24 November 2000

End-Summer Projects Activity Report.

V. Romanovsky

May 2000: Fieldwork (May 5 - May 7) on the CALM sites along the Dalton Highway. Investigator - V. Romanovsky. Measurements of the snow cover thickness and structure at the Happy Valley, Franklin Bluffs, Deadhorse, and West Dock sites. In general, the snow cover thickness this year was significantly larger compared to the thickness at the same time last year at the same sites, except for the West Dock site where snow cover thicknesses were very similar to those in 1999.

July 2000: Fieldwork (July13 - July 15) at the ATLAS Ivotuk site. Investigators - V. Romanovsky, D. Keltner, J. Boike.

Downloading of the data from the loggers at four sites (air, ground surface and soil temperature, soil moisture at three depths). Four sites were established in 1998 at the locations of the flux measurement towers. At each site, the air temperature, ground (including ground surface and six to seven depths down to 60 to 80 cm) temperatures at two locations (six meters apart), and ground moisture at three depths were recorded hourly during the entire year of Summer 1999 - Summer 2000. Data show that mean annual air temperature in 1999-2000 was almost 2C colder than in 1998-1999. It was -11.7C at the MAT site, -12.1C at the MNAT and SHRB sites, and -12C at the MOSS site. These numbers are probably more typical for this area. However, despite of this air temperature cooling, the ground surface and soil temperatures were significantly warmer in 1999-2000 compared with 1998-1999 for the three out of four sites. Especially noticeable warming occurred during the winter. Ground surface temperatures were warmer than -11C and the soil temperatures at the 50 cm depth were warmer than -9C at MAT and MNAT and warmer than -8C at SHRB and MOSS for the entire winter. Mean annual temperatures at the ground surface in 1999-2000 were -2.35C at MAT (0.44C increase), -1.8C at MNAT (0.85C increase), -1.8C at SHRB (0.25C decrease), and -1.5C at MOSS (1C increase). Ground surface warming provoked increase in temperatures within the active layer. Mean annual temperatures at 50 cm depth in 1999-2000 were warmer than in 1998-1999 by 0.4C at MAT, by 0.6C at MNAT, by 1C at MOSS, and was practically the same (-1.77C) at SHRB.

At Skip Walker's Omalik sites four Optical StowAway mini-loggers were collected and downloaded and new mini-loggers were installed. Also Matthew Sturm's mini-loggers were collected at a near-Ivotuk site.

Fieldwork (July 18 - July 20) at the ATLAS Council sites. Investigators- V. Romanovsky and N. Romanovskiy

Four "soil climate" sites established during summer 1999 at the locations of the flux measurement tower locations (C1, C2, C3, C4)

continued to operate during the 2000 campaign, and will remain installed in their present locations over the longer term. At each site air and ground temperatures (including ground surface and 10 to 11 depths down to 80 to 104 cm) as well as soil moisture at three depths will continue to be recorded hourly. During the 2000 field season, temperature and soil moisture data were collected from all sites, processed and transferred to the JOSS database. The data show that permafrost is present only at the tundra (C2) and woodland (C4) sites and absent (at least within the upper several meters) at white spruce forest (C1) and shrub (C3) sites. One additional thermistor probe (12 thermistors within upper 1.5 m) was installed at the tundra site in a thermokarst depression to monitor the temperature regime and thermokarst development process.

The ground temperatures were surprisingly warm. The warmest soil temperatures were at the "Shrub" site, where temperature at 1 m depth was +2.7C on August 1, 1999. At the "Forest" site, temperature at 1 m depth was +2.1C on August 1, 1999.

Mean annual air temperatures (Summer 1999 - Summer 2000) were very similar for all four sites: -4.1C at C1, -4.3C at C2, -4.6C at C3, and -4.5C at C4. Mean annual ground surface temperatures were +0.4C at C1, -1.5C at C2, +1C at C3, and -0.8C at C4. Mean annual soil temperatures at 1 m depths were +0.75C at C1, -1.85C at C2, +0.8C at C3, and -1C at C4.

August 2000: Fieldwork (August 14 - August 19) on the recent and future CALM sites along the Elliot and Dalton Hws. Investigator - V. Romanovsky, R. Peterson in cooperation with Skip Walker group.

Active layer depths measurements were completed on five 100x100 m CALM grids at the "West Dock", "Deadhorse", "Franklin Bluffs", "Chandalar Shelf", and "Old Man" sites. Air, ground surface, and soil (down to 1 m depth) temperatures and soil moisture data were downloaded from the data loggers; technical service of the equipment was accomplished. Additional two sites ("SagMNAT" and "SagMAT") were established. Five sites were equipped with frost heave measurement devices. Active Layer thicknesses were slightly shallower compared to the last year, except for the "Chandalar Shelf" site, where the AL thickness was the same. The mini-logger surface temperature data along profiles at the "Deadhorse" and "Franklin Bluffs" sites were collected and new data-loggers were installed.