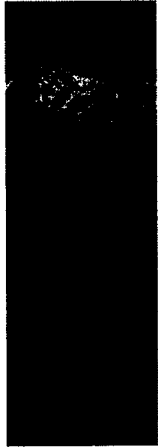


3-1-4-9(a)



**Modeling Future Snow and Ice Accumulation in the Rocky Mountains under climate warming**

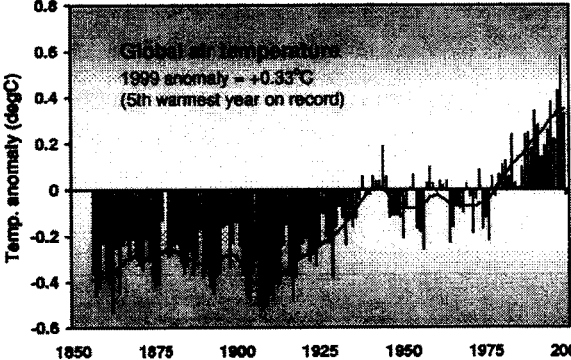
### Investigators

- Dr. James Byrne, University of Lethbridge
- Dr. Stefan Kienzle, University of Lethbridge
- Dr. Aaron Berg, University of Guelph
- Suzan Lapp, University of Lethbridge
- Nicole Rabe, University of Lethbridge
- Nicole McKechnie, University of Lethbridge
  
- Many others

## IS THE GLOBAL CLIMATE CHANGING?

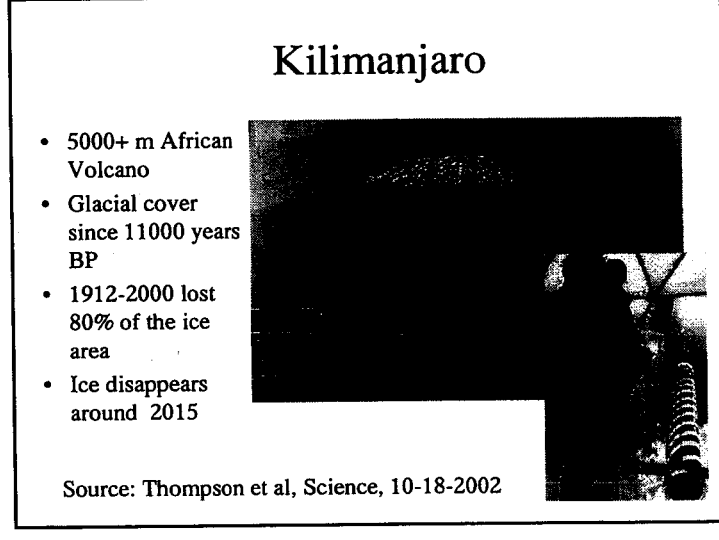
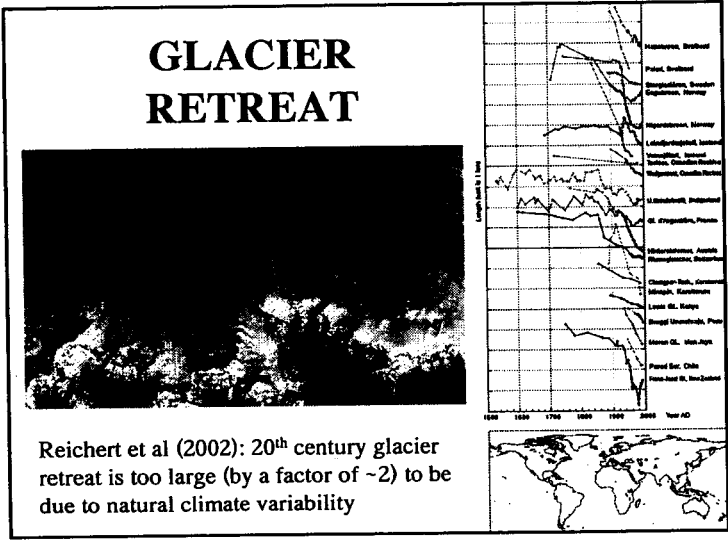
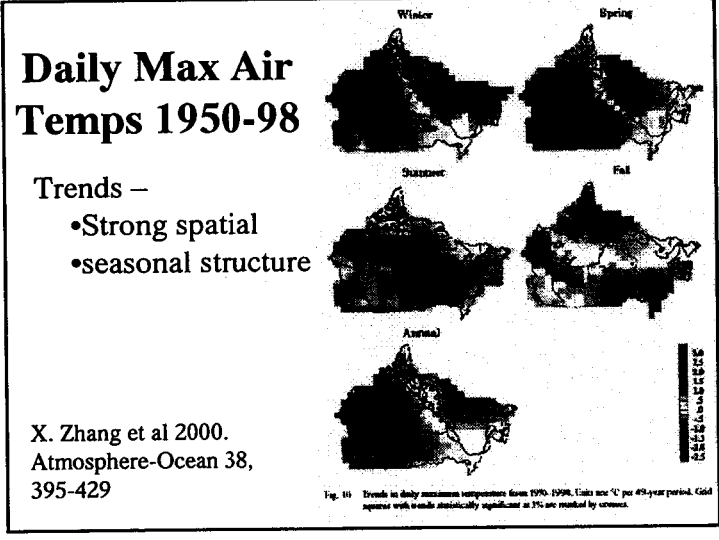
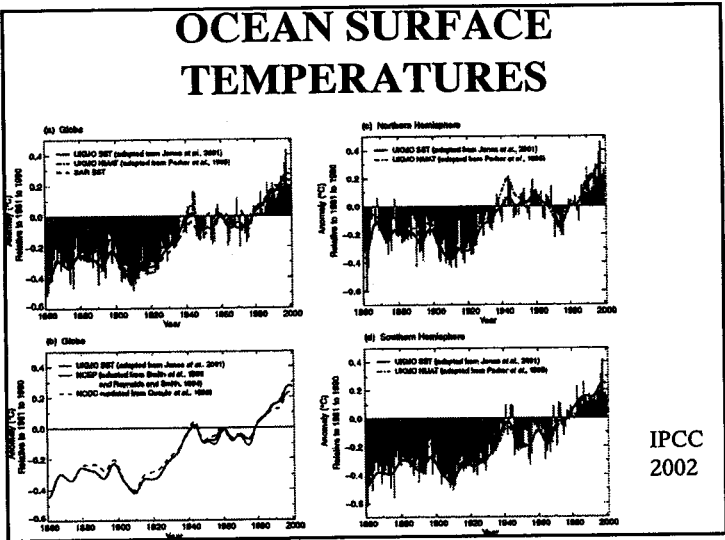
What the sceptics say:  
“There is no convincing evidence...”

