FILE NAME: Station Record AK 005.doc

LAST UPDATED: 8/28/23

**SAGWON, ALASKA**

**SITE 1, NON-ACIDIC**

### Station Record

**STATION:** AK005, SAGWON 1, MOIST NON-ACIDIC TUNDRA, FLUX STUDY SITE 95-3 (005)

|  |  |  |  |
| --- | --- | --- | --- |
| **PROJECT MANAGER:**  Phone:  FAX:  E-mail: | C.A. Seybold  USDA NRCS  Federal Bldg., Rm. 152  Lincoln, NE 68508  (402) 437-4132  (402) 437-5336  cathy.seybold@lin.usda.gov | F. E. Nelson  Department of Geography  University of Delaware  Newark, Delaware 19711  (302) 831-0852  (302) 831-6654  fnelson@udel.edu | K. M. Hinkel  Department of Geography  University of Cincinnati  Cincinnati, Ohio 45221-0131  513-556-3430  513-556-3370  71042.2643@compuserve.com |
|  |  |  |  |
| Phone:  FAX:  E-mail: | Chien-Lu Ping  University of Alaska Fairbanks  Palmer Research Center  533 E. Fireweed  Palmer, Alaska 99645  907-746-9462  907-746-2677  pfclp@uaa.alaska.edu |  |  |

**LOCATION:** West of Haul Road (Dalton Hwy.) near Sagwon materials site.

GPS (06/24/96): 69° 26’ 22.38” N

148° 40’ 07.62” W

253 m elevation

GPS (08/14/98): 69° 26’ 21.6” N

148° 40’ 06.8” W

650 ft elevation

GPS (09/15/99): 69° 26’ 22.7” N

148° 40’ 05.5” W

850 ft elevation

GPS (08/15/01): 69° 26’ 22.3” N

148° 40’ 07.7” W

847 ft elevation

GPS (06/21/02): 69° 26’ 22.3” N

148° 40’ 07.5” W

845 ft elevation

GPS (08/19/03): 69° 26’ 22.2” N

148° 40’ 07.8” W

800 ft elevation

GPS (08/15/04): 69° 26’ 22.3” N

148° 40’ 07.9” W

819 ft elevation

GPS (08/08/07): 69° 26’ 22.2” N

148° 40’ 07.8” W

803 ft elevation

GPS (08/14/08): 69° 26’ 22.3” N

148° 40’ 07.8” W

811 ft elevation

GPS (08/14/09): 69° 26’ 22.3” N

148° 40’ 07.7” W

800 ft elevation

GPS (08/13/10): 69° 26’ 22.3” N

148° 40’ 07.8” W

825 ft elevation

**INSTRUMENTATION:**

Summary

| Quantity | Description | Comments |
| --- | --- | --- |
| (1) | Campbell CR-10 datalogger (SN: 26581). | Installed 1996, Removed 2000. |
| (1) | Campbell CR-10X-2M datalogger (SN: X19498). Wiring panel SN: 6409 | Installed 2000. Recalled.  Replaced 8/01 |
| 1 | Campbell CR-10X-2M-XT datalogger (SN: X16669). Wiring panel SN: 6409 | Installed 8/01 |
| 1 | Campbell AM416 multiplexer SN: 7616 | Installed 1996. |
| (1) | Campbell SM192 storage module, upgraded to SM716 (SN: 4066). | Installed 1996, upgraded to SM716 ?, removed 2000. |
| (1) | Campbell CSM1 card storage module SN: E3338. | Installed 2002.  Removed 2003 |
| 1 | Campbell Storage module SM4M | Installed 2003 |
| 1 | Campbell PS12LA power supply. | Installed 1996 |
| (1) | 7 Ah battery | replaced 2003, removed 2005 |
| 1 | 12 Ah battery | Installed 2005 |
| 1 | Campbell Solar panel. | Installed 1996, replaced 2005 |
| 1 | Campbell ENC 16/18 enclosure. | Installed 1996. |
| 3 | Vitel dielectric constant soil moisture/temperature sensors. | Installed 1996. |
| 3 | Campbell 107B soil temperature sensors | Installed 1997 |

| MULTIPLEXER  POSITION | VITEL PROBE  SERIAL # | DEPTH  (cm) | COMMENTS |
| --- | --- | --- | --- |
| 1 | 315 | 12 | Horizontal orientation. |
| 2 | 317 | 25 | Horizontal orientation. |
| 3 | 350 | 45 | Vertical orientation |

**HISTORY:** June 24, 1996: Station initiated. Transported to site by helicopter. Vitel sensors were installed in the soil at three depths. Sensor #315 was installed horizontally at 12 cm (about 2 cm below the organic layer), sensor #317 was installed horizontally at 25 cm, and sensor #350 was installed vertically in the bottom of the hole at 45 cm. The datalogger is programmed to read the sensors in the order: 12 cm, 25 cm, and 45 cm. The datalogger program is *sag1*. The datalogger was set to Alaska Savings Time. Measurements are made at 20-minute intervals and averaged and recorded every two hours. The enclosure was placed in a plastic garbage sack and wrapped with a plastic coated tarp, secured with duct tape. The wrapped enclosure was placed on two boards to raise it off the ground. The solar panel was set on the ground, leaning against the datalogger enclosure. Wrapped enclosure with blue tarp.

