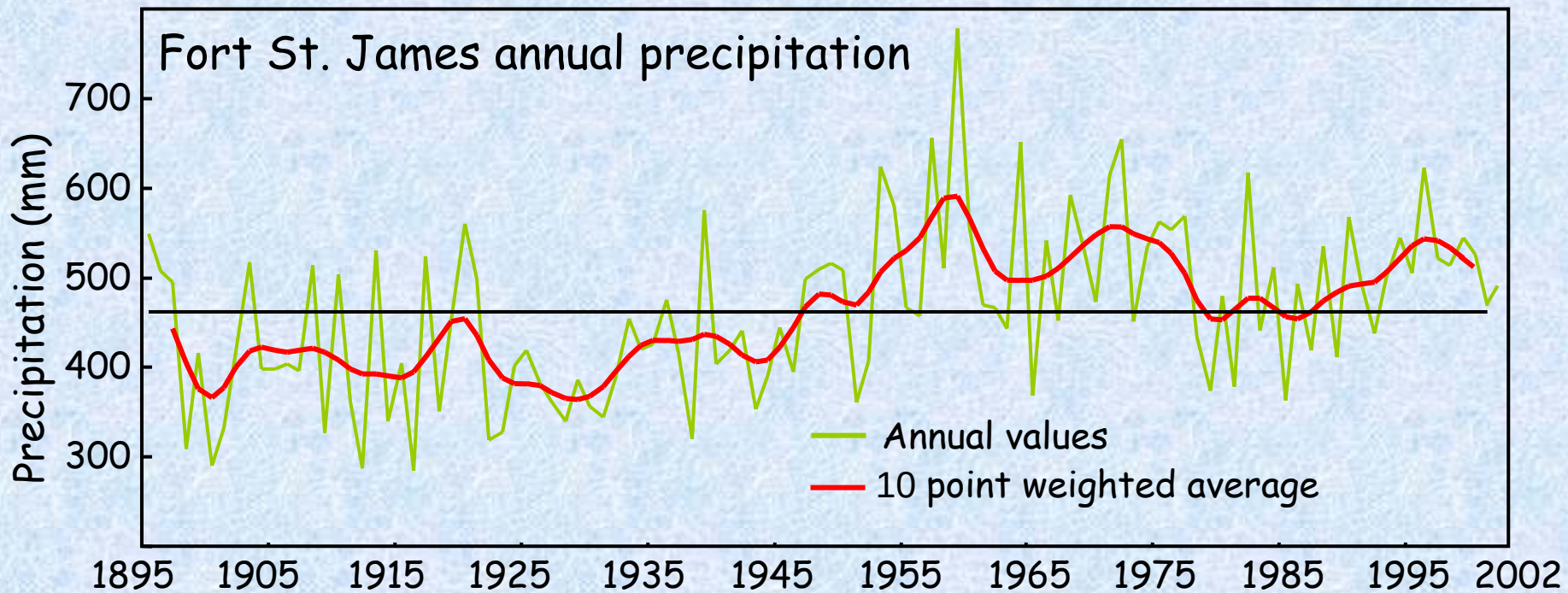


Summer



Fall



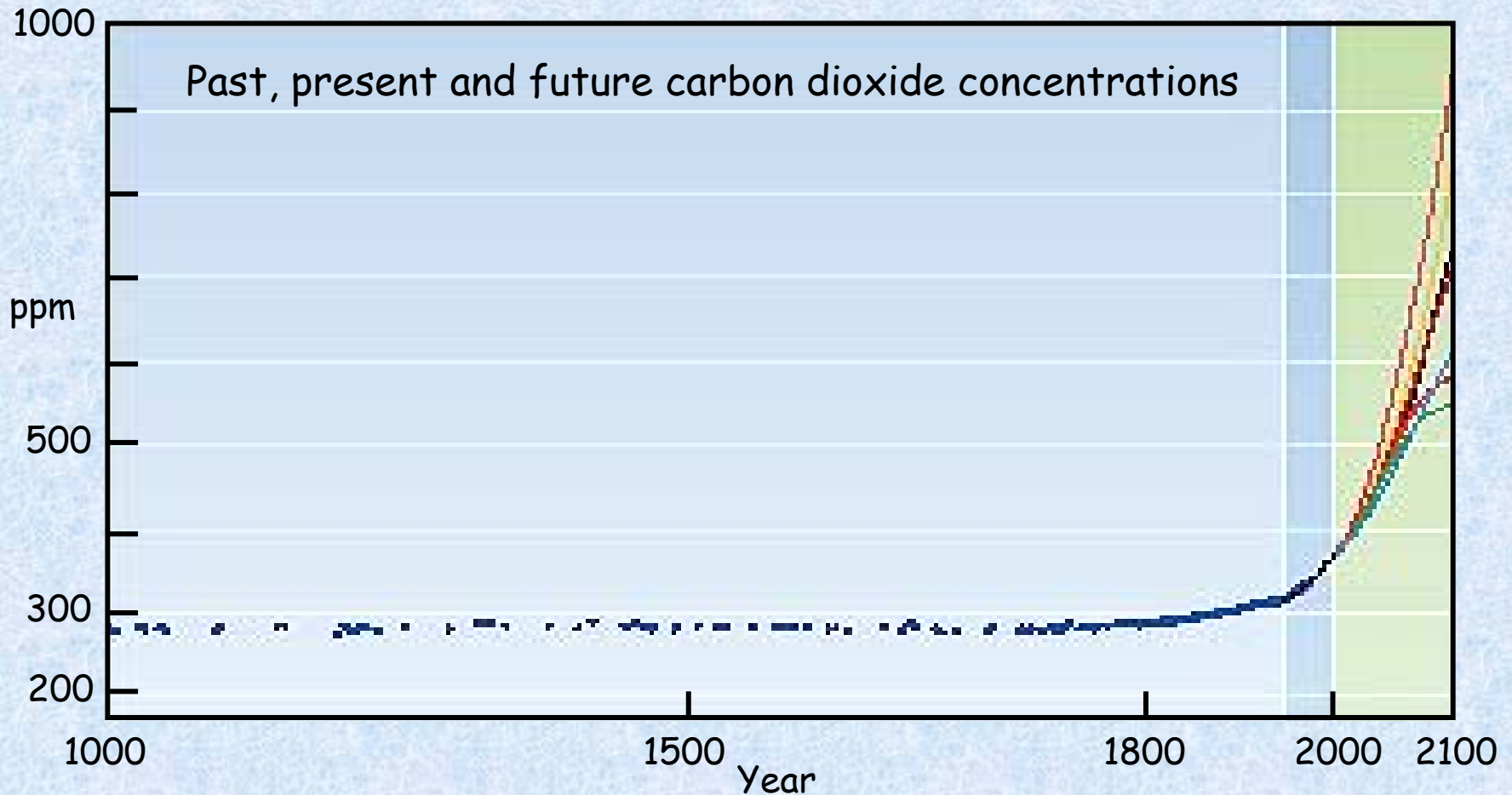


Climate Change or Variability?

- Both! Trend superimposed on natural decadal scale cycles in climate
- Magnitude and direction of trend influenced by choice of period
- Global warming signal in temperature record.
- Significant changes in precipitation but because of the variability it is not possible to implicate global warming as the main cause.
