Field Activity Report: Summer 2001
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During summer 2001, 27 permafrost observatories were visited. These observatories are located primarily along a north-south transect of Alaska that roughly parallels the Alyeska Pipeline. This is the 25th year that some of these observatories have been in operation. Temperatures were measured in deep drillholes (to 80 m) at these sites using a precision measuring system capable of 0.01 °C accuracy or better. The past year of data in the active layer and near-surface permafrost were collected from automatic dataloggers. Some of these dataloggers have been running continuously since 1986. Observations of active layer, permafrost and thermokarst conditions were also made at the sites.

New instrumentation was installed at 2 sites on the University of Alaska campus to measure hourly temperatures and moisture contents in the active layer and near-surface permafrost. One site was in discontinuous permafrost and the other in a thawed area.

Results for continuous permafrost

- Sites north of the Brooks Range began to warm in the mid-1980s after cooling in the early 1980s.
  - Magnitude of warming at permafrost surface about 2 to 3 °C.
  - This is comparable to the warming of the last century.
  - Warming greatest on the coastal plain.

- Air, ground surface and permafrost surface temperatures, measured since 1986.
  - Trends include a warming until 1989, cooling to 1992, and then warming prior to 2000 with cooling the last 2 years.
  - This cooling is similar to the cooling in the early 1990s that produced the minimum in 1993.

Results for discontinuous permafrost

- Discontinuous permafrost is extremely warm, much of it within 1°C of thawing.
- Discontinuous permafrost temperatures began warming in the late 1980s.

Magnitude at the permafrost surface ranges from 0.5 to 1.5 °C.

Warming rates near the permafrost surface were 0.05 to 0.2 °C yr^{-1}.

There has been little change in the last two years.

- There is widespread warming and thawing of discontinuous permafrost and extensive areas of thermokarst terrain are now being created as a result of climatic change.
- Thermokarst drastically modifies and remolds the ground surface. It can severely change or disrupt ecosystems, human activities, infrastructure, and the fluxes of energy, moisture and gases across the ground surface-air interface.