### Global mean annual air temp



- Two step warming (1910-40 and post 1970)
- 0.8° C warming since late 19<sup>th</sup> century

Source: P D Jones, Climate Research Unit, University of East Anglia, U.K.



## Glacier National Park

- 150+ glaciers in 1850s
- 37 today
- Ice mass decline > 90%
- All gone in a few decades

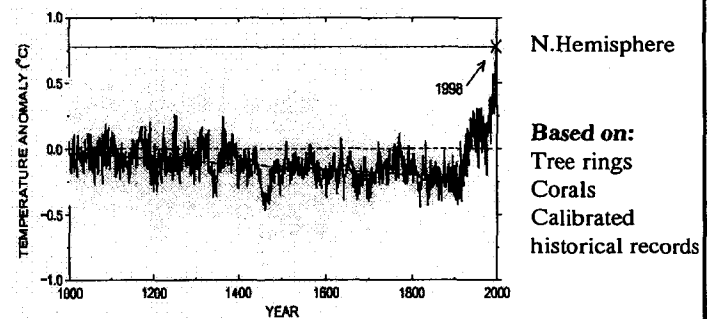
Source: Fagre, 2002.

## GLACIER RETREAT Who should care?

- St. Mary Basin water users
- Milk River basin water users
- International Joint Commission

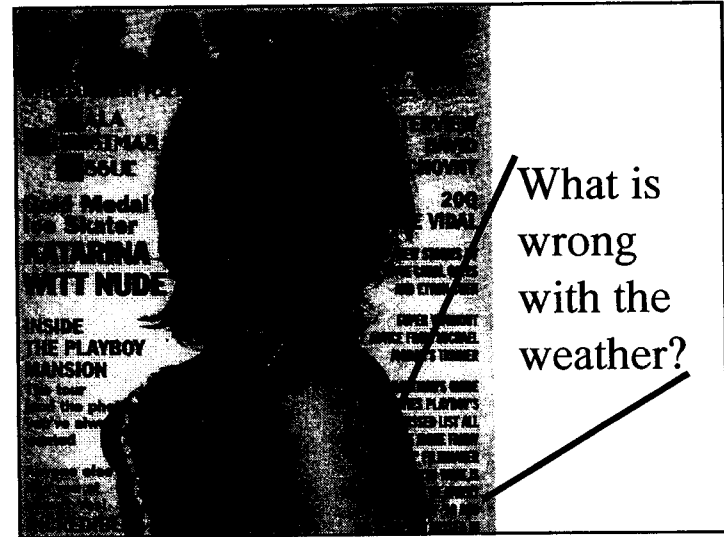
## ARE HUMAN ACTIVITIES RESPONSIBLE FOR CLIMATE WARMING?