- Consistent with model simulations of natural and anthropogenic contributions to global change.

Scientific Basis for Climate Change

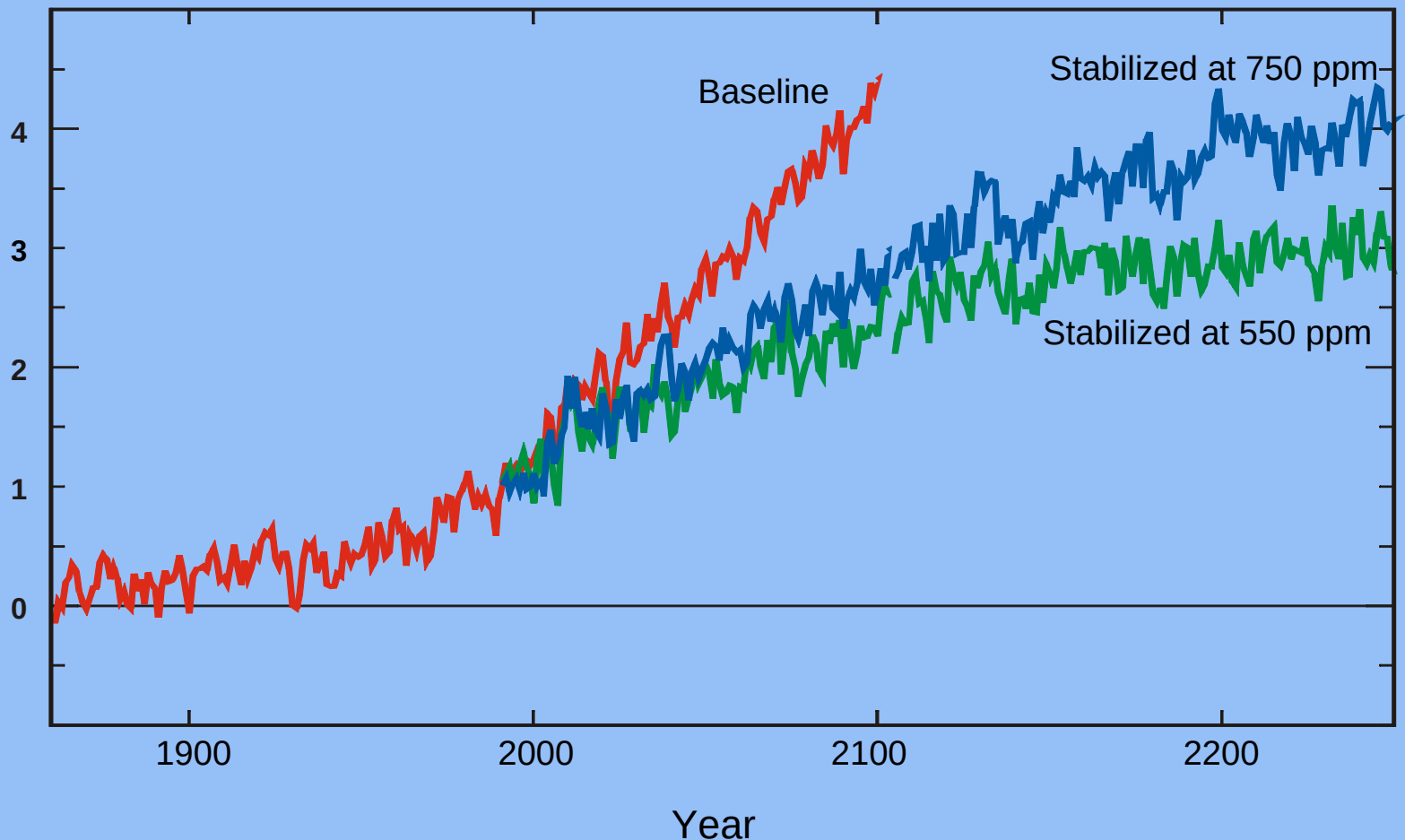
Greenhouse gases such as CO_2 , CH_4 and N_2O influence the radiation balance of the Earth. Human activity is increasing the concentration of these gases in the atmosphere.



