AWS - DYE2 - Metadata

Latitude: 66.478035
Longitude: -46.287125
Elevation: 2112 m a.s.l.
Installation date: 05/11/2017
Removal date:

Station History

---------- **2019** ----------

09/05/2019

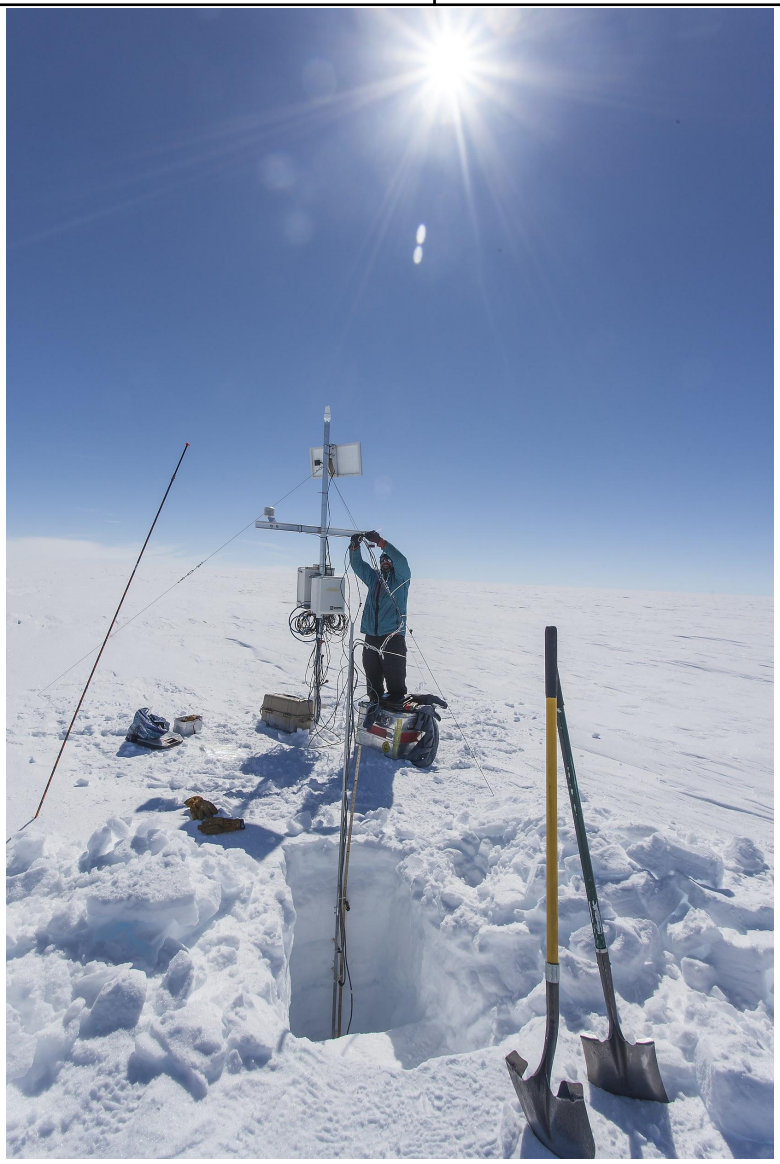
New snow at the surface ~ 0.06-0.10 m

Distance of sensors from the surface	
SR50	2.03 m
Ablation Stake	1.525 m
Thermistors Stake	1.46 m

05/17/2019

- Station run continuously since installation
- 3 new thermistors (custom build by F. Covi) have been installed at the seasonal snow / firn interface. The thermistors were fixed with zip ties on a metal stake (same as the ablation stake) drilled into the firn.
  TOP: installed just above the snow/firn interface
  MID: installed between 2 big ice lenses
  BOT: installed on top of a big ice lens
- The depth of seasonal snow in the pit where the thermistors were installed was 52.0 cm
- Changed Logger Program: Dye2_2017.CR1 => Dye2_2019.CR1:
  1) added 3 new thermistors at snow/firn interface: (OMEGA 44031)
  added new thermistors on the MUX (MUX 29H/29L, 30H/30L and 31H/31L)
  new thermistors are read in the same way as the old Geokon but different Steinhart-Hart constants are used
- STRATIGRAPHY of snow pit where thermistors were installed, DEPTHS ARE FROM THE BOTTOM, total depth 105 cm:
  52 cm: seasonal snow / firn interface
  32 - 52 cm: ice lens
  0 cm: ice lens

Distance of thermistors from **SNOW SURFACE**		Distance of thermistors from **TOP STAKE**	
TOP	0.5 m	TOP	1.725 m
MID	0.65 m	MID	1.875 m
BOT	0.99 m	BOT	2.215 m
Distance of sensors from the surface			
SR50 (Mike MacFerrin)		1.92 m	
Logger Box Bottom		1.27 m	
Temperature (Mike MacFerrin)		2.13 m	
Ablation Stake		1.32 m	
Thermistors Stake		1.26 m	



---------- **2018** ----------

05/16/2018

More work on AWS. Downloaded data from both UAF and Mike's station. Work not finished, but station is now running. AWS didn't run between May 9th and May 16th. Ask Mike for SR50 height same for pics.

