FILE NAME: Station Record AK 006.doc

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**SAGWON, ALASKA**

SITE 2, ACIDIC

### Station Record

**STATION:** AK006, SAGWON 2, MOIST ACIDIC UPLAND TUNDRA, FLUX STUDY SITE 95-4 (006).

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

GPS (06/24/96): 69° 24’ 08.73” N

148° 47’ 52.88” W

324 m elevation

GPS (08/11/97): 69° 24’ 08.82” N

148° 47’ 52.23” W

334 m elevation

GPS (08/15/98): 69° 24’ 07.3” N

148° 47’ 52.4” W

1134 ft elevation

GPS (08/15/01): 69° 24’ 09.0” N

148° 47’ 51.7” W

1103 ft elevation

GPS (06/21/02): 69° 24’ 09.0” N

148° 47’ 52.0” W

1114 ft elevation

GPS (08/20/03): 69° 24’ 08.9” N

148° 47’ 52.2” W

1100 ft elevation

GPS (08/15/04): 69° 24’ 08.9” N

148° 47’ 52.0” W

1098 ft elevation

GPS (08/12/05): 69° 24’ 09.0” N

148° 47’ 52.1” W

1080 ft elevation

GPS (08/14/06): 69° 24’ 09.0” N

148° 47’ 52.9” W

1082 ft elevation

GPS (08/08/07): 69° 24’ 08.9” N

148° 47’ 52.0” W

1080 ft elevation

GPS (08/14/08): 69° 24’ 09.0” N

148° 47’ 52.0” W

1082 ft elevation

GPS (08/14/09): 69° 24’ 09.0” N

148° 47’ 52.0” W

1086 ft elevation

1073 ft elevation

GPS (08/13/10): 69° 24’ 08.9” N

148° 47’ 51.9” W

1086 ft elevation

GPS (08/12/12): 69° 24’ 08.8” N

148° 47’ 52.2” W

1084 ft elevation

**INSTRUMENTATION:**

Summary

| Quantity | Description | Comments |
| --- | --- | --- |
| (1) | Campbell CR-10 datalogger (SN: 26583). | Installed 1996, removed 2000. |
| (1) | Campbell CR-10X-2M datalogger (SN: X20008). Wiring panel SN: | Installed 2000, Recalled  Replaced 8/01 |
| 1 | Campbell CR-10X-2M datalogger (SN: X16670). Wiring panel SN: 6405 | Installed 8/01, replaced logger on 8/12 |
| 1 | Campbell AM416 multiplexer SN: 7617 | Installed 1996. |
| (1) | Campbell SM192 storage module. | Installed 1996, replaced ?? |
| (1) | Campbell SM716 storage module (SN: 3196). | Installed ??, removed 2000. |
| (1) | Campbell CSM1 card storage module SN: E3402. | Installed 2002.  Removed 2003 |
| 1 | Campbell SM4M Storage module | 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. |
| 6 | Vitel dielectric constant soil moisture/temperature sensors. | 3 installed 1996, 3 installed 1998. |
| 3 | Campbell 107B soil temperature sensors | Installed 1997 |

| MULTIPLEXER  POSITION | VITEL PROBE  SERIAL # | DEPTH  (cm) | COMMENTS |
| --- | --- | --- | --- |
| 1 | 313 | 10 | Horizontal orientation. |
| 2 | 351 | 25 | Horizontal orientation. |
| 3 | 348 | 45 | Vertical orientation |
| 4 | 602 | 15 | Horizontal orientation. |
| 5 | 837 | 10 | Horizontal orientation. |
| 6 | 835 | 15 | Horizontal orientation. |

**HISTORY:**  June 24, 1996: Station initiated. Vitel sensors were installed in the soil at three depths. Sensor # 313 was installed horizontally at 10 cm, sensor # 351 was installed horizontally at 25 cm, and sensor #348 was installed vertically in the bottom of the hole at 45 cm. The datalogger reads the sensors in the following order: 10 cm, 25 cm, and 45 cm. The datalogger program is *sag2*. 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 placed on the ground, leaning on the datalogger enclosure. The sensor leads are enclosed in flexible conduit (plastic coated steel). Wrapped enclosure with blue tarp.

August 11, 1997: Downloaded data to Sag29701.dat. Reset datalogger clock (off by 12 hours). Downloaded upgraded datalogger program, *sag2a*. Changed ID to 006 from 001. Changed to average data hourly instead of every two hours. Added three Campbell 107B soil temperature sensors at 12, 25, and 45 cm depths. Wrapped enclosure with blue tarp.

August 15, 1998: Three additional Vitel soil moisture sensors, #602, 837, and 835 were installed at depths of 15, 10, and 15 cm, respectively. Original sensor at 10 cm giving erratic readings possibly due to it’s being in the organic layer. The additional sensors were installed to check this out. Downloaded data: Sag2001.dat and Sag2002.dat. Downloaded upgraded datalogger program, *sag2* to account for the additional Vitel sensors. Moved soil temperature leads from 4L1, 5L1, and 6L1 to 7L1, 8L1, and 9L1, respectively to make room for the Vitel sensors. The organic mat extends to about 12 cm. Soil seems to have experienced subsidence around datalogger enclosure. Downloaded data in Sag4001.dat and Sag4002.dat. Wrapped enclosure with blue tarp.

June 23, 2000: Gary Michaelson, UAF, replaced the CR10 datalogger with a CR10X-2M (SN: X20008). In addition, he removed the storage module. Program, *sag2* 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: X16670). Downloaded program, *sag2* v.2.00. Helicopter to station. Weather bad and deteriorating, so in haste, did not check datalogger operation. Did not add desiccant. Could not communicate with recalled datalogger. Wrapped enclosure with blue tarp.

