

Lecture 19: Wednesday, April 2, 2008

HW#4 is due in class TODAY.

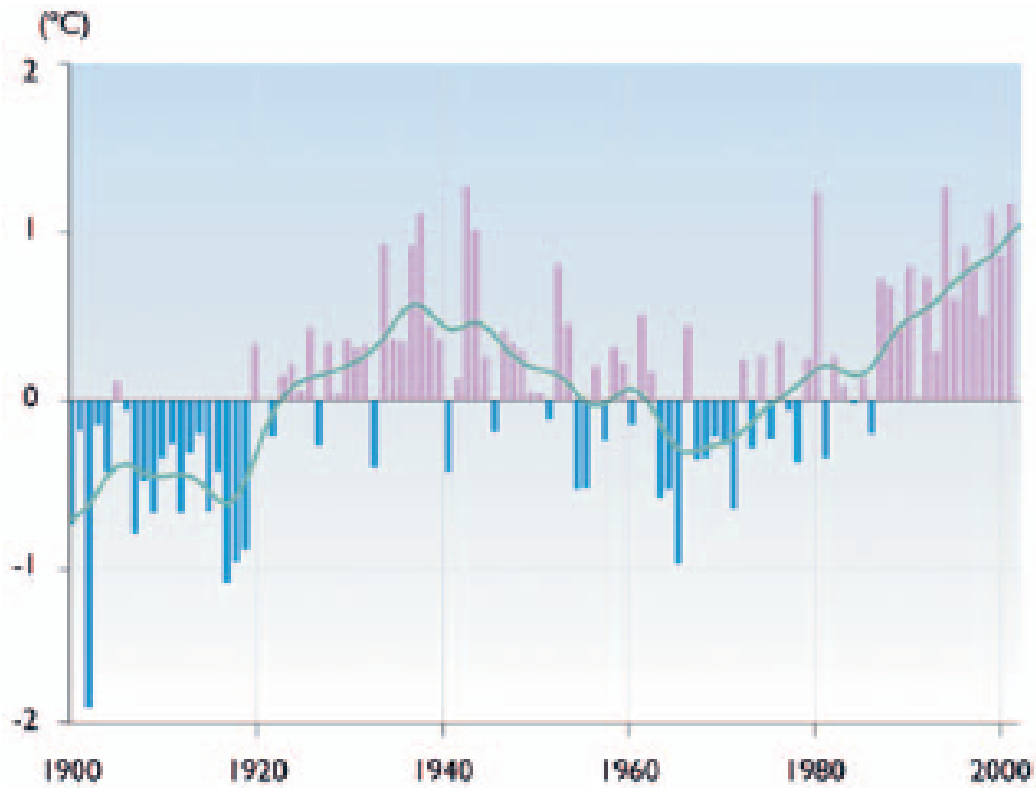
Our 2nd hour exam is next Wednesday, in class.
We will have an exam review in class on
Monday.

For today:
Climate change in the Arctic



- Saami Council (SC)
- Russian Association of Indigenous Peoples of the North (RAIPON)
- Aleut International Association (AIA)
- Inuit Circumpolar Conference (ICC)
- Gwich'in Council International (GCI)
- Arctic Athabaskan Council (AAC)

