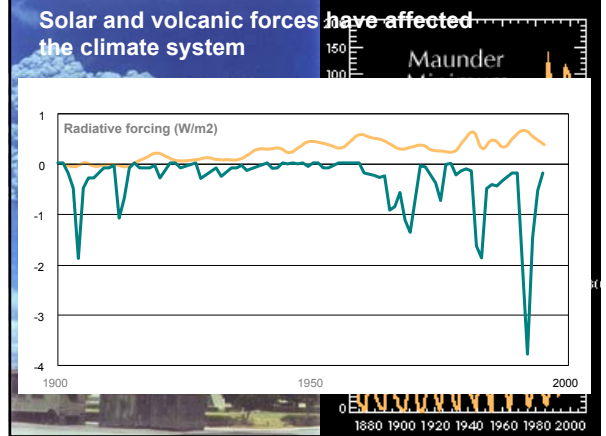


# Adapting to Climate Change:

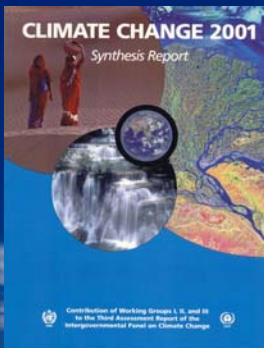
## The Role of Canada's Engineers and Geoscientists

Henry Hengeveld  
Environment Canada

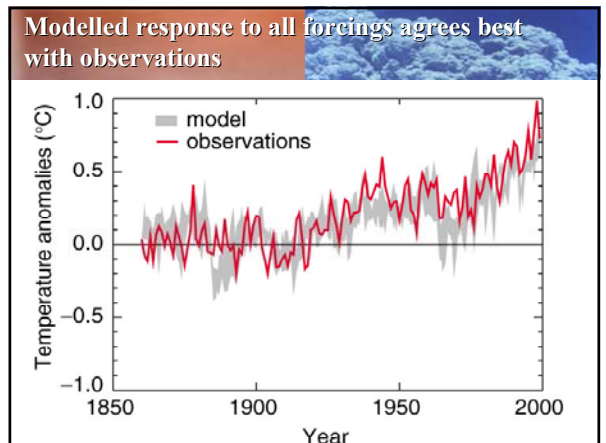
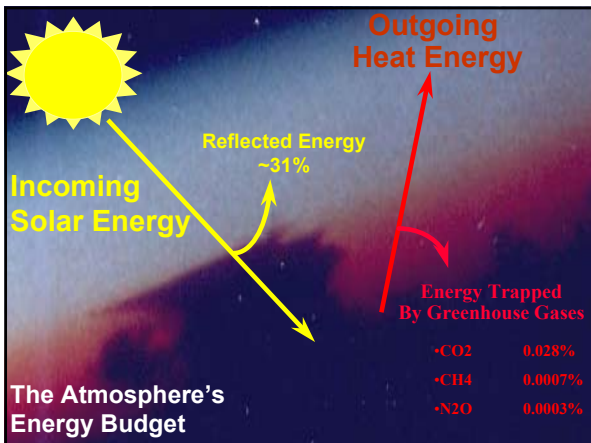
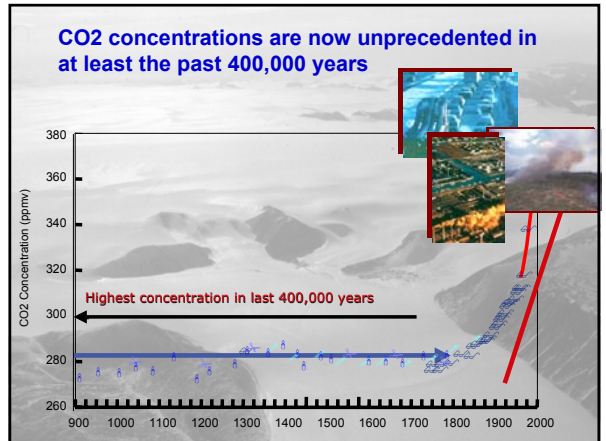
APEGBC Annual Conference  
Oct 23, 2003



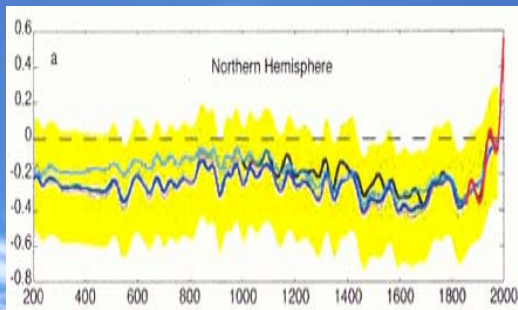
### Some key conclusions of recent science assessments



- Humans are already causing change
- Future very likely beyond our experience
- Benefits and problems
- Problems dominate if change is large or rapid
- Mitigation can reduce but not stop change
- Must also learn to adapt

