

Site Name	Coal Mine Ridge
Processed by	Niki Jacobs
Collected by	Anna Liljedahl, Joel Bailey
PI	Anna Liljedahl, akiljedahl@alaska.edu
Location(UTM)	X: 561974 Y: 7060795
Elevation(m)	1021
Codes for missing or bad data	6999 = Missing Data 7777 = Poor Quality Data
Notes	Times are in AKST = UTC-08:00 No valid rain, solar radiation, or snow depth data was collected for this time. Data was collected from 2012-09-26 to 2012-12-31
Funding	Alaska University Transportation Center (2012–2013) Alaska Department of Transportation and Public Facilities (2012–2013) Cold Regions Research and Engineering Laboratory through SERDP-DOD (2011–2014) Pacific Northwest Transportation Consortium - PacTrans (2012-2013) National Institutes for Water Resources (2012) Institute of Northern Engineering (2011)



Instruments	Air Temperature(AT) and Relative Humidity(RH): Heights of Sensors: 1m and 2m Serial numbers: 60837457(1m) and 60837491(2m) Instrument Name/Company: Campbell Scientific HC2S3-L Temperature and Relative Humidity Probe
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General Sensor Specifications
Electronics Operating Limits: -40° to +100°C
Storage Temperature: -50° to +100°C
Diameter: 15 mm (0.6 in)
Length w/o connector: 85 mm (3.3 in)
Length w/connector: 183 mm (7.25 in)
Weight: 10 g (0.35 oz)
Filter: Polyethylene (standard) or Teflon (optional, ordered separately)
Current Consumption:
< 4.3 mA @ 5 Vdc
< 2.0 mA @ 12 Vdc
Supply Voltage: 5 to 24 Vdc
Startup Time: 1.5 s typical
Maximum Startup Current:
< 50 mA for 2 µs
Analog Outputs
Offset at 0 V: ±3 mV (maximum)
Deviation for Digital Signal:
< ±1 mV (0.1°C, 0.1% R. H.)

Technical details for temperature sensor
Temperature Sensor: PT100 RTD, IEC 751 1/3 Class B
Measurement Range: -40° to +60°C (default)
Output Signal Range: 0 to 1 V
Accuracy at 23°C: ±0.1°C with standard configuration settings
Long Term Stability: < 0.1°C/year
Sensor Time Constant
[63% step change (1 m/s air flow at sensor)]
Standard PE Filter: ≤ 22 s
Optional Teflon Filter: ≤ 30 s [Typical 4 s, 63% of a step change (1 m/s air flow at sensor)]

Technical details for relative humidity sensor
Sensor: ROTRONIC® Hygromer IN-1
Measurement Range: 0 to 100% RH, non-condensing
Output Signal Range: 0 to 1 Vdc
Long-Term Stability: < 1% RH per year
Accuracy at 23°C: ±0.8% RH with standard configuration settings
Sensor Time Constant
[63% of a 35 to 80% RH step change (1 m/s air flow at sensor)]
Standard PE Filter: ≤ 22 s
Optional Teflon Filter: ≤ 30 s [Typical 10 s, 63% of a 35 to 80% RH step change (1 m/s air flow at sensor)]

Dew Point(DP): Calculated from air temperature and relative humidity at 1m.

Solar Radiation Shield:

Instrument Name/Company: Campbell Scientific 41003-5 10-Plate Solar Radiation Shield

Solar Radiation Shield Specifications

Attaches to a crossarm, mast, or user-supplied pipe with a 1.0 to 2.1 in. OD

Weight: 590 g (1.3 lb)

Height: 20.3 cm (8.0 in.)

Plate Diameter: 11.9 cm (4.7 in.)

Construction: UV stabilized white thermoplastic plates, aluminum mounting bracket, white powder coated stainless-steel U-bolt clamp

Wind Speed(WS) and Wind Direction(WD):

Height of Sensor: 3m

Serial number: WM118947

Instrument Name/Company: Campbell Scientific RM Young 05103-45-L Wind Monitor, Alpine Version

General Sensor Specifications

Operating Temperature:

-50° to +50°C, assuming non-riming conditions

Overall Height: 37 cm (14.6 in.)