August 11, 1997: Downloaded data to Sag19701.dat. Reset datalogger clock (was off by 12 hours) Downloaded upgraded datalogger program, *sag1a*. Added three Campbell 107B soil temperature sensors at 12, 25, and 45 cm depths. The soil was thawed to about 50 cm. The 45-cm depth soil temperature sensor is not working (Bad sensor? Connected to wrong input channel on multiplexer?). Wrapped enclosure with blue tarp.

August 14, 1998: The 45-cm depth soil temperature sensor (Soil Temp #3) output wire was connected to shield position on multiplexer. Connected it to 6H1 where it should have been. Working now. Soil seems to have experienced subsidence around datalogger enclosure. Downloaded data: Sag3001.dat, Sag3001.dat, and Sag3003.dat. Added desiccant. Wrapped enclosure with blue tarp.

September 15, 1999: Station does not respond. Red light indicates that solar panel is working. Added desiccant. All wiring seems OK. Wrapped enclosure with blue tarp.

June 23, 2000: Gary Michaelson, UAF, replaced the CR10 datalogger with a CR10X-2M (SN: X19498). In addition, he removed the storage module. Program, *sag1* v.2.00, is loaded in CR10X-2M. It makes readings at 20-minute intervals and averages hourly. Wrapped enclosure with blue tarp.

August 15, 2001: Replaced the recalled datalogger with a CR10X-2M-XT (SN: X16669). Downloaded program, *sag1* v.2.00. Helicopter to station. Weather bad and deteriorating, so in haste, did not check datalogger operation. Did not add desiccant. Downloaded data from recalled datalogger. Wrapped enclosure with blue tarp.

June 21, 2002: Downloaded program, *sag1* v.2.01. Helicopter to station. Did not add desiccant. Downloaded data from datalogger. Added card storage module. Replaced faulty 45-cm depth soil temperature, but could not install it in the ground. Need to do this next time. Need a long ¼-in hanger bit for installation. Checked Li battery for CR10. V = 3.0598V. Set datalogger ID to 5. Everything seems to be working OK. Wrapped enclosure in blue tarp.

August 19, 2003: Downloaded data. Replaced power supply—12V,7ah. Added storage module SN: 3478. Installed the 45-cm depth soil temperature sensor (107). Reset clock—was 20 min ahead. Added two desiccant Everything seems to be working OK. Wrapped enclosure in blue tarp.

August 15, 2004: Downloaded data from storage module. Added storage module SN:3467. Station clock was 1.5 min behind. Did not reset clock. Added two desiccant Everything seems to be working OK. Wrapped enclosure in blue tarp.

August 12, 2005: Downloaded data from datalogger and swapped storage modules. Internal battery was 3.1 volts. Retrieved program from datalogger. Station clock was 3 min behind. Replaced the 7 Ah battery with a 12 Ah battery. Moved enclosure to lower legs of a tripod. Replaced solar panel. Added desiccant. Everything seems to be working OK.

August 14, 2006: Arrived at station at about 5:30 PM. Swapped storage modules. Internal battery was 3.1 volts. Station clock was 5 min behind; reset clock. Added two desiccant packs. Everything seems to be working OK.

August 08, 2007: Swapped storage modules. Internal battery was 3.15 volts. Station clock was a of couple min off. Added two desiccant packs. Everything seems to be working OK.

August 14, 2008: Arrived at site about 1:00 PM. Swapped storage modules. Lithium battery was 3.11 volts. Station clock was 2 minutes behind. Added two desiccant packs. Everything seems to be working okay. Spray painted the enclosure with tundra color paint to reduce the visibility of the station.

August 14, 2009: Downloaded data from data logger and swapped storage modules. Lithium battery was 3.14 volts. Station clock was 4.5 minutes behind—reset clock. Added two desiccant packs. Everything seems to be working okay.

August 13, 2010: Downloaded data from data logger (with RECON) and swapped storage modules. Lithium battery was 3.12 volts; battery was 13.6 volts. Station clock was 1.5 minutes behind. Need to reset clock for next time (date is one month off). Everything seems to be working okay. Air temp was 15.9ºC with light winds.

August 12, 2012: Downloaded data from data logger (with RECON) and swapped storage modules. Lithium battery was 3.12 volts; battery was 13.52 volts. Station clock was one month (7/12/12) and 45 minutes behind; reset clock. Everything seems to be working okay. Air temp was 15.3ºC, sunny and buggy.

August 14, 2014: Swapped storage modules.

August 16, 2015: AEK & FEN at 11:15 am. Swapped storage modules.

August 15, 2016: Swapped storage modules.