05/09/2018

Before working on AWS: Mike MacFerrin SR50 height from surface is 76.0 cm. Station was raised with a 2m extension. Work on weather station not finished. Station not running overnight. The station run continuously since the visit in May 2017.

---------- **2017** ----------

05/11/2017

AWS installed and tested. Logger box mounted directly on Mike MacFerrin station mast. Shared solar panel, charge controller and battery. Data transmission at this station is not available due to the fact that Mike MacFerrin modem has an I/O port and not cables connection.

This AWS consists only of a datalogger and a thermistors string since meteorological data are available in close proximity of the site (Samira Samimi AWS and GC-Net AWS both few hundreds meters apart).

Thermistor #15 is not working (it reads NAN).

AWS leveled.

Sensors Description

Thermistors String

Geokon 3810-2 custom made (http://www.geokon.com/3810)
15m of free cable (at the surface) + 16m with thermistors every 0.5m between 16m and 5m, every 1m between 5m and 0m. Total of 28 thermistors (see reference picture for details).

Datalogger & Multiplexer

Campbell Scientific CR1000 (https://www.campbellsci.com/cr1000)
Campbell Scientific AM16-32B (https://www.campbellsci.com/am16-32b)

Solar Panel & Battery

Solar panel: AltE Store 30W, 12V (https://www.altestore.com/store/solar-panels/alte-poly-30-watt-12v-solar-panel-p10350)
Charge controller: AltE Store 4A, 12V (https://www.altestore.com/store/charge-controllers/solar-charge-controllers/mppt-solar-charge-controllers/genasun-solar-charge-controllers/genasun-gv-4-pb-12v-4a-mppt-controller-for-12v-lead-acid-batteries-p10622/)
Battery: AltE Store 98 AH (20HR) (https://www.altestore.com/store/deep-cycle-batteries/sealed-gel-cell-batteries/mk-8g30h-gel-98-ah-20hr-t876-terminal-p7473/)
The powering section of the station is shared with Mike MacFerrin and Achim Heilig stations.

Enclosures

Logger Box: Campbell Scientific ENC12/14 (https://www.campbellsci.com/enc12-14)
Battery Enclosure: Pelican 1460 (http://www.fuertecases.com/product/Pelican-1460/Pelican-Protector-Hard-Protective-Waterproof-Stoage-Shipping-Cases-Containers-Boxes)

Mast & Cross Arm

Mast: 2.5 inches mast shared with Mike MacFerrin and Achim Heilig stations.
Cross arm: 1 inch pipe, 183 cm long from old Regine's AWS. Connected to Mike MacFerrin's mast with a cross mounting custom built by our machine shop.

Guy Wires

Aircraft cable: 1/8" from Home Depot
Fence post: 8 feet galvanized fence post from ULine, drilled into the last summer horizon
Turnbuckles + ubolts

Sensors Calibration

Thermistors string

Calibration date**:** 14 March 2017

The thermistor string was calibrated in an action packer filled with a saturated solution of snow and water supposed to be exactly at the melting point (0°C). All thermistors showed temperatures in the range of the thermistor accuracy (±0.1°C) except thermistor #11, which measured temperatures between 0.32°C and 0.45°C. The offset of this single thermistor is automatically corrected in the datalogger program (-0.385°C) and thus no further corrections are required.

During the calibration of string #3 a suspected anomalous behaviour was observed.

Close to 0C some thermistors were showing exactly the same temperature values (to the last number digit which is out of the accuracy of both the thermistors and of the logger). Thermistors affected by this behaviour were randomly changing and not always the same sensor were showing the same value. This excluded problem in the wiring of both the thermistors string and in the connectors to the multiplexer/logger (another logger and multiplexer setup was even tried without solving the issue). A delay of 20ms between each switch of the MUX channels was introduced, but the problem was not solved.

The finals solution to this problem (not yet 100% sure) was found to be in the minimum voltage difference detectable by the logger. In a saturated solution of water and snow the temperature of the solution is really constant and thus it can happen that the reading of different thermistors falls exactly on the same logger resolution interval. The precision on the exactly the last digit of the temperature is most likely due to the calculation which transform the net voltage measured into a resistance and then into temperature via the Stainhart-Hart equation.

Data collected during the thermistor string calibration are found in the file:
Dye2_ThermStringCal_03132017.dat

Snow Thermistors - added in Spring 2019

Calibration date**:** 12 April 2019

Same procedure as above.

OM3: 0.00 Dye2 TOP
OM4: 0.10 Dye2 MIDDLE
OM5: 0.10 Dye2 BOT

Data Logger Program

Program name: Dye2_2017.CR1
Loading date: 11 May 2017
The program is attached to this metadata file and it is provided with enough comments to fully understand it.
The program records the meteorological variables the firn variables (thermistors string) every 1 hour.

Program name: Dye2_2019.CR1
Loading date: 17 May 2019
Spring 2019 update:
1) added 3 new thermistors at snow/firn interface: (OMEGA 44031)
   added new thermistors on the MUX (MUX 29H/29L, 30H/30L and 31H/31L)
   new thermistors are read in the same way as the old Geokon but different
   Steinhart-Hart constants are used