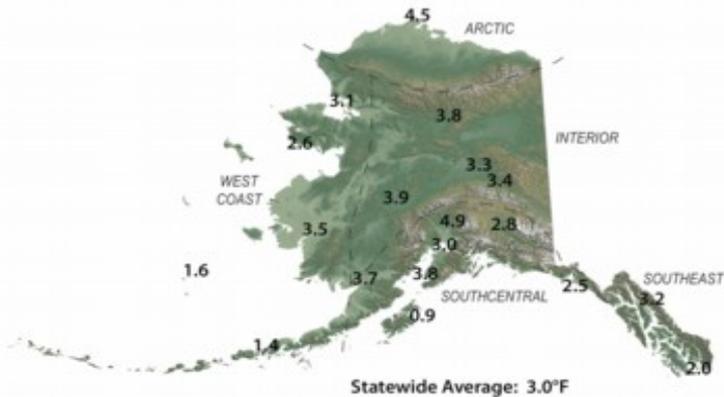
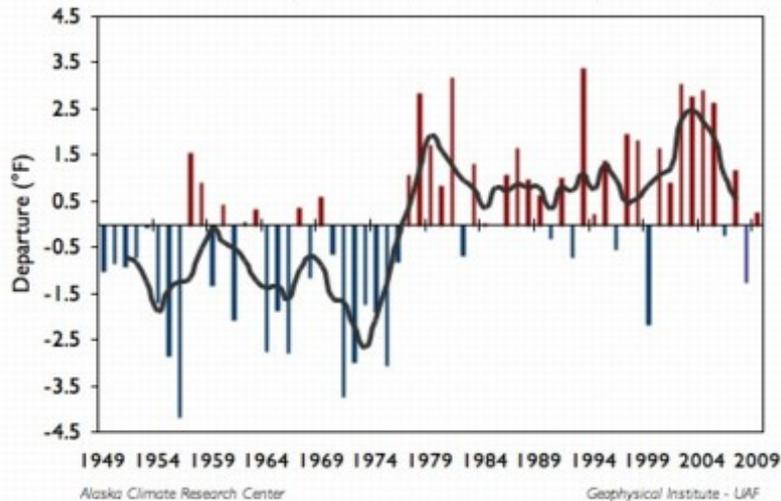


Temperature Change

Total Change in Mean Annual Temperature (°F), 1949 - 2009



Mean Annual Temperature Departure for Alaska (1949 - 2009)