IPCC Third Assessment Report, 2001

Mitigation will slow down the rate and magnitude of change, but cannot stop it

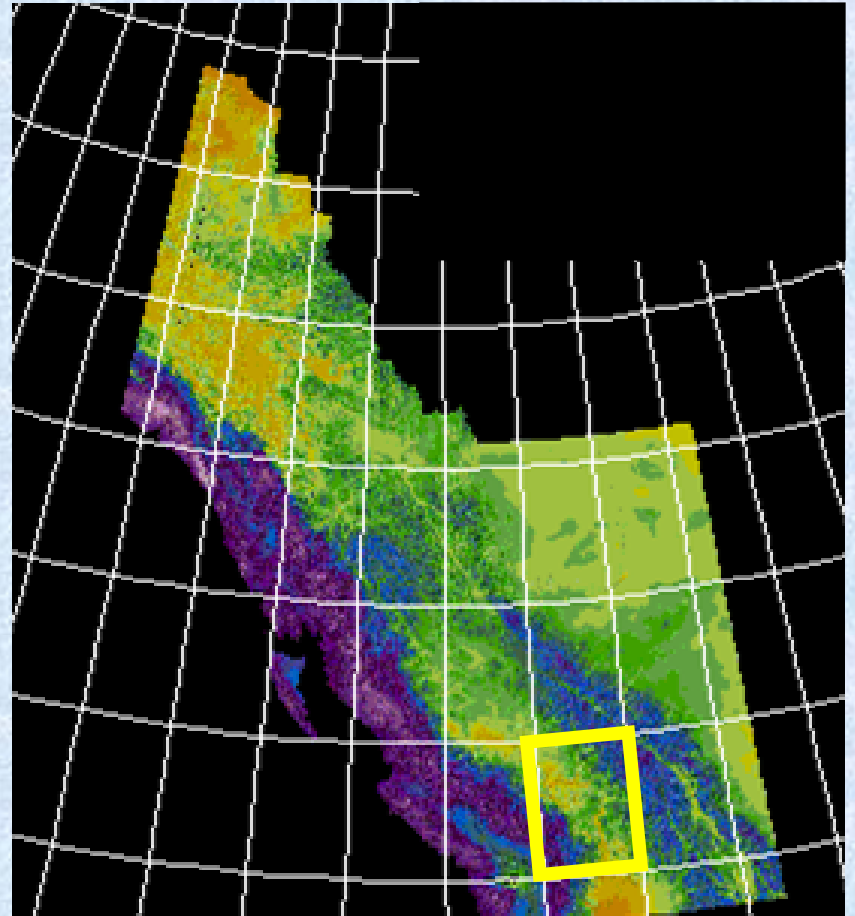
Global Temperature Change (degrees C)



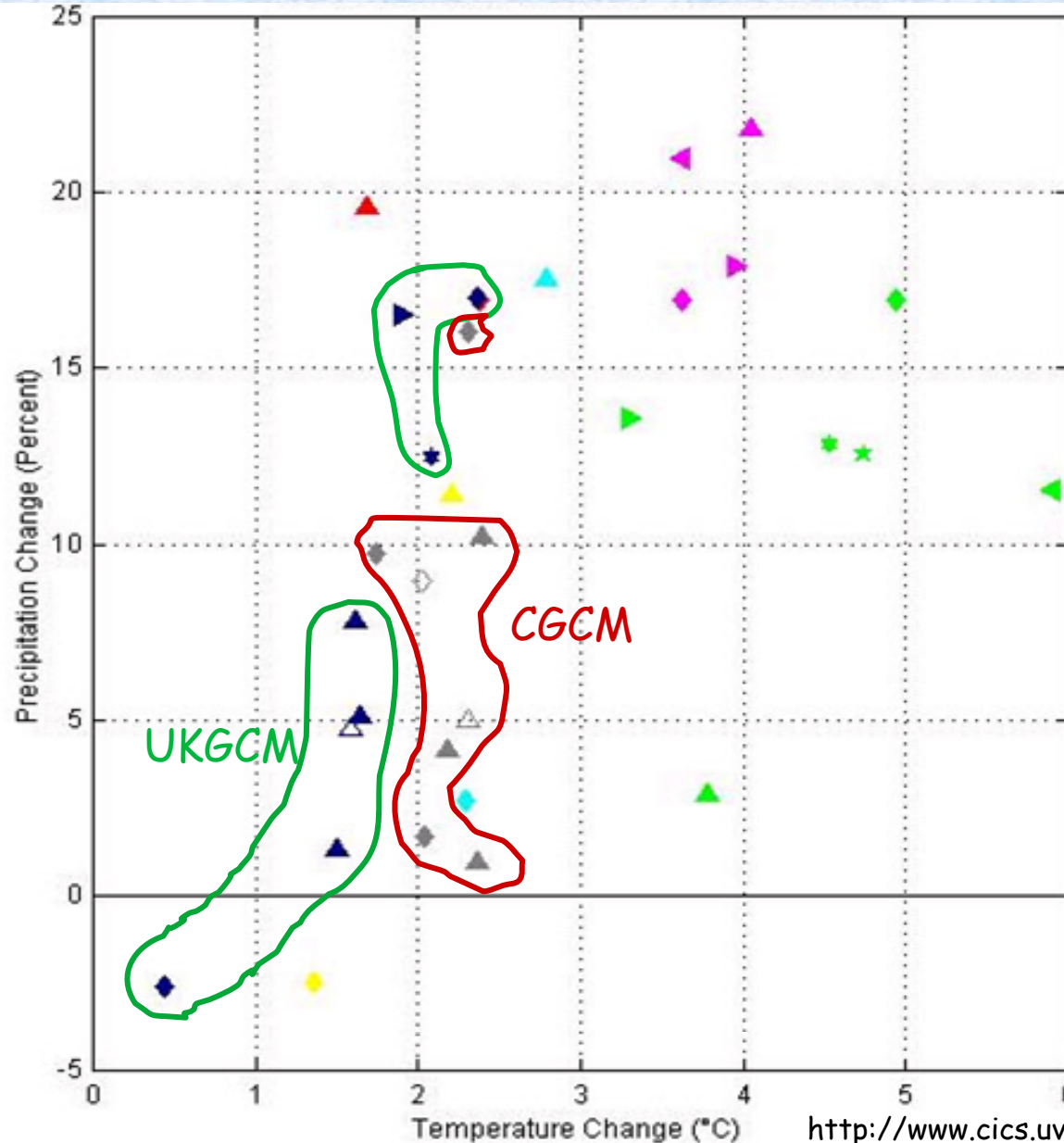
Global Climate Models

Limitations

- Resolution
- Representation of physical processes
- Representation of surface
- Average conditions
- Accuracy
- Emission scenarios



