FILE NAME: StationRecordMinnaBluff.doc

LAST UPDATED: 3/16/2023

STATION RECORD

## MINNA BLUFF

**ANTARCTICA**

**STATION:** MINNA BLUFF (ANT009)

|  |  |  |  |
| --- | --- | --- | --- |
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**LOCATION:** Minna Bluff, Antarctica.

GPS (01/07/03): 78º 30’ 41.6” S

166º 45’ 58.2” E

125 ft elevation

GPS (01/06/04): 78º 30’ 41.7” S

166º 45’ 58.1” E

72 ft elevation

GPS (01/17/05): 78º 30’ 41.6” S

166º 45’ 58.1” E

GPS (01/9/06): 78º 30’ 41.6” S

166º 45’ 57.5” E

122 ft elevation

GPS (01/20/09): 78º 30.694 S

166º 45.970 E

91 ft elevation

GPS (01/20/11): 78º 30’ 41.6” S

166º 45’ 58.1” E

92 ft elevation

GPS (01/14/12): 78º 30’ 41.6” S

166º 45’ 58.2” E

93 ft elevation

GPS (12/15/12): 104 ft elevation

**INSTRUMENTATION:**

Summary

|  |  |  |
| --- | --- | --- |
| Quantity | Description | Comments |
| 1 | Campbell CR-10X-2M-XT datalogger S/N: X24399. Wiring panel S/N: 10180. | Installed 01/03 |
| 1 | Campbell AM416XT multiplexer S/N: 13627. | Installed 01/03 |
| 1 | Campbell SM4M storage module S/N: 3482 (Minna Bluff (A)); alternate S/N: 3483 (Minna Bluff (B)) | Installed 01/03 |
| 1 | Campbell CH100 charger/regulator | Installed 01/07 |
| 3 | Campbell BP24 24-amp-hr YUASA battery | Installed 2009, 2010, 2011. |
| 1 | Campbell MSX-20R Solar panel. | Installed 01/03. Replaced 01/07. |
| (1) | MetOne wind sensor. (S/N: D4046) | Installed 01/03. Replaced 1/05. Replaced 1/06 Removed 1/07 |
| 1 | RM Young wind sensor. | Installed 01/07, Replaced 01/09, Replaced 1/18 |
| 1 | Vaisala HMP35C air temperature/RH sensor. | Installed 01/03, Replaced with HMP45C 1/18 |
| 1 | Campbell solar radiation shield and HMP35C air temperature/relative humidity sensor. | Installed 01/03 |
| 1 | Licor LI200X solar radiation sensor. | Installed 01/03, Replaced 01/09 |
| 1 | Licor pyranometer solar radiation sensor leveling fixtures. | Installed 01/03 |
| 1 | Pyranometer mounting fixture for cross-arm. | Installed 01/03 |
| 1 | Campbell ENC 16/18 enclosure. | Installed 01/03 |
| 1 | Campbell CM10 3-m tripod. | Installed 01/03 |
| 1 | MRC soil temperature probe | Installed 01/03. Replaced 1/06. |
| 8 | Vitel dielectric constant soil moisture/temperature sensors. | Installed 01/03. Replaced 1/06. |
| 12 | Campbell 107 soil temperature sensors | Installed 01/03 |
| 1 | Campbell 107 air temp & radiation shield | Installed 01/06 |

**HISTORY:**  January 7-11, 2003: Station initiated. Soil sensors were installed by Megan Balks and Don Huffman. Two reps of Vitel Hydra probes were installed. The Vitel probes were attached to a Campbell Scientific CR10X-2M-XT datalogger. Two stacks of Campbell 107 temperature sensors were installed and attached to the datalogger. A MRC soil temperature probe was installed. The top sensor, which should be at the soil surface, is actually about 3.5 to 4 inches above the level soil surface and about 2 inches above the built-up surface of coarse gravel placed around the probe. The Vitel and 107 soil temperature sensors, with the exception of the 5-cm depth, were installed with depths referenced to the MRC probe. That is the depths are depths below the highest sensor in the probe. Need to clarify depths with Don and Megan. The MRC probe was connected using a pair of matched 10.01 kΩ low thermal coefficient (TC = 50 ppm/ºC). Above ground sensors are one Vaisala HMP35C air temperature/RH sensor, one MetOne wind speed and direction sensor, and one Licor pyranometer. The air temperature sensor is mounted in a solar radiation shield on the tripod. The air temperature/RH sensor was mounted two meters above the ground surface. The wind sensor and solar radiation sensor were mounted on the tripod cross-arm three meters above the soil surface. The datalogger, a Campbell AM416XT multiplexer, and two Campbell BP24 power supply, were located inside of a Campbell ENC16/18 enclosure. The enclosure was mounted on the tripod. Power is supplied by a Campbell (SolarX) MSX20R solar panel, mounted on the tripod. The solar panel faces true north and is nearly perpendicular to the surface of the earth. Datalogger was set to New Zealand Standard Time. Midnight is 0000. The datalogger program, *Ant9* v1.00, was downloaded to the datalogger. Measurements are made at 20-minute intervals and averaged and recorded every hour. Measurements of solar radiation, wind, air temperature, and RH are made at 10-second intervals and averaged and recorded every hour. A decision was made in the field to add max 10-s wind speed, max air temperature, and min air temperature and to change the number of MRC soil temperature probe positions read to 14 from 12. This had to be done in the terminal mode of the PDA and a check will have to be made of the data to determine if the operation was successful. The datalogger ID was set to 74. [Depths adjusted after consultation with Megan and Don 01/17/03. Need to cross check data.]