Total Change in Mean Seasonal and Annual Temperature (°F), 1949 - 2009

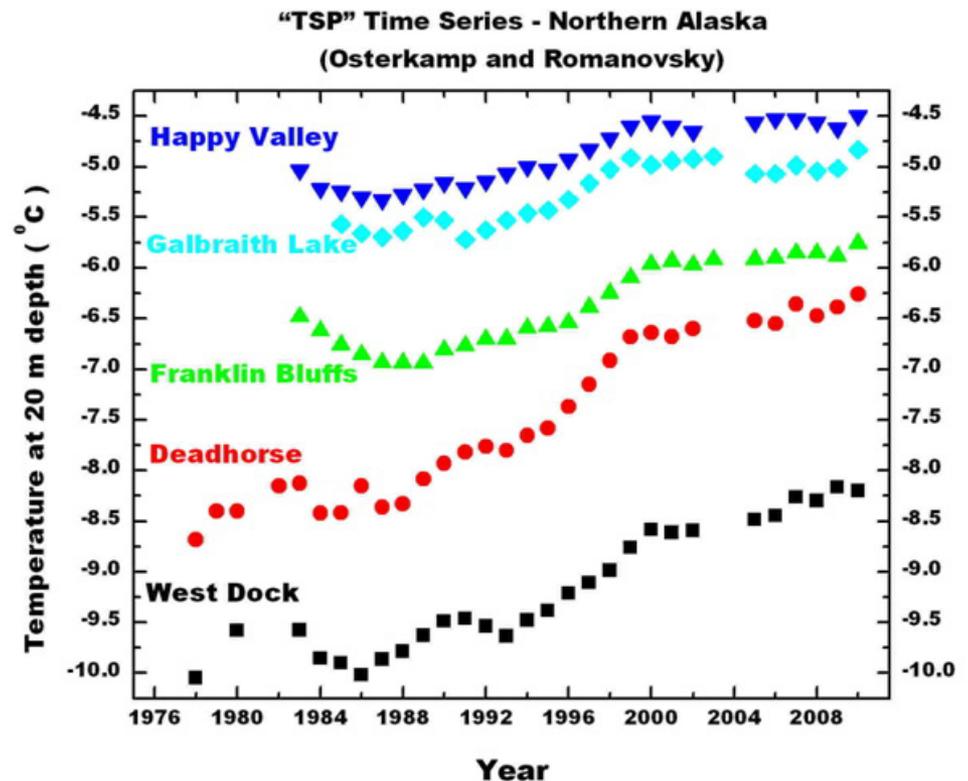
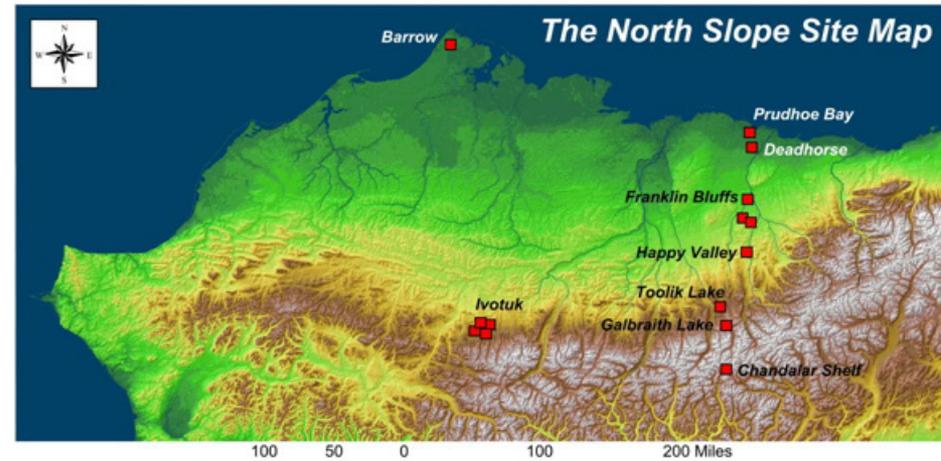
Region	Location	Winter	Spring	Summer	Autumn	Annual
Arctic	Barrow	6.7	4.5	3.0	3.7	4.5
Interior	Bettles	8.1	4.3	1.8	1.1	3.8
	Big Delta	8.9	3.4	1.2	0.0	3.4
	Fairbanks	7.4	3.6	2.3	-0.2	3.3
	McGrath	7.4	4.6	2.7	0.8	3.9
	West Coast	Kotzebue	6.3	1.8	2.6	1.4
West Coast	Nome	4.2	3.3	2.5	0.4	2.6
	Bethel	6.6	4.8	2.3	0.0	3.5
	King Salmon	7.9	4.5	1.7	0.6	3.7
	Cold Bay	1.5	1.6	1.7	0.8	1.4
	St Paul	0.8	2.1	2.6	1.1	1.6
Southcentral	Anchorage	5.8	3.3	1.6	1.5	3.0
	Talkeetna	8.4	5.2	3.1	2.4	4.9
	Gulkana	7.7	2.4	1.0	0.1	2.8
	Homer	5.9	3.8	3.3	1.8	3.8
	Kodiak	0.7	2.1	1.2	-0.4	0.9
Southeast	Yakutat	4.6	2.8	1.8	0.4	2.5
	Juneau	6.2	2.9	2.2	1.4	3.2
	Annette	3.4	2.3	1.8	0.3	2.0
Average		5.7	3.3	2.1	0.9	3.0