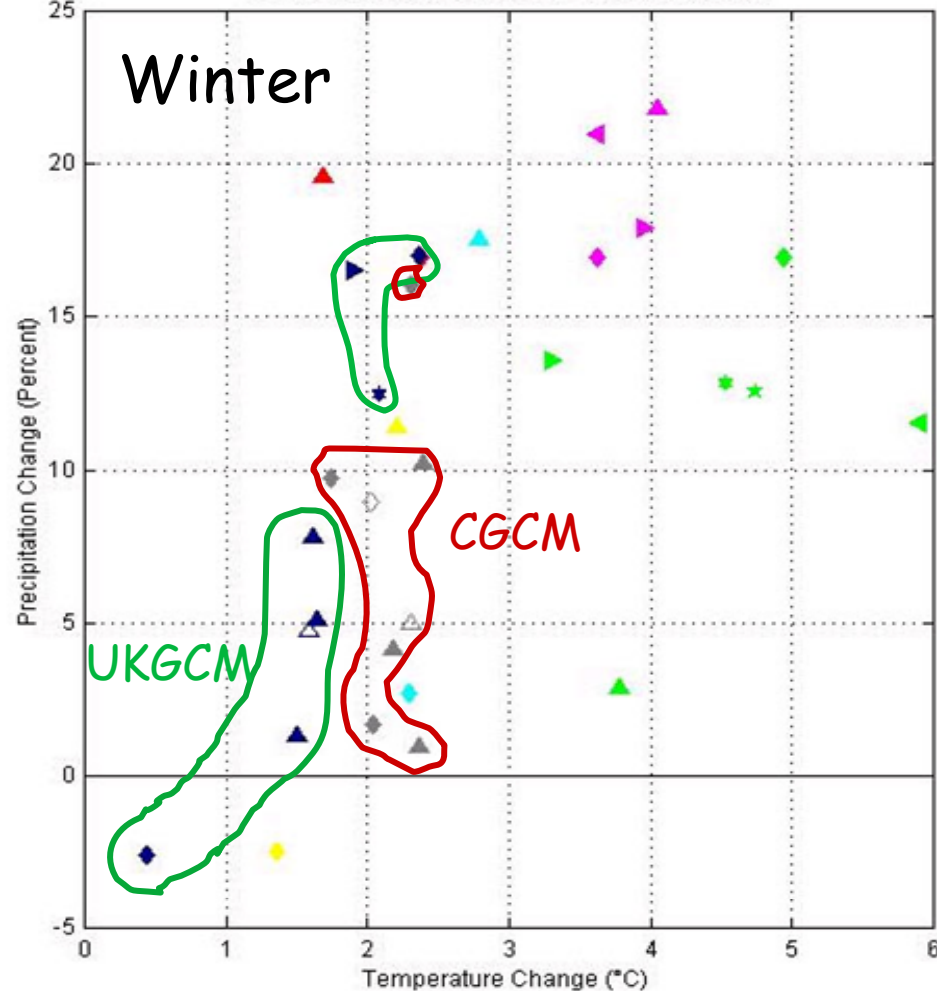
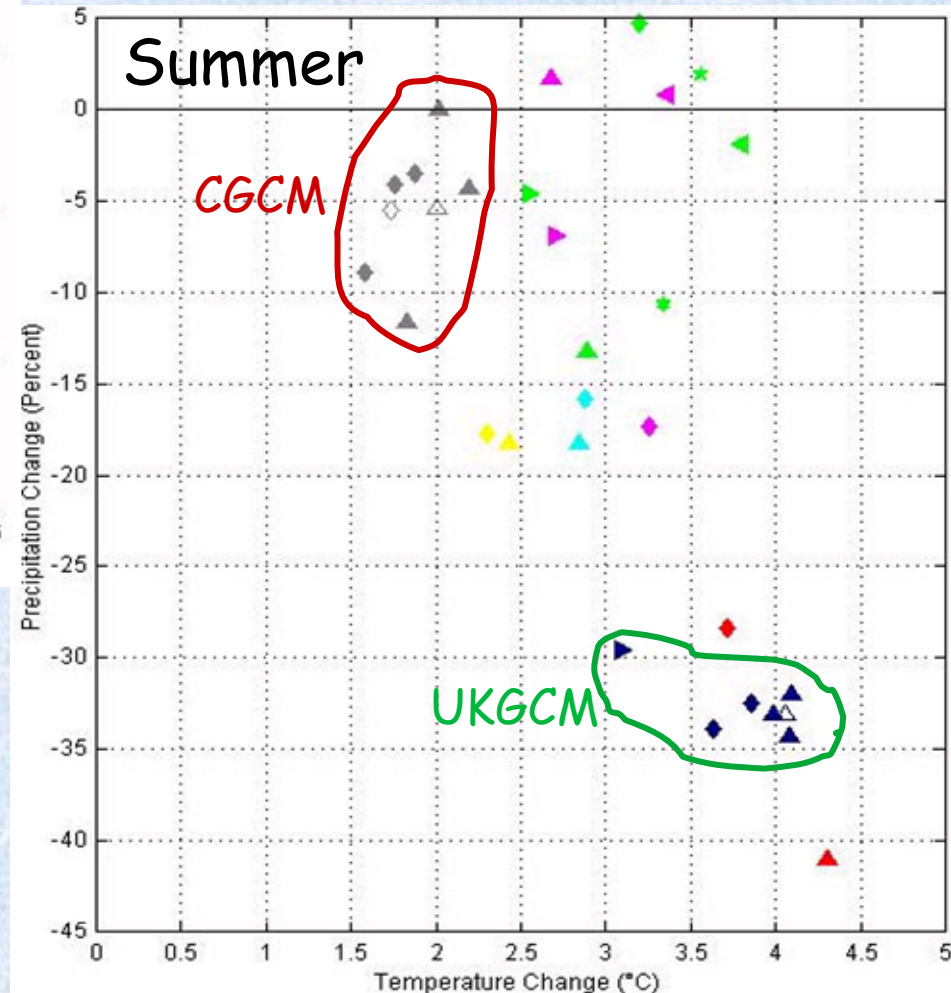
Change in Mean Winter Temperature and Precipitation from 1961-90 Values for 2050s, Okanagan.