Overall Length: 55 cm (21.7 in.)

Main Housing Diameter: 5 cm (2.0 in.)

Propeller Diameter: 14 cm (5.5 in.)

Mounting Pipe Description:

34 mm (1.34 in.) OD; standard 1.0-in. IPS schedule 40

Weight: 1 kg (2.2 lb)

Technical details for wind speed

Range: 0 to 100 m/s (0 to 224 mph)

Accuracy: ± 0.3 m/s (0.6 mph) or 1% of reading

Starting Threshold: 1.0 m/s (2.2 mph)

Distance Constant (63% recovery): 2.7 m (8.9 ft)

Output: ac voltage (three pulses per revolution);

90 hz (1800 rpm) = 8.8 m/s (19.7 mph)

Technical details for wind direction

Range

Mechanical: 0 to 360°

Electrical: 355° (5° open)

Accuracy: $\pm 5^\circ$

Starting Threshold at 10° Displacement:

1.1 m/s (2.4 mph)

Damping Ratio: 0.3

Damped Natural Wavelength:

24.3 ft (7.4 m)

Undamped Natural Wavelength:

23.6 ft (7.2 m)

Output: analog dc voltage from potentiometer—resistance 10kohms; linearity 0.25%; life expectancy 50 million revolutions

Power switched excitation voltage supplied by datalogger

Rain(PPT): No valid data collected

Snow depth: No valid data collected

Solar Radiation: No valid data collected

Soil Temperature(ST):

Height of Sensor: multiple depths, see data "Hourly Soil"
Sensor Installation: Soil temperature sensors, custom built using 12 pair, twisted pair, direct burial, telephone cable.
Type: Thermistor used is an YSI44033

Soil Moisture(SM):
Height of Sensor: multiple depths, see data "Hourly Soil"
Serial number: ?
Instrument Name/Company: Campbell Scientific CS616-L Water Content Reflectometer

Technical details
Operational Temperature: 0° to +70°C
Probe-to-Probe Variability: ±0.5% VWC in dry soil, ±1.5% VWC in typical saturated soil
Accuracy: ±2.5% VWC using standard calibration with bulk electrical conductivity of ≤0.5 dS m⁻¹, bulk density of ≤1.55 g cm⁻³, and measurement range of 0% VWC to 50% VWC
Precision: better than 0.1% VWC
Resolution: 0.1% VWC
Output: ±0.7 V square wave with frequency dependent on water content
Current Drain: 65 mA @ 12 Vdc (when enabled); 45 µA (quiescent typical)
Power Supply Voltage: 5 Vdc minimum;
18 Vdc maximum
Enable Voltage: 4 Vdc minimum; 18 Vdc maximum
Electromagnetic: CE compliant; meets EN61326 requirements for protection against electrostatic discharge
Rod Length: 300 mm (11.8 in)
Rod Diameter: 3.2 mm (0.13 in)
Rod Spacing: 32 mm (1.3 in)
Probe Head Height: 85 mm (3.3 in)
Probe Head Width: 63 mm (2.5 in)
Probe Head Depth: 18 mm (0.7 in)
Weight without cable: 280 g (9.9 oz)
Cable Weight: 35 g per m (0.38 oz per ft)

Data Logging:	Name	Serial #
Data Logger:	Campbell Scientific Cr1000	50163
Multiplexor:	Campbell Scientific AM16/32B	13284
Keyboard:	Campbell Scientific CR1000KD	6555
Cellular Digital Modem:	Airlink GPRS Cell Modem	1202673425
Solar Controller:	Morningstar SS-10-12V	12140595
Camera(at 1m):	Campbell Scientific CCSMPX w/Defroster	1532

Comments

This data was compiled and processed in R, scripts should be contained in the server files.
For more information or copies of scripts please contact Niki Jacobs at najacobs@alaska.edu
Data was collected from 2012-09-26 to 2012-12-31
Soil temperatures at 150cm were excluded from the text file and soil temperature plot as the measurements were an extreme deviation from the the other depths