January 6, 2004: Retrieved the Campbell SM4M storage module (A) and installed the alternate (B). Installed a third Campbell BP24 24-amp-hr YUASA battery. The vane on the wind sensor had been sheared off; replaced the vane. Replaced the desiccant.

January 16, 2005: Retrieved the alternate Campbell SM4M storage module S/N: 3483 (Minna Bluff (B)) and installed S/N: 3482 (Minna Bluff (A)). Replaced the left inside battery. Dated it. Used crimp type butt splices to connect the wiring. Put automotive wire sheathing around the outside battery leads. Voltages: station batteries-13.6 vdc, Li battery-3.1 vdc. Station time 12:49 PM, actual time 1:17 PM, NZST. Station was reset back to NZST. Drift spans two years because time was not reset last season. Replaced the Met-One anemometer. Tail was gone and cups would only turn if forced. Used the existing cable. Periods of no wind data are attributed to the poor condition of the sensor. Taped down several loose sensor wires. It appears that 4 Vitel sensors are working, 4 are not. Wiring appears OK. Looked at the near surface 107s by following the leads. Nothing was exposed. Swapped desiccant packs. Removed built-up mound from around the MRC probe. Ground surface to top of probe was 3-1/2 inches. It is now 6-1/2 inches. Area was leveled, then stones re-applied to resemble the surrounding surface roughness. Reseated and checked the MRC probe wiring and resistors. Retrieved the CR10X datalogger program. Don will forward it to both Curtis and Ron P. Wiped off the LI200 pyranometer. No apparent damage due to sand blasting or flying rocks. Took station pictures looking N,E,S,W. Weather conditions: high thin clouds clearing, -3C, wind 5-7 mph. [Note: Megan used the spare MRC probe for the project at Cape Hallett.]

January 9, 2006: The MRC probe was not reading correctly. Checked the resistors on the MRC probe and both were reading okay (10.0 kΩ). The old MRC probe was sticking out of the ground 16 cm. The MRC probe was pulled out and a new one was installed. A hole was dug for the MRC probe in the same location as the previous probe. After installation, the MRC probe was 16 cm above the ground. New resistors were also used. All eight vital sensors were replaced because 7 of them were not reading correctly. The two stacks of 4 sensors were mistakenly installed at 10, 15, 24, and 37 inch depths instead of cm depths. The vital sensors were installed along hole dug for the MRC probe. The two stacks were installed on opposite sides of the hole from each other (with the MRC probe in the middle). Five of the old vitels were removed. In the process of removing some of the old vital sensors, three of the soil temp sensors were dug up (the 5, 5, and 20 cm depth sensors); these were reburied at the appropriate depths. Also, both of the 84 cm depth soil temp sensors were destroyed when digging the hole for the MRC probe. These were not replaced (we did not have any 107’s with us). An air temp (107) and radiation shield were installed (82 inches above ground). The tail of the wind vane was gone, and so the sensor was replaced; used the existing cable. The solar panel was shattered by a flying rock; will need to be replace for next time. The solar panel was still working okay. The rock hole was sealed with silicone sealant. The lightning rod was snapped off and lying on the ground; was able to re-install it. Replaced the 24 amp-hr battery, which was located on the ground (installed in a new gray enclosure box). Date was placed on the battery. The datalogger and old program were downloaded. Storage modules were swapped (installed storage module SN:5950). A new program was installed (minnarev4.dld). Station clock was reading 10:37 and PC clock was reading 10:12 am. Clock was reset (at about 5:00 pm). After completing the new installations, everything appeared to be working okay. Added three packets of desiccant. There was no regulator; need to install one for next time. Weather conditions were calm, sunny, and -2 C air temp. Total time at site was 6.5 hr. The MRC probe hole was dug by Tristen, Rikki, and Tam (Scott Base staff).

January 15, 2007: Downloaded data and swapped storage modules. Wind vane was broken off its vertical axis. Replaced wind sensor with a RM Young wind sensor. Replaced the shattered solar panel. Installed a regulator. Replaced one battery (need to label with year it was installed). Plugged new battery into “int” socket of regulator. Connected the other two batteries together (in parallel) and plugged them into the “ext” socket of regulator. Removed vitels #5-8 and tapped them to the tripod (can be reconnected). Installed four new viels--#5 10 cm rep 1, #6 10 cm rep 2, #7 15 cm rep 1, and #8 15 cm rep 2. Buried the vitels, it was very dry and very gravelly. Clock was okay. Downloaded new program (MINNAREV5.dld). Everything appeared to be working. Very windy (40-45 mph) air temp 0°C. Tobby and Able from Scott Base helped.

January 15, 2008: The station was down. The solar panel was gone and the cross bar on tripod was upside down. The wind sensor and solar radiation were upside down, but okay. Put on a new solar panel, but did not have the correct bracket. So, the solar panel was wired (secured at four point) onto the back of the enclosure, with the tripod pole between them. Seemed very secure. The existing solar panel cable was used to connect the new solar panel. Replaced one 24 Ah battery in the enclosure. Connected the two batteries in the enclosure to the power supply regulator. The station was up and running. Lithium battery was 2.999 volts and the battery was 12.6 volts (new battery only). Station clock was 64 minutes behind. Reset clock. Flipped the cross bar on the tripod upright and tightened the screws. The cross bar had vibrated loose; one screw had worked its way out and the other was tight but had etched the cross bar, so the bar was loose. Will need new cross bar and solar panel bracket for next time. Everything appeared to be working okay. Downloