

FRESH EYES ON ICE

CASE STUDY







University of Alaska Fairbanks

Various Locations,
Alaska, USA



*"It has been a pleasure to work with **beadedstream's** engineers to design this snow-ice buoy that we now have deployed at remote lakes around Alaska. With few exceptions, data transmission has been continuous and often through thick layers of ice and snow, which we find somewhat amazing!" - Chris Arp, Research Associate Professor*



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Fresh Eyes on Ice is a current (multi-year) project aimed at connecting researchers and local Arctic communities using freshwater ice data. This data is used to study the changing climate conditions and for science education and outreach.

*beadedstream provided Buoy Loggers and Digital Temperature Cables to monitor lake ice. Transmission of the data through satellite modems allows stakeholders to quickly and easily access data from the **beadedcloud** web application.*

Application

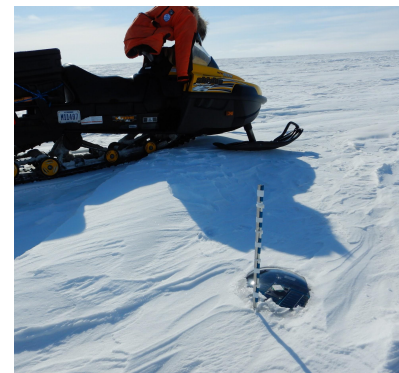
Researchers at UAF are studying changing freshwater winter responses due to the effects of climate change. Monitoring the change in the formation, growth, and melting of ice in various locations around Alaska helps them understand the impact of permafrost, hydrology, greenhouse gas emissions, and human travel and subsistence.

Many communities across Alaska rely on frozen lakes and rivers to travel during the winter season and the changing climate is impacting their ability to rely on the frozen ground. The Fresh Eyes on Ice team is sharing this data with these communities.

Air and water/ice temperature data is an important parameter for this project. This data is combined with surveys, remote sensing, camera images, historic data, and local knowledge and observations allowing researchers to study the impacts of climate change.

beadedstream Solution

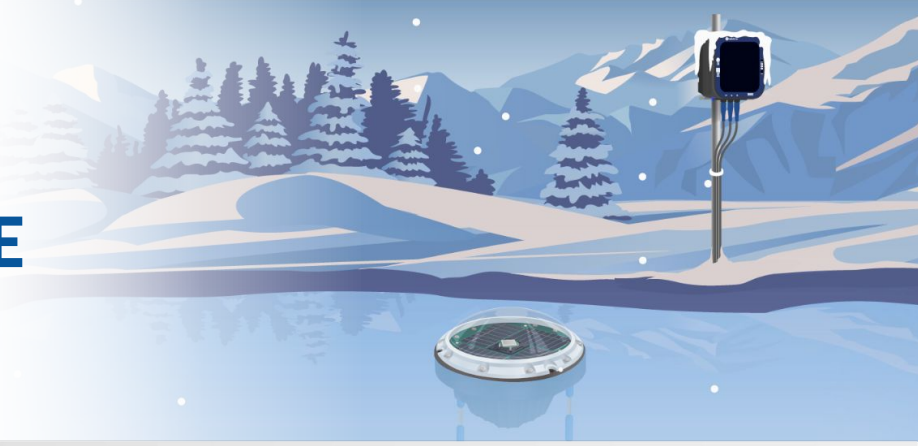
beadedstream has provided Digital Temperature Cables for 12 locations across Alaska. Each location has 21 temperature sensors at 10cm (4 inch) spacing with 0.4m (1.3 ft) in the air and 1.6m (5.2 ft) into the water.



A buoy deployed into a lake prior to freezing (left) and after (right). The 0.4m (1.3 ft) of air sensors are visible above the surface.

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Children from a local school learning about the temperature sensors and what the data means.

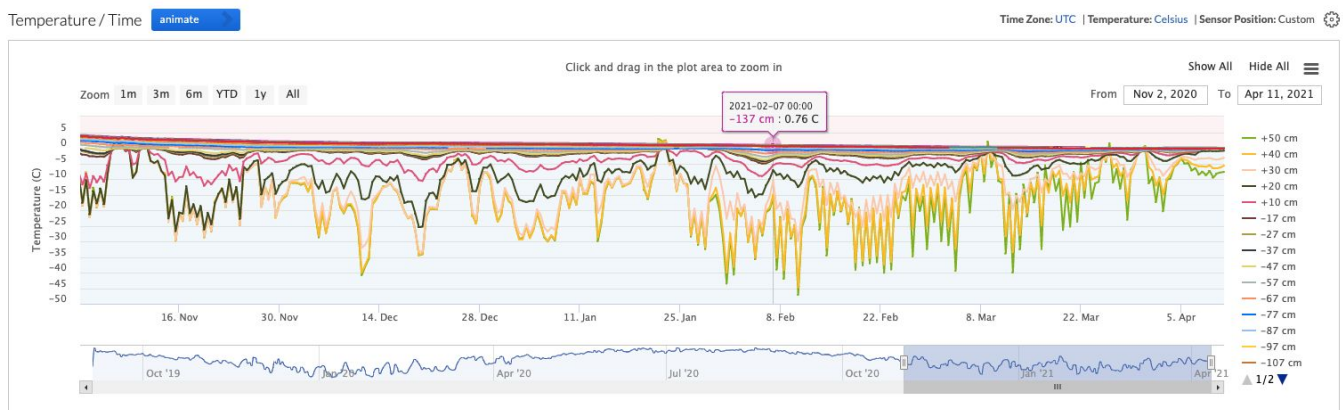
The cables terminate into **beadedstream's** Buoy Logger, which is deployed prior to freeze up and floats at the surface of the water until it is eventually frozen during winter. Each logger has a solar cell for recharging the battery and a satellite modem that transmits data to the cloud while it is deployed. The loggers are able to transmit even when under 1m (3 ft) of ice.

The buoys are moored to the lake beds via a boat anchor, chain and long line to prevent entanglement with the cables and ice movement during freeze-up and break-up.

beadedstream Solution Benefits

The **beadedstream** buoys are installed and deployed in several Alaskan lakes in order to easily collect freshwater monitoring data. The temperature data is used to watch formation, growth and melt of ice. The data from these remote sites is collected by direct-to-orbit transmissions and stored in the cloud. This feature saves time and provides safety for researchers by eliminating the need for them to travel on thin ice to collect data.

The **beadedcloud** web application allows researchers and community stakeholders to view the data in real-time. This project includes science education and outreach lead by community-based monitoring teams in 11 cities, towns and villages across Alaska. These teams share and make use of the data sets collected from the sensors, which includes lessons at local K-12 schools.



Temperature data in **beadedcloud** shown over the course of one winter at one buoy location.