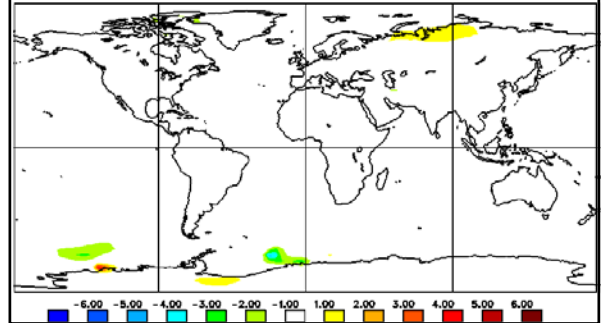


Recent global temperatures appear to be unprecedented during at least the past 2 millennia

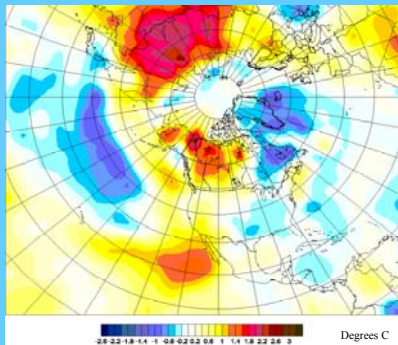


Projected temperature changes vary considerably from year to year

CCCma Surface Temperature Change Projection for 1990  
Simulated by CGCM1 (<http://www.cccma.bc.ec.gc.ca>)



Changes in temperature are unevenly distributed



Trends for 1950-98

#### FCCC OBJECTIVE

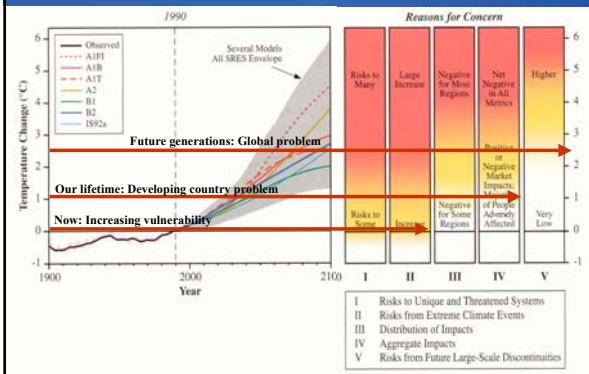
"...to achieve...stabilization of greenhouse gas concentrations...at a level that would prevent dangerous interference with the climate system..."

#### Kyoto Protocol Commitments

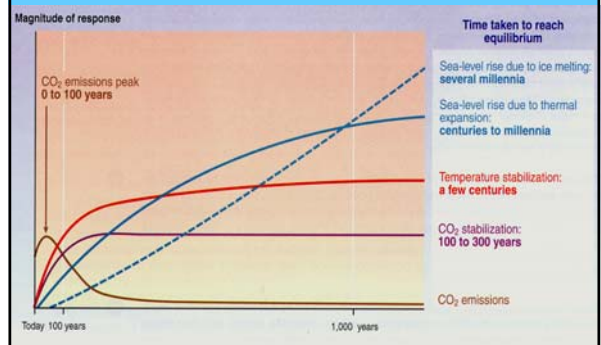
- Developed countries - 5.2% reduction from 1990 emissions by 2010
- Canada - 6% reduction



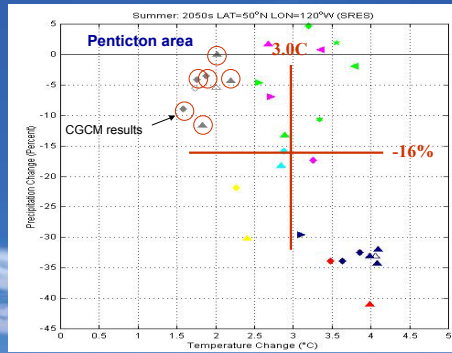
Reasons for concern amplify with time and rate of global warming



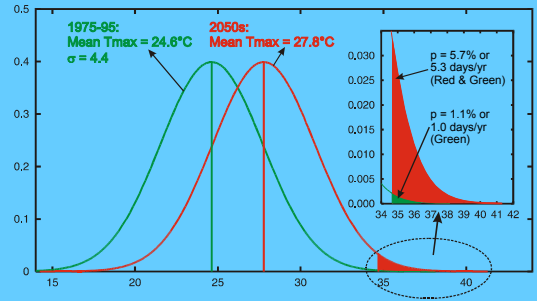
In fact, temperature will continue to rise for centuries, and sea levels for millennia after CO<sub>2</sub> stabilization