Alaska Climate Research Center

Geophysical Institute, University of Alaska Fairbanks

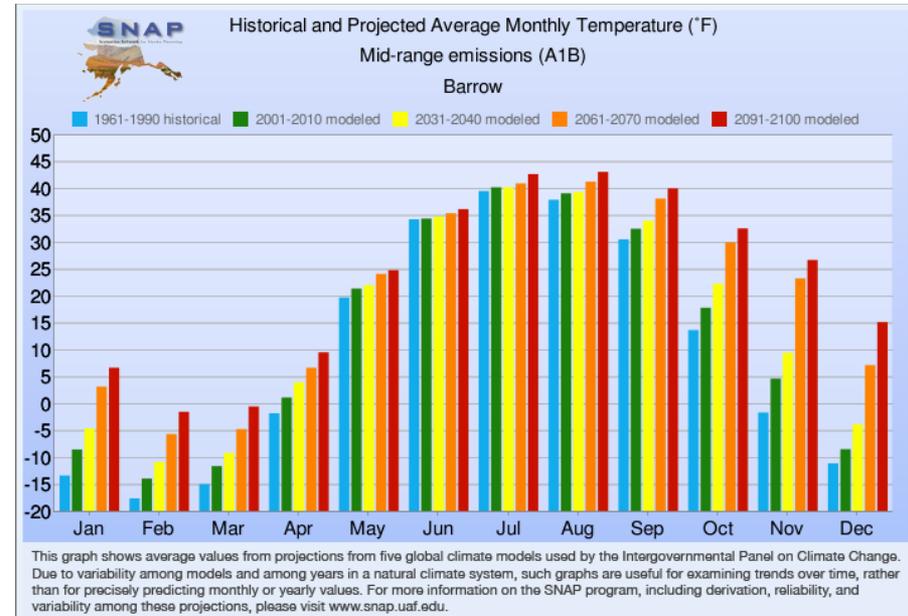
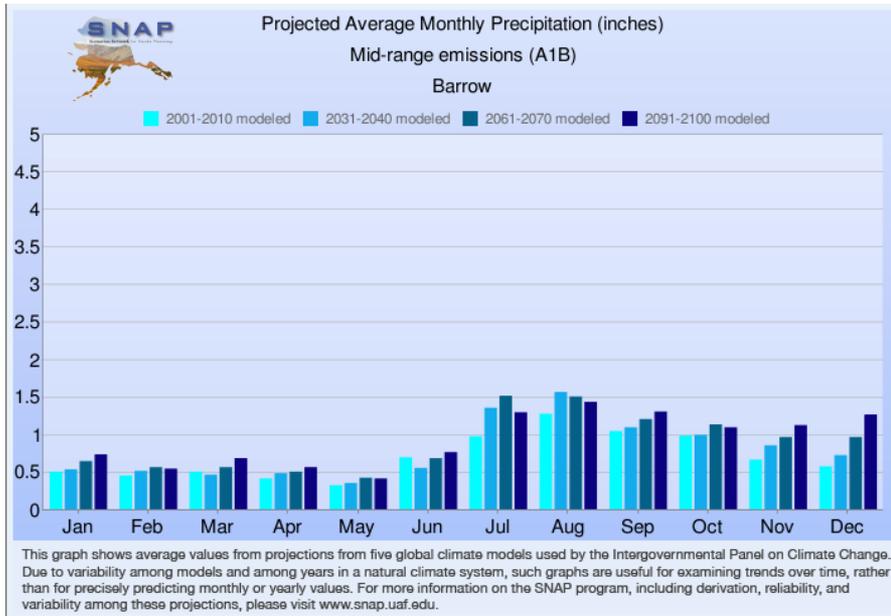
Permafrost

Figure P2. Top: Location of the long-term University of Alaska permafrost observatories in northern Alaska. Bottom: Changes in permafrost temperatures at 20 m depth during the last 27 to 32 years (updated from Osterkamp, 2003).



Scenario Planning for Climate Change

- Scenario Network for Alaska Planning
 - Downsized models for Alaska
 - Decadal projections
 - <http://www.snap.uaf.edu/>



Overarching Engineering Research Needs

- *“Across-the-board improvement in the collection, coordination, and accessibility of information” – Adaptation Advisory Group*
- *“Integrated research and knowledge management infrastructure supporting multi-disciplinary systematic analyses and decision making” – Research Needs Working Group*
- *“Knowledge management system to support design and assessment and including lessons learned” – Arctic Civil Infrastructure Research Needs Workshop*