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Project Title:
Collaborative Research: Changes in Lake Dynamics on the Arctic Coastal Plain of North America Over the Past Half-Century

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Classification:
Hydrology

Dataset Title:
Lake sediment thermal properties for Emaiksoun Lake (Barrow, Alaska)

Time Period Covered:
August 19, 2008

Dataset Description:

Lake sediment thermal property measurements were made on August 19, 2008 on Emaiksoun Lake (also known as "Freshwater Lake"). This lake is located on the south end of town in Barrow, Alaska. The measurements were made using a KD-2 Pro Thermal Properties Analyzer (with 30-mm SH-1 dual sensor), manufactured by Decagon Devices, Inc. Parameters measured include: 1) thermal conductivity, 2) thermal resistivity, 3) specific heat, 4) thermal diffusivity, 5) r-squared (goodness of fit), and 6) sediment temperature. The date and time of measurement and water depth were also recorded, as were latitude and longitude (using a differential GPS unit). Measurements in water depths of 0.5 and 1.0 meter were made by a person standing in the water, using a PVC extension rod. A boat was used to reach lake sediments in water depths of 1.5 meters or greater. Slight boat movements during the time of measurement had an impact on data accuracy, although any data points that were obviously unreliable were thrown out and are not included in this dataset. All data that have been saved have r-squared values of at least 0.96. Measurement time by the KD-2 Pro typically takes a few minutes.

Variable definitions and units:
K = Thermal conductivity in units of W/(m·K)
R = Thermal resistivity in units of m·K/W
C = Volumetric heat capacity in units of MJ/(m^3·K)
D = Thermal diffusivity in units of mm^2/s
r^2 = Goodness of fit (from 0 to 1)
T = Sediment temperature during measurement interval, in units of °C
Depth = Water depth at measurement location, in units of m