Seven global climate models and eight emission scenarios. Canadian (CGCM) and UK (UKGCM) scenarios are highlighted. The scenarios reflect levels of reduction in greenhouse gas emissions.

Change in mean winter and summer temperature and precipitation for 2050s, Okanagan. (Seven global climate models and eight emission scenarios.)

<http://www.cics.uvic.ca/scenarios/index.cgi?Scenarios>



Climate Change Scenarios

From 7 models and 8 emissions scenarios

Winter

Summer

Southern BC

	Temp.C	Precip.%	Temp.C	Precip.%
2020s	0 to 2	-5 to +15	+0.5 to 2	-30 to +5
2080s	+2 to 6	+0 to 25	+2.5 to 7.5	-50 to +0

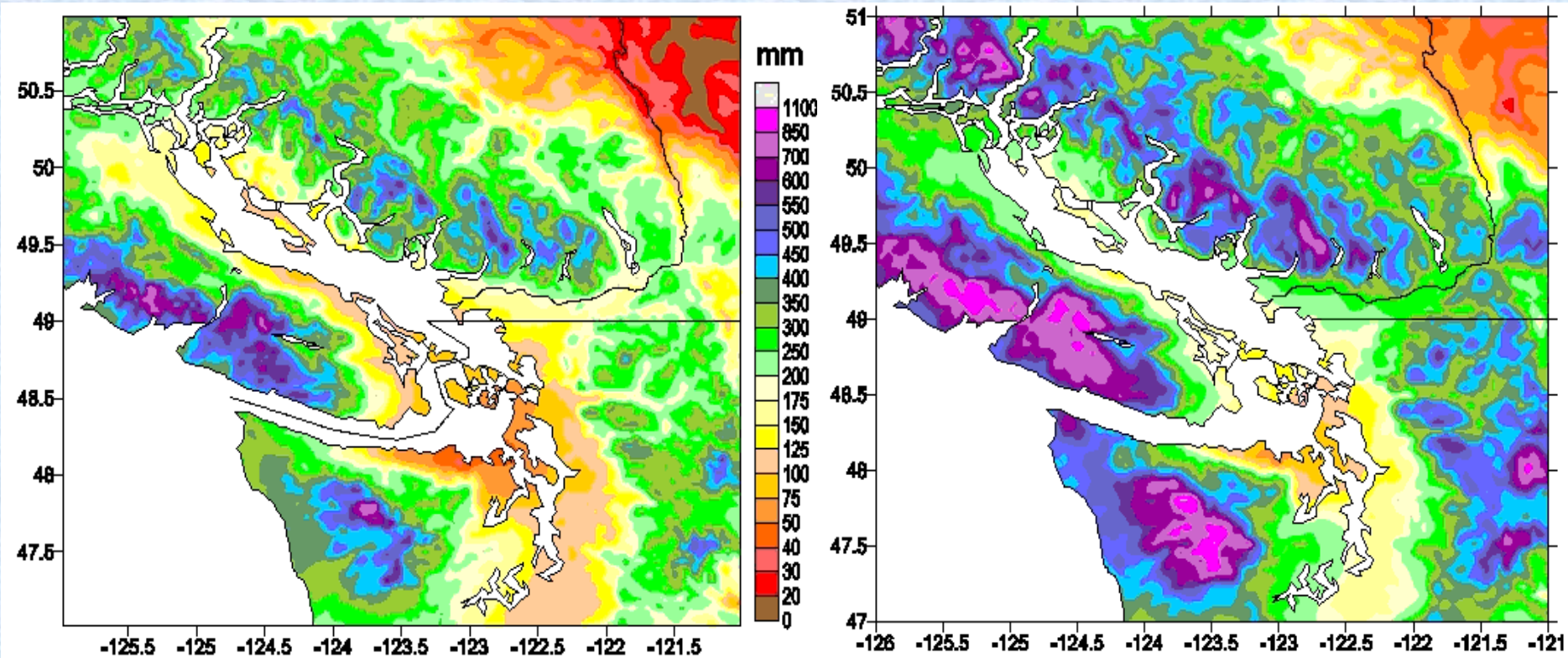
Northern BC

2020s	+0 to 2.5	0 to 20	+0.5 to 1.5	-10 to +10
2080s	+2.5 to 8.5	0 to 45	+2 to 7	-15 to +25

High-resolution Climate Maps

Maps similar to those shown here are now available. They can be combined
With climate change data to show future possible climates