August 17, 2017: Swapped storage modules. After looking at the data, in January the year changed from 2017 to 2013. The year in the raw data file was not corrected.

August 16, 2018: Swapped storage modules. In the raw data, the years are off; 2013 should be 2017 and 2014 should be 2018. The year in the raw data file was not corrected. The clock needs to be reset.

August 13, 2019: Swapped storage modules. In the raw data, the years are off; 2014 should be 2018 and 2015 should be 2019. The year in the raw data file was not corrected. The clock needs to be reset for next time.

August 13, 2021: Swapped storage modules. In the raw data, the years are off; 2016 should be 2020 and 2017 should be 2021. The year in the raw data file was not corrected. The clock needs to be reset for next time.

August 16, 2022: Swapped storage modules at about 1542. In the raw data, the date/time was off, but was corrected in the processed data. The date/time in the raw data file was not corrected. The clock needs to be reset for next time.

August 13, 2023: Swapped storage modules at about 1540 AST. In the raw data, the date/time was off, but was corrected in the processed data. The date/time in the raw data file was not corrected. Clock was reset (ADT). The clock was reset using Recon from 5/4/2010 11:08 am to new time of 8/13/2013 16:53. Reset clock next time to AK saving time (AST).

**DATA:**

DATALOGGER OUTPUT:

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 005 |
| 2 | Year | N/A | N/A | Campbell CR10 |  |
| 3 | Day | N/A | N/A | Campbell CR10 |  |
| 4 | Time | N/A | N/A | Campbell CR10 | AK savings time |
| 5 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 6 | Int Temp | °C | Datalogger | Campbell CR10 |  |
| 7 | Ref Temp | °C | Enclosure | Campbell CR10TCR | Not working |
| 8 | Enc Temp | °C | Enclosure | Thermocouple | Not working |
| 9 | 1V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 10 | 2V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 11 | 3V1 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 12 | 1V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 13 | 2V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 14 | 3V2 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 15 | 1V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 16 | 2V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 17 | 3V3 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 18 | 1V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 19 | 2V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 20 | 3V4 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 21 | Soil Temp | °C | Soil 10 cm | Campbell 107B |  |
| 22 | Soil Temp | °C | Soil 25 cm | Campbell 107B |  |
| 23 | Soil Temp | °C | Soil 40 cm | Campbell 107B | Not working |

DATA PROCESSING ALGORITHMS:

Vitel Hydra Probe soil moisture, temperature, complex dielectric constant, electrical conductivity, and salinity are determined from the raw data (four voltages), and a calibration option (1, 2, or 3), depending on the soil texture, with a program supplied by Vitel, Inc. Option 2 (silt) used here (5 volt sensors).

DATA STORAGE AND ACCESS:

Processed data are available on the USDA NRCS NSSC Internet home page at [http://www.wcc.nrcs.usda.gov](http://www.wcc.nrcs.usda.gov/). Data are in Excel files organized by calendar year. Each file consists of a page containing all downloaded data for that year and 3 pages of processed Vitel sensor data (one page for each sensor) with the following column headings: HOUR, TIME, DATE, SENSOR, SOIL (calibration option), ER (real part of the soil dielectric constant), EI (imaginary part of the soil dielectric constant), TEMP (soil temperature °C), ER-COR (temperature corrected ER), EI\_COR (temperature corrected EI), WATER (volume fraction soil water content), SALINITY (soil salinity in g/l NaCl), SOIL\_COND (soil electrical conductivity in S/m or mhos/m), SOIL\_COND\_COR (temperature corrected SOIL\_COND in S/m or mhos/m), WATER\_CON\_COR (temperature corrected soil water electrical conductivity in S/m or mhos/m). The column headings for the annual data are: ID (site), YEAR, DAY OF YEAR, HOUR, TIME, DATE, BATT VOLT (battery voltage), INT TEMP °C (datalogger temperature), REF TEMP °C, TC °C (enclosure temperature), 1V1 12-cm depth (Vitel), 1V2 12-cm depth (Vitel), 1V3 12-cm depth (Vitel), 1V4 12-cm depth (Vitel), 2V1 25-cm depth (Vitel), 2V2 25-cm depth (Vitel), 2V3 25-cm depth (Vitel), 2V4 25-cm depth (Vitel), 3V1 45-cm depth (Vitel), 3V2 45-cm depth (Vitel), 3V3 45-cm depth (Vitel), 3V4 45-cm depth (Vitel), Soil T 10 cm °C, Soil T 25 cm °C, Soil T 40 cm °C.

**SOILS:** Loess. Sampled for characterization.

CLASSIFICATION:

**LANDSCAPE:**

SLOPE:

ASPECT:

ELEVATION:

**VEGETATION:** Moss, grass, and small annual flowers.

GROUND COVER:

CANOPY COVER:

**COMMENTS:** Sensor installation went very well, especially considering all of the coarse fragments present.

**NOTES FOR NEXT STATION VISIT:**  Routine maintenance.