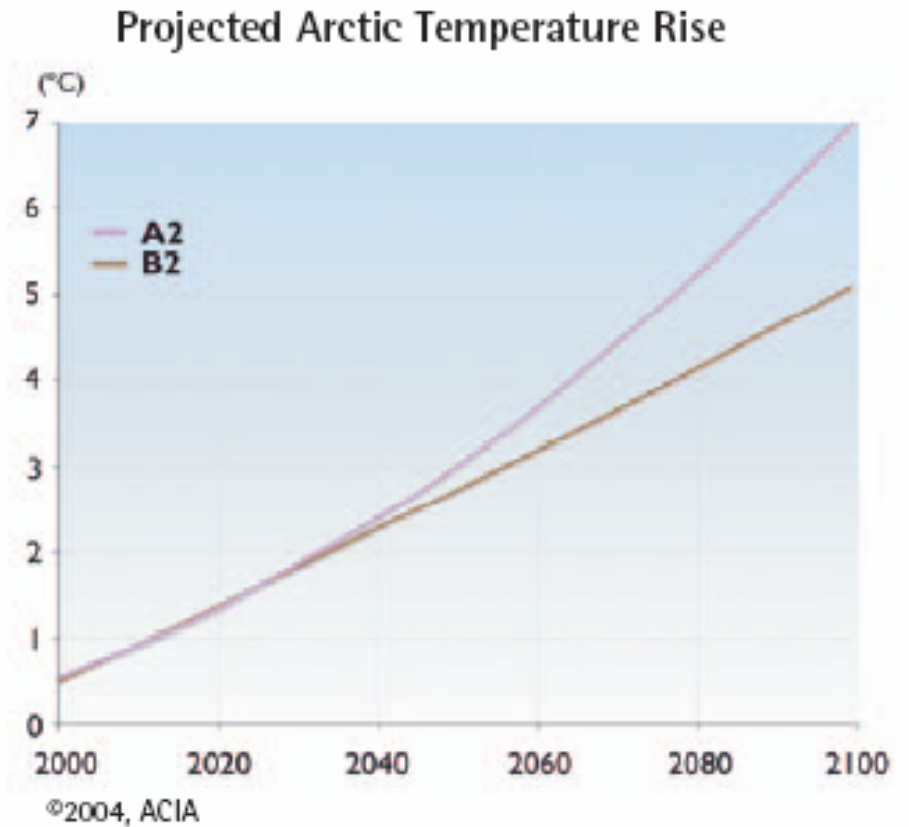
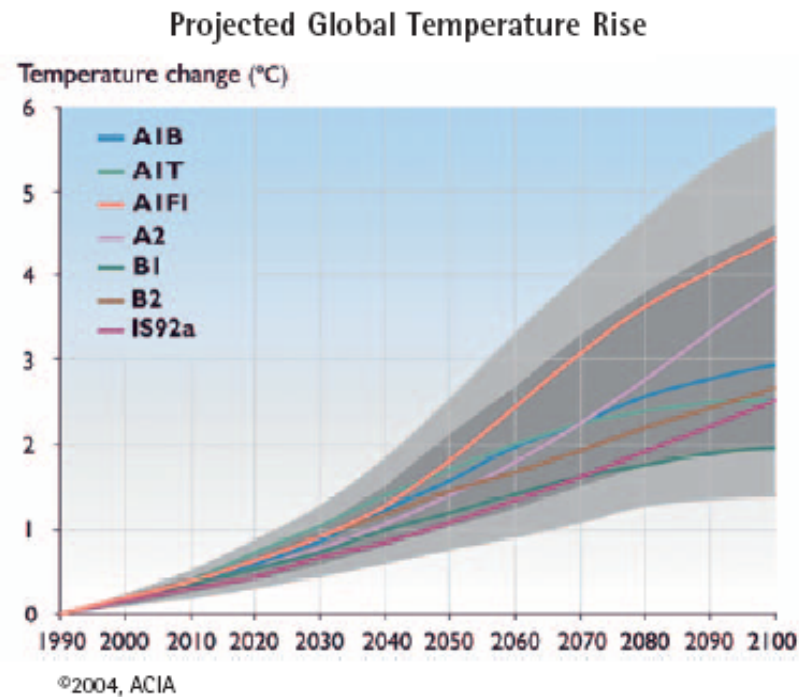
Observed Arctic Temperature, 1900 to Present



©2004, ACIA

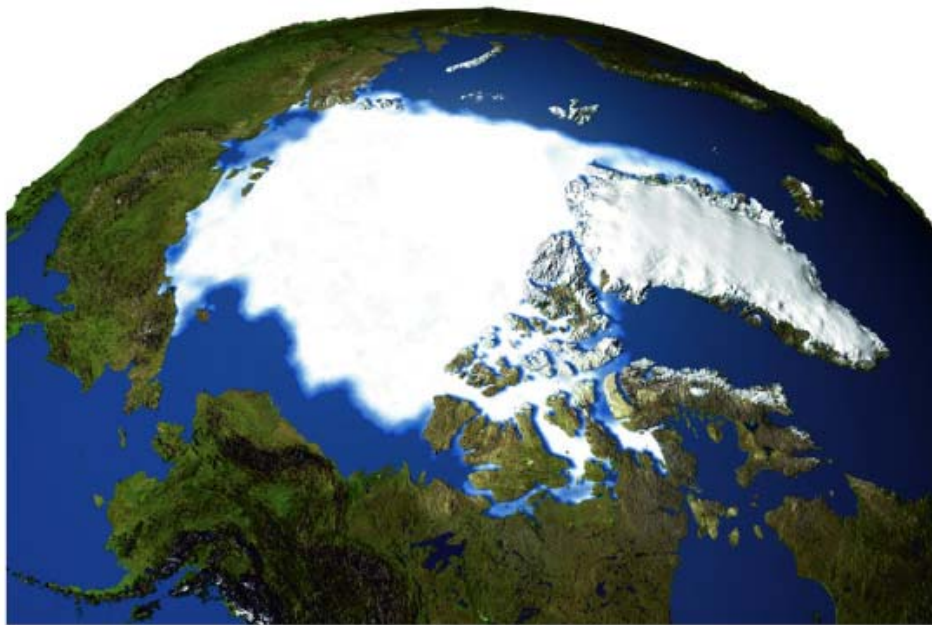
compare global average: 0.8 C

Wintertime temperatures in western Canada and Alaska have climbed 4 C since the 1950's