June 21, 2002: Helicopter to station. Downloaded data to storage module card. Added CSM1 card storage module. Downloaded program, *sag2* v.2.01. Li battery voltage = 3.1203V. Datalogger ID set to 6. Did not add desiccant. Wrapped enclosure with blue tarp. Everything seems to be working OK.

August 20, 2003: Moderate to heavy fog. Walked to station and took helicopter back to truck. Downloaded data. Downloaded data since last download onto the Palm computer. Added storage module SN: 3474. Added two desiccant. Power supply was plugged into the external outlet. Replaced supply battery—12V 7ah. Reset the clock—was about 30 min behind. Everything seems to be working OK. Wrapped enclosure with blue tarp.

August 15, 2004: Clear warm day. Took the helicopter from Toolik. Downloaded data from storage module. Added storage module SN:3475. Added two desiccant. Station clock was about 13 min behind. Reset station clock. Everything seems to be working OK. Wrapped enclosure with blue tarp.

August 12, 2005: Downloaded data from datalogger and swapped storage modules. Put in storage module SN:2798. Internal battery was 3.1 volts. Retrieved program from datalogger. Station clock was 18.5 min behind. Replaced the 7 Ah battery with a 12 Ah battery. Moved enclosure to lower legs of tripod. Replaced solar panel. Added desiccant. Everything seems to be working OK.

August 14, 2006: Arrived at station at about 2:11 PM. Swapped storage modules. Put in storage module SN:2798. Internal battery was 3.125 volts. Station clock was 10 min behind; reset clock. Added two desiccant packs. Everything seems to be working OK.

August 08, 2007: Swapped storage modules. Internal battery was 3.13 volts. Station clock was about one min behind. Added two desiccant packs. Everything seems to be working OK.

August 14, 2008: Arrived at site about 4:30 PM. Swapped storage modules. Lithium battery was 3.17 volts. Station clock was 4.5 minutes behind; reset the clock. Added one desiccant pack. Everything seems to be working okay. Spray painted the enclosure with tundra color paint to reduce the visibility of the station.

August 14, 2009: Swapped storage modules and downloaded datalogger. Lithium battery was 3.21 volts. Station clock was 3 minutes behind—reset the clock. Added two desiccant packs. Everything seems to be working okay. Reset the #2 temp sensor to 25 cm (was at 15 cm)—it was reading high compared to the others.

August 13, 2010: Swapped storage modules and downloaded datalogger with RECON. Lithium battery was 3.15 volts; battery was 13.70 volts. Station clock was 1 month and 3 minutes behind; reset the clock. Added two desiccant packs. Everything seems to be working okay. Air temp was 15.4ºC with light winds.

August 12, 2012: Swapped storage modules and downloaded data to RECON. Lithium battery was 3.16 volts; battery was 13.64 volts. Station clock was 43 minutes behind; reset the clock. Replaced datalogger (with one taken out from Westdock8 after replacing lithium battery). Lithium battery in the replaced datalogger was 3.078 volts. Downloaded program and reset clock. Everything seems to be working okay. Air temp was 12.4ºC.

August 14, 2014: Swapped storage modules.

August 16, 2015: AEK & FEN at about 3:45 pm. Swapped storage modules.

August 15, 2016: Swapped storage modules.

August 15, 2017: Swapped storage modules.

August 16, 2018: Swapped storage modules.

August 13, 2019: Swapped storage modules.

August 13, 2021: Swapped storage modules at 14:15 AST.

August 18, 2022: Swapped storage modules at 13:52.

August 13, 2023: Swapped storage modules at 12:15 AST.

**DATA:**

DATALOGGER OUTPUT:

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 006 |
| 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 | 1V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 8 | 2V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 9 | 3V1 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 10 | 4V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 11 | 5V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 12 | 6V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 13 | 1V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 14 | 2V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 15 | 3V2 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 16 | 4V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 17 | 5V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 18 | 6V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 19 | 1V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 20 | 2V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 21 | 3V3 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 22 | 4V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 23 | 5V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 24 | 6V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 25 | 1V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 26 | 2V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V4 | Volts | Soil 40 cm | Vitel Soil Moisture/Temp |  |
| 28 | 4V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 29 | 5V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 30 | 6V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Added 8/15/98 |
| 31 | Soil Temp | °C | Soil 10 cm | Campbell 107B |  |
| 32 | Soil Temp | °C | Soil 25 cm | Campbell 107B |  |
| 33 | Soil Temp | °C | Soil 40 cm | Campbell 107B |  |

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 6 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 deg C (datalogger temperature), 1V1 10-cm depth (Vitel), 1V2 10-cm depth (Vitel), 1V3 10-cm depth (Vitel), 1V4 10-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), 4V1 15-cm depth (Vitel), 4V2 15-cm depth (Vitel), 4V3 15-cm depth (Vitel), 4V4 15-cm depth (Vitel), 5V1 10-cm depth (Vitel), 5V2 10-cm depth (Vitel), 5V3 10-cm depth (Vitel), 5V4 10-cm depth (Vitel), 6V1 15-cm depth (Vitel), 6V2 15-cm depth (Vitel), 6V3 15-cm depth (Vitel), 6V4 15-cm depth (Vitel), Soil T 10-cm depth (°C), Soil T 25-cm depth (°C), Soil T 45-cm depth (°C).

**SOILS:**

CLASSIFICATION:

**LANDSCAPE:**

SLOPE:

ASPECT:

ELEVATION:

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

GROUND COVER:

CANOPY COVER:

**COMMENTS:**

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