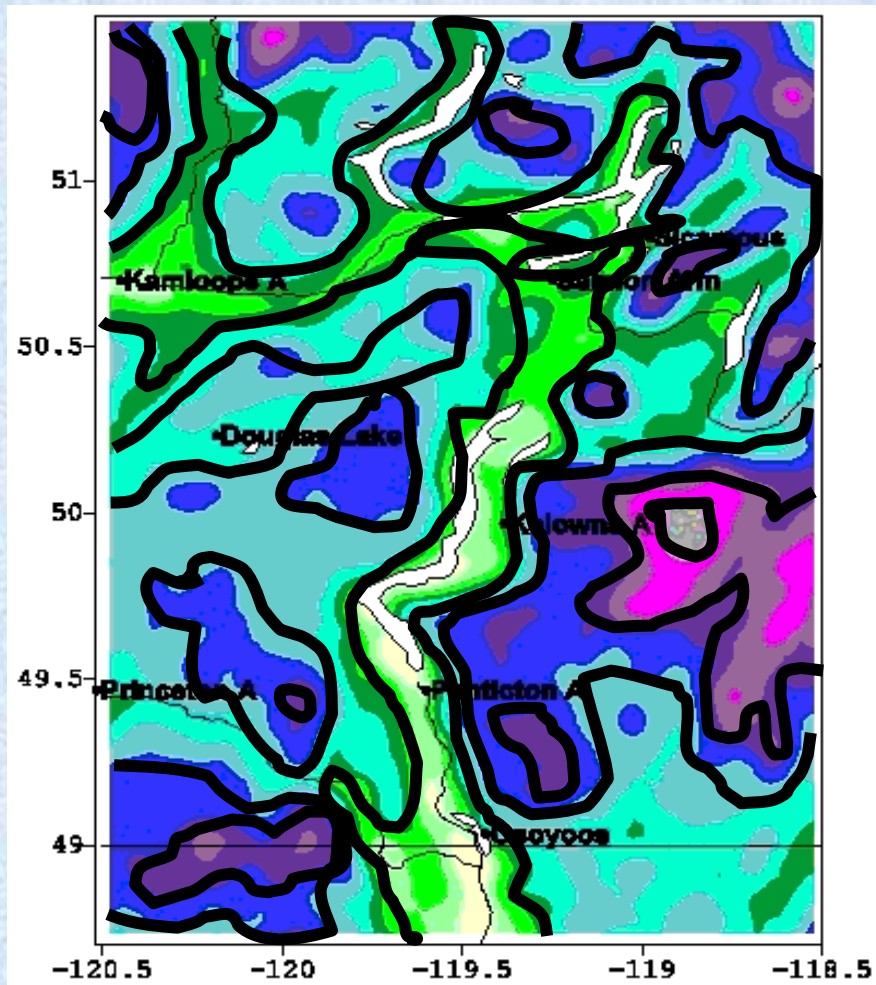
Current January Mean Precipitation 2080s



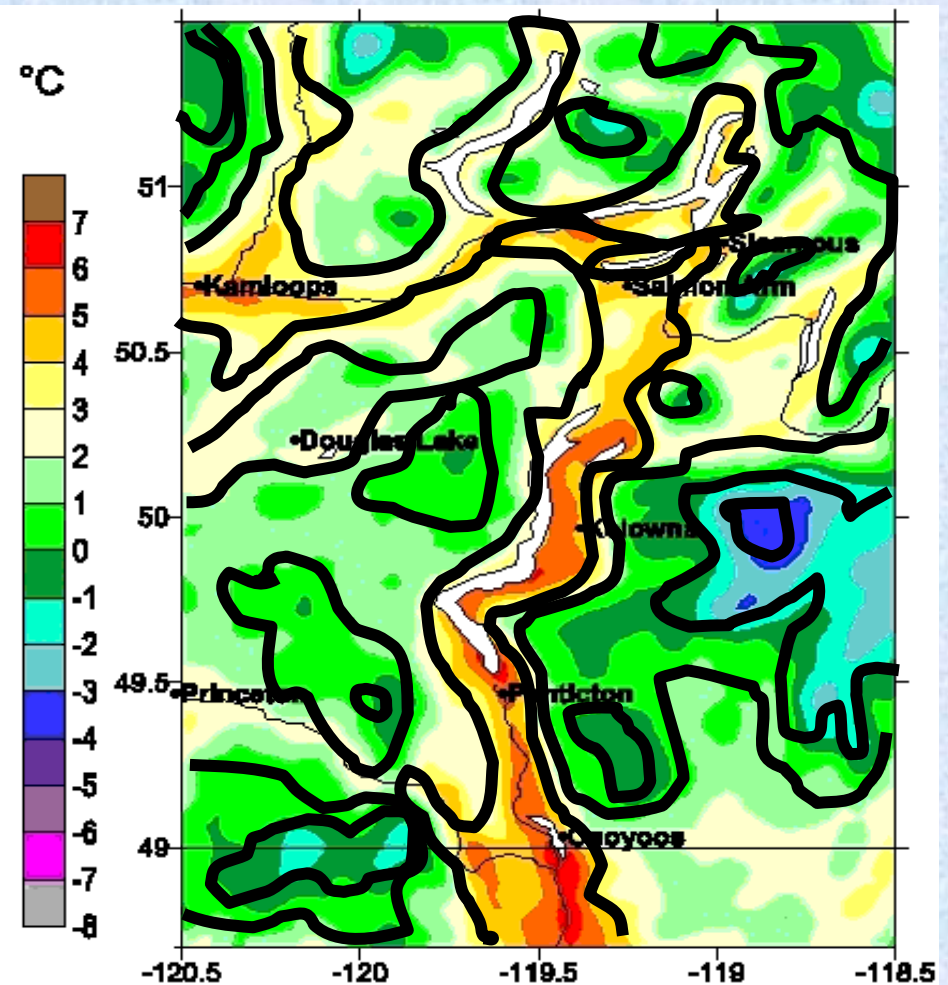
Meteorological Service of Canada

Overlay climate maps with vegetation or species distribution maps to define current and future climates of the map units

