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**Title: Hydrologic Response and Feedbacks to a Warmer Climate in Arctic Regions****Field Personnel**

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**Tasks****1. ATLAS Climate Stations Service and Maintenance**

A site visit was made to each of the six ATLAS climate stations on the Seward Peninsula during the months of January, May, June and October. Servicing tasks during each visit included downloading data, checking the condition of the batteries, and removing and replacing damaged sensors. During the month of May net radiation sensors were installed at each site for the summer season, these were removed in October. In August the primary climate station at Kougarok was destroyed in a tundra fire. A complete climate station was reinstalled at the same location in October. This will provide valuable post fire climate information. Also in October the two remaining climate stations at Kougarok were improved to increase their reliability. The data logging equipment was moved from coolers on the ground into weatherproof enclosures on each tower.

Site visits were also made to the two ATLAS climate stations at Ivotuk during the months of February, May and September.

**2. Radio Telemetry Project (Continued from 2001)**

The radio telemetry project that was started during the summer of 2001 was completed during this past year. The final mountain top repeater was installed in June. This site is located on a high plateau at east end of the Kigluaik Mountains. Several reconnaissance

trips were needed to find a site that would provide a reliable radio link between Nome and Kougarok. This site also needed to be suitable for a helicopter to land. The later of these two things was the more difficult to find. During the month of June, upgrades were made to radio equipment at each of the Council climate stations. These upgrades completed the Council portion of telemetry installation. In October two of the mountain top repeaters were serviced and several problems were corrected. After these corrections were made the telemetry system on the Seward Peninsula was fully operational and installation of the system was complete. The result of this project is that all six of the ATLAS Seward Peninsula climate stations are connected via the Internet and radio modems to WERC offices back in Fairbanks. The sites can be monitored and reconfigured if needed remotely. Data from these six climate stations, plus data from the three mountain top radio repeater sites are now available in real time on the Internet. <http://www.uaf.edu/water/projects/atlas/metdata/atlasmetsitemap.htm>

A satellite GOES transmitter was installed at Ivotuk in May. Data is transmitted every three hours from the primary climate station at Ivotuk to a satellite, which then retransmits the data back to an earth downlink station. This communication link provides WERC with diagnostic information and real time climate data from Ivotuk. <http://www.uaf.edu/water/projects/near-real-time/status.html>

### **3. CALM Grid Measurements**

During the month of October the active layer depth was measured at Council and Kougarok. The active layer depth at Ivotuk was measured in September. Measurements are made on a 1 km by 1 km grid, sampling every 100m. This data is archived by the Circumpolar Active Layer Monitoring (CALM) project.

### **4. Quartz Creek Fire**

A tundra fire was ignited on August 4<sup>th</sup> in the headwaters of the Niagara Creek, one of the study watersheds of the Kougarok (Quartz Creek) study area. This fire, designated Fire A526 by the BLM Alaska Fire Service, was started by a pick-up truck that had been four-wheeling and became high-centered in an area classified for limited protection on State land. Smoke jumpers did respond to the fire to protect the three weather stations and two dataloggers in the streams in Mauze Gulch and Niagara Creek operated by our research group. The fire grew to 25,630 acres and smoldered through August 19. It appears to have been quite a severe burn, as it burned down to mineral soils in most places and through several creek beds. Half of the CALM grid located in the headwaters of Mauze Gulch was burned. This may provide a good opportunity for studying the effects of fire in tundra watersheds. Our main meteorological station K2 (<http://www.uaf.edu/water/projects/atlas/kougarok/k2/k2.html>) was completely burned. The instruments were replaced on October 15 and the station continues to operate with total data loss between the previous site visit on July 6, 2002.

### **5. Hydrological Monitoring**

Hydrological processes, including snowpack ablation and snowmelt runoff were monitored at Kougarak (Niagara Creek and Mauze Gulch) and in Council (Melsing Creek and Clyde's Gulch). After snowmelt was complete, we initiated summer runoff measurements to include Guy Rowe Creek also. This was an unusual snowmelt as the snowpack was very thin on west facing slopes, so those slopes were snowfree unusually early (By May 1). Consequently, the end of winter snow distribution was not well characterized for this year. Hydrological monitoring ceased in Niagara Creek and Mauze Gulch when the dataloggers were removed to protect them from the fire on August 4. Data collection in Melsing Creek, Clyde's Gulch and Guy Rowe continued through Oct 17.