In most places, temperatures in winter are rising more rapidly than in summer

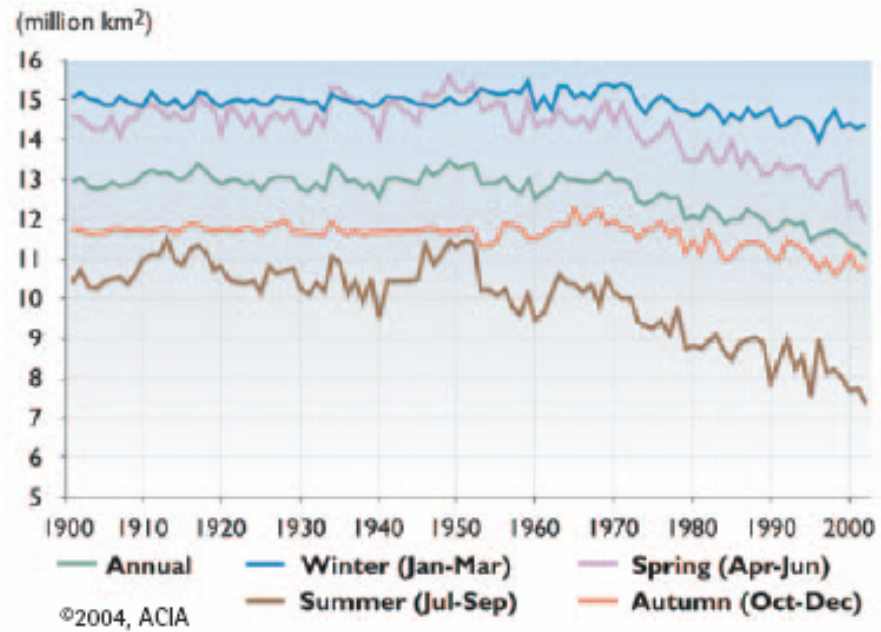
Observed sea ice September 1979



Observed sea ice September 2003



Observed seasonal Arctic sea-ice extent (1900-2003)



2010 - 2030



2040 - 2060



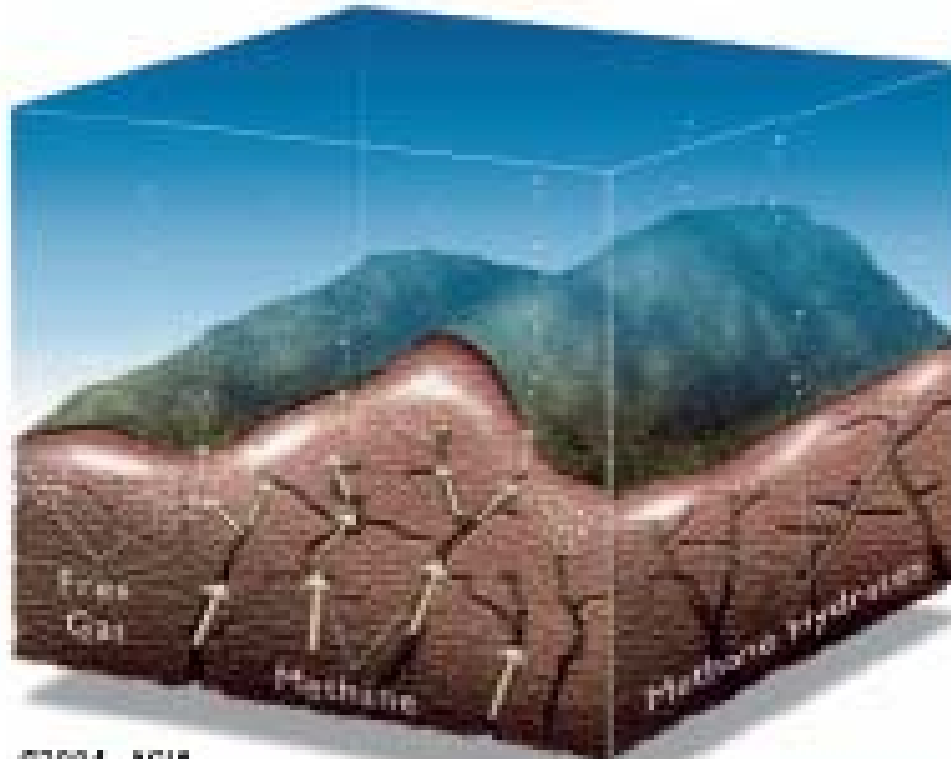
2070 - 2090



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September sea ice cover

Subsea Methane Hydrates



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Vast amounts of methane, in a solid icy form called methane hydrates or clathrates, are trapped in permafrost and at shallow depths in cold ocean sediments. If the temperature of the permafrost or water at the seabed rises a few degrees, it could initiate the decomposition of these hydrates, releasing methane to the atmosphere.