April Mean Minimum Temperature
Current

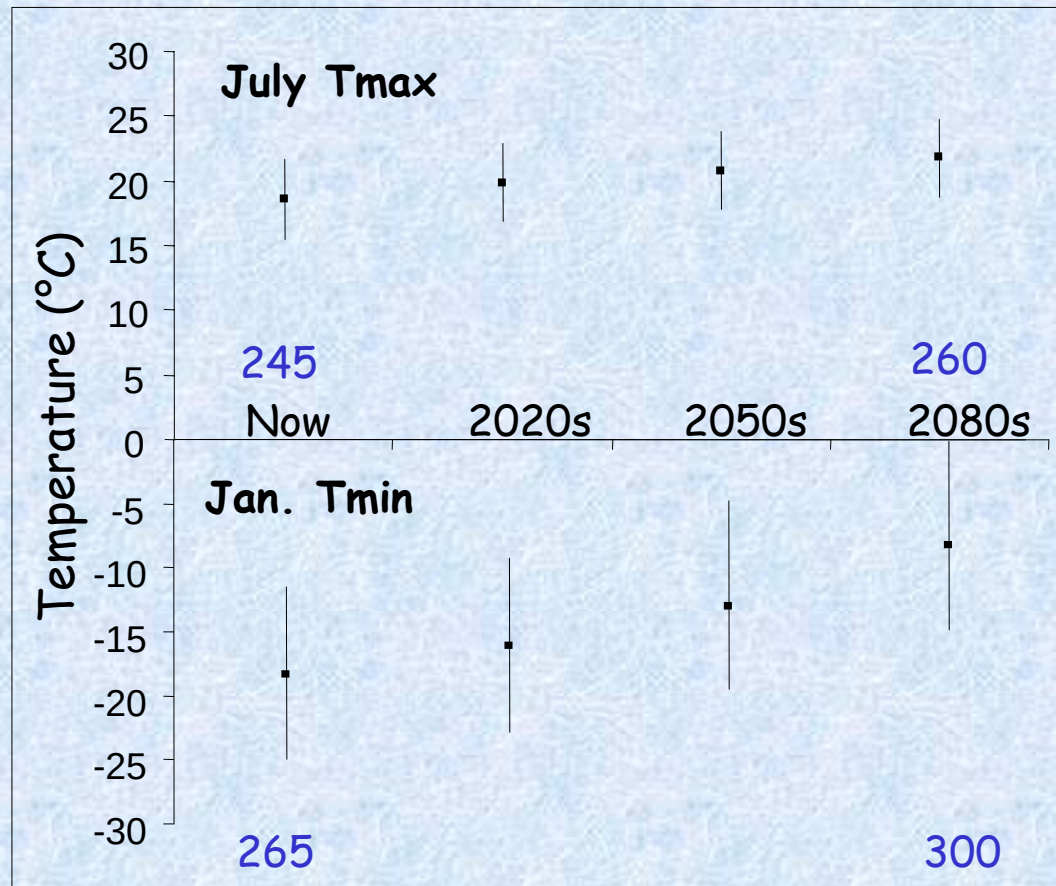


2080s



Modified from Meteorological Service of Canada

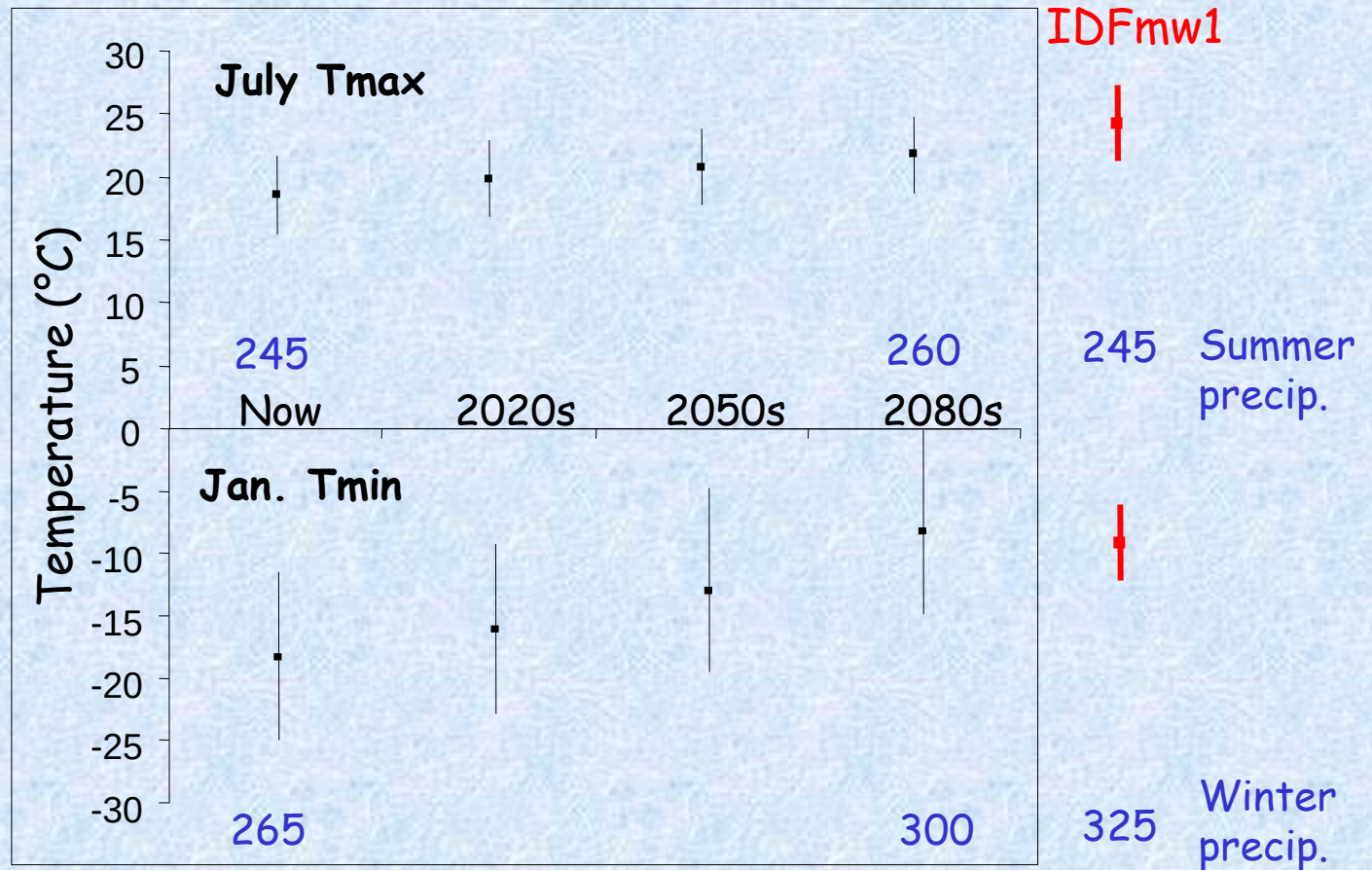
Current and future climates for the Boreal White and Black Spruce, BWBSdk1 Climate change scenarios from Canadian GCMA2x