## Michael Mann's Hockey Stick



M E Mann et al., 1999, Geophys. Res. Lett. 26, 759

# Science nature



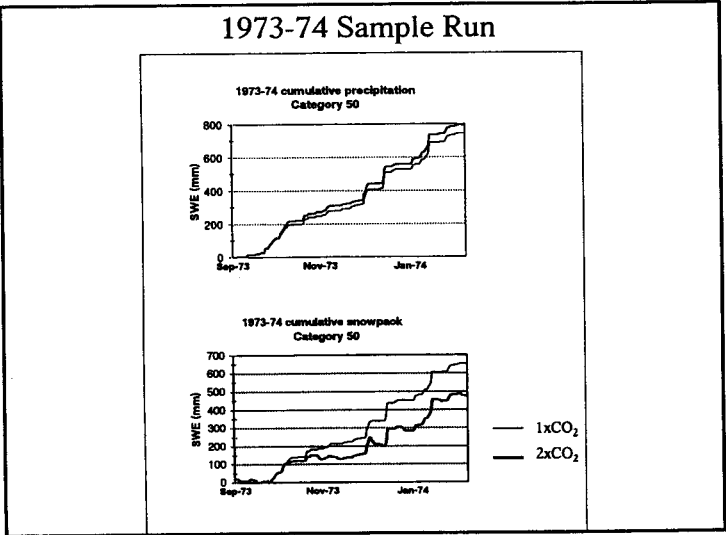
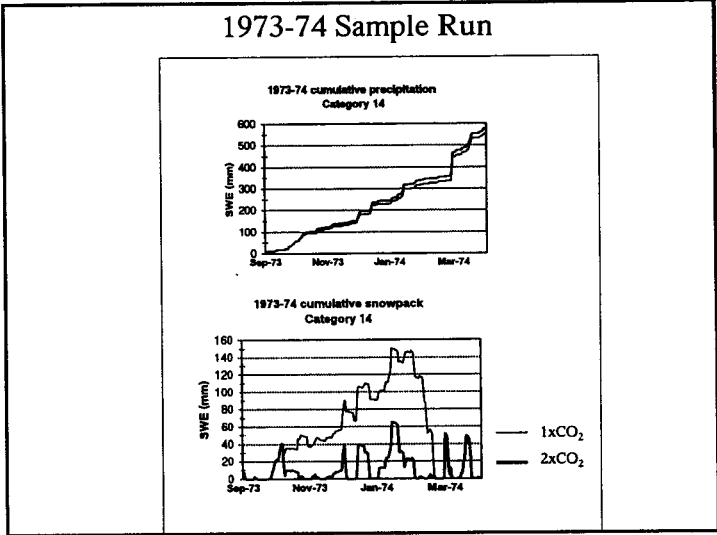
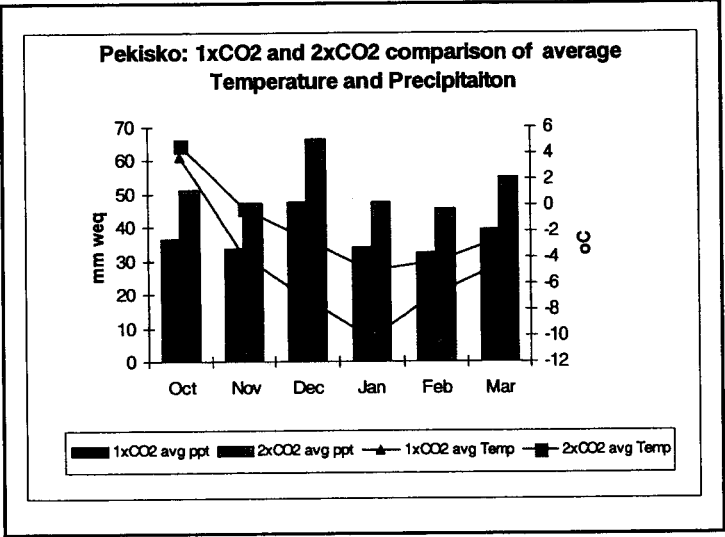
**Objective**  
*What will be the overall change in Oldman Basin snow water equivalent under climate change?*



**Global Circulation Models say increased precipitation in winter for our region**

**implies we have no problem**

**unfortunately we do**



### *Oldman Basin spring snow water equivalent declines 40% by 2020-50*