Current Arctic Vegetation



Projected Vegetation, 2090-2100



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Darker forests: more
absorption of solar energy
Reduction in reindeer & caribou



Alaska Winter Tundra Travel Days

(1970-2002)



©2004, ACIA

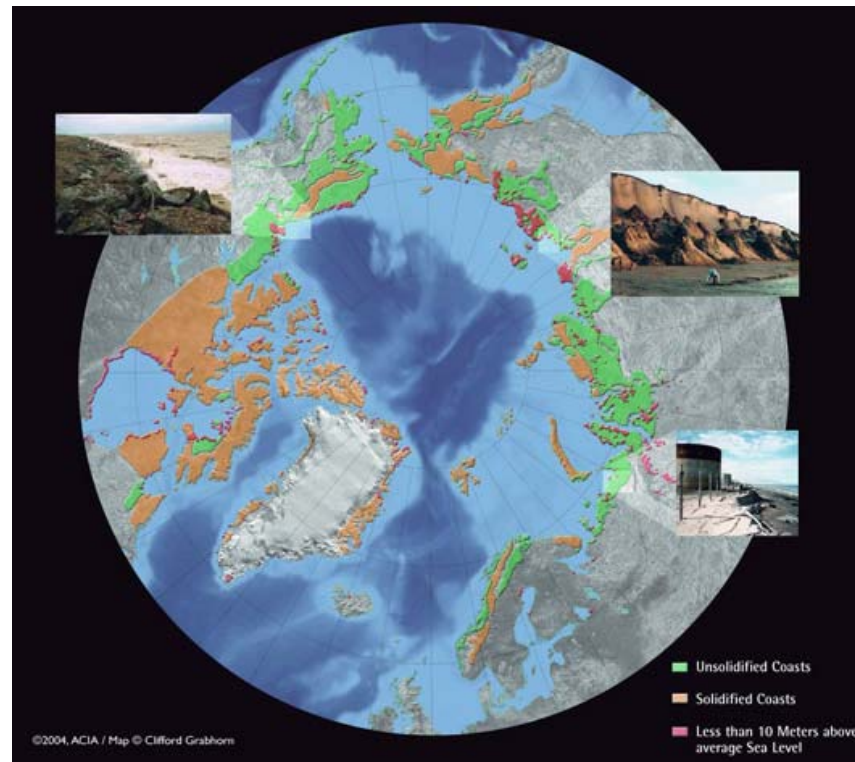


Risk to infrastructure (buildings, roads) by 2050 with B1 scenario



Permafrost - "Drunken Forest"





Arctic areas susceptible to coastal erosion

February 27, 2008

Flooded Village Files Suit, Citing Corporate Link to Climate Change

By [FELICITY BARRINGER](#)

Correction Appended

SAN FRANCISCO — Lawyers for the [Alaska](#) Native coastal village of Kivalina, which is being forced to relocate because of flooding caused by the changing Arctic climate, filed suit in federal court here Tuesday arguing that 5 oil companies, 14 electric utilities and the country's largest coal company were responsible for the village's woes.

The suit is the latest effort to hold companies like BP America, Chevron, Peabody Energy, Duke Energy and the Southern Company responsible for the impact of [global warming](#) because they emit millions of tons of greenhouse gases, or, in the case of Peabody, mine and market carbon-laden coal that is burned by others. It accused the companies of creating a public nuisance.

1. The Arctic climate is now warming rapidly and much larger changes are projected.
2. Arctic warming and its consequences have worldwide implications.
3. Arctic vegetation zones are projected to shift, bringing wide-ranging impacts.
4. Animal species' diversity, ranges, and distribution will change.
5. Many coastal communities and facilities face increasing exposure to storms.
6. Reduced sea ice is very likely to increase marine transport and access to resources.
7. Thawing ground will disrupt transportation, buildings, and other infrastructure.
8. Indigenous communities are facing major economic and cultural impacts.
9. Elevated ultraviolet radiation levels will affect people, plants, and animals.
10. Multiple influences interact to cause impacts to people and ecosystems.

From the Arctic Climate Impact Assessment, 2004
<http://www.acia.uaf.edu/>