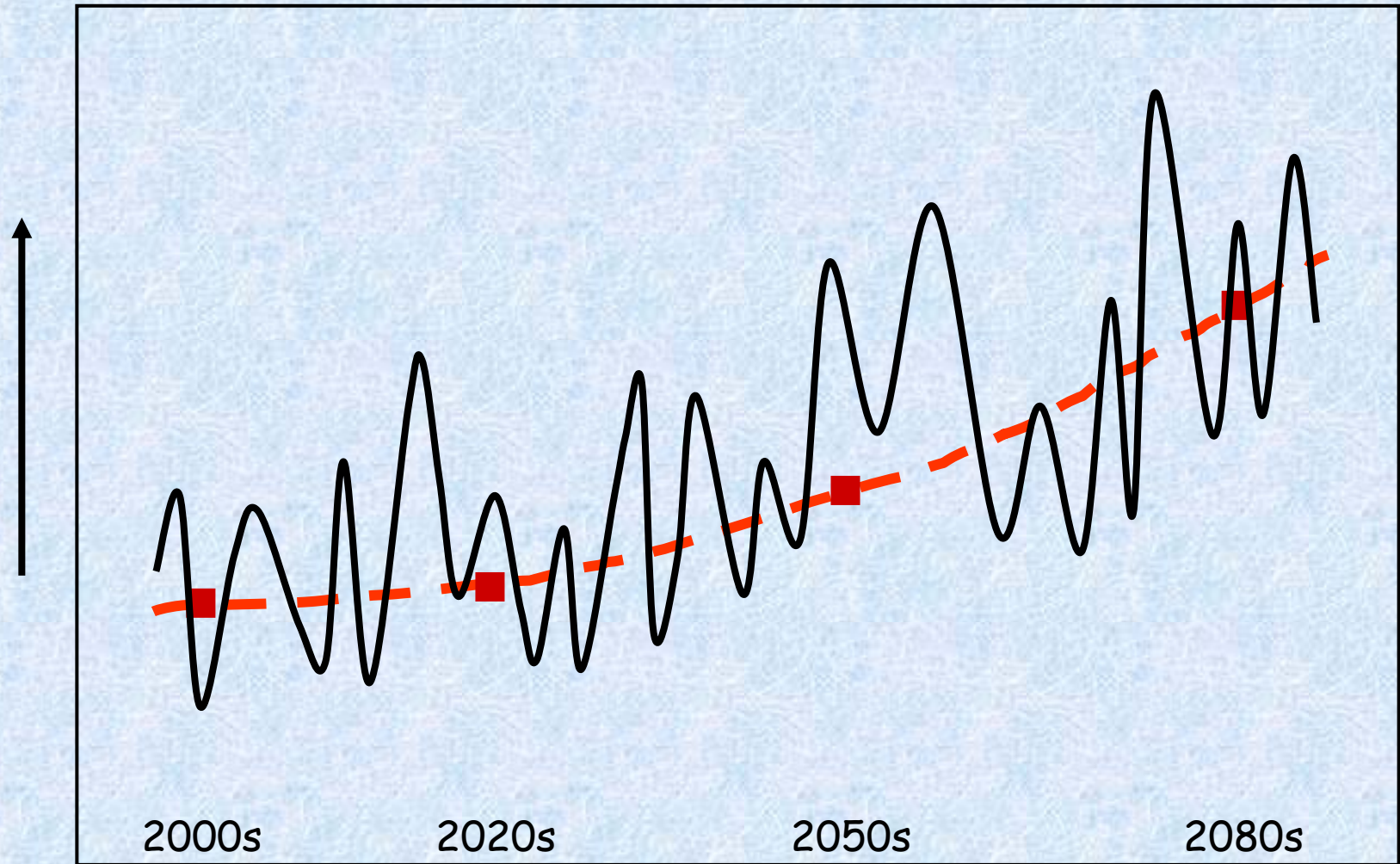
Summer
precip.

Winter
precip.

Current and future climates for the
Boreal White and Black Spruce, BWBSdk1
Climate change scenarios from Canadian GCMA2x.
Current climate of the Interior Douglas-Fir, IDFmw1



Need to consider the inter-annual variability as well as changes in mean conditions.



Summary

- Climate is always changing
- Evidence that anthropogenic climate change is underway in BC
- Temperature increasing
- Future changes will be faster than in the past
- Use a range of climate scenarios
- Inter-annual variability important