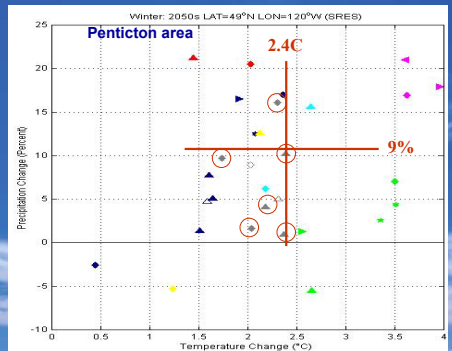
However, site specific projections can vary greatly between models and scenarios used



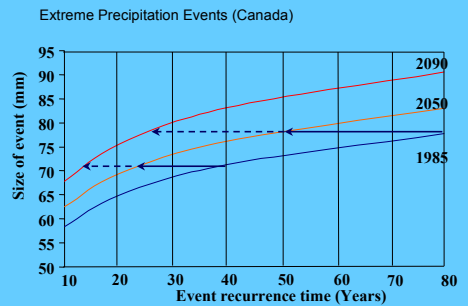
A modest increase in mean temperature could dramatically increase frequency of very hot days



However, site specific projections can vary greatly between models and scenarios used



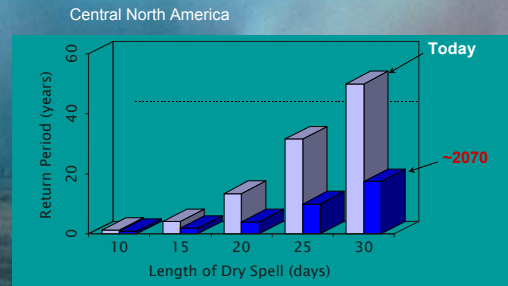
Extreme precipitation events are likely to become more frequent



Many regions of Canada's coastline are also vulnerable to sea level rise



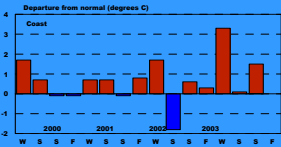
The frequency and severity of droughts are also likely to increase in southern Canada





## Recent Unusual Weather Events in S. B.C: Persistent drought and warm temperatures

### Temperature



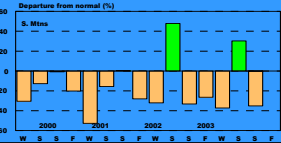
• Low reservoirs and streamflow

• Mountain pine beetle epidemic

• Wildfire

• Impacts on wide range of economic sectors

### Precipitation



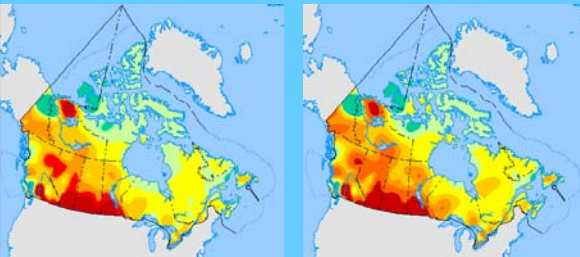
Hence adaptation is a key part of the response

“Many important economic and social decisions are being made today on long-term projects...based on the assumption that past climate data...are a reliable guide to the future. This is no longer a good assumption...”

UNEP/WMO/ICSU Conference  
Villach, Austria 1985

## Fire Weather Index Scenario for the 2050s (right) compared with Fire Weather Index for the 1980s (left)

Source: Natural Resources Canada

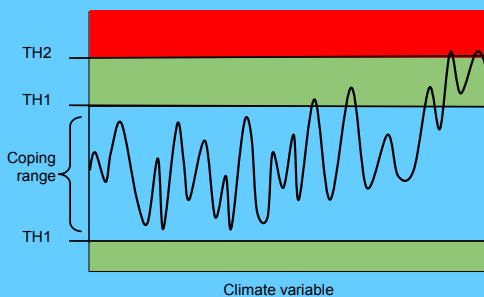


Note: scenario of changing extreme event based on changes in mean monthly temperature

## There are gaps and uncertainties in adaptation policy development

- Policies of the past may not work in the future
- Analysis of adaptation issues and options not far advanced
- However, at minimum, should ask
  - What if?
  - So what?
  - Can I adapt?

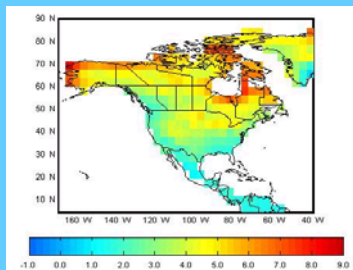
## Risk assessment must take climate change into account



## Some concluding thoughts

- Climate change is for real (*it won't go away!*)
- Global consequences of future climate change are significant cause for concern
- The regional details are still (and may remain) very uncertain
- Need multiple scenarios to study impacts
- Adaptation is part of the solution

Canadian Climate Impacts Scenarios (CCIS) Project  
<http://www.cics.uvic.ca/scenarios>



Canadian Climate Impacts and Adaptation Network  
(C-CIARN) <http://sts.nrcan.gc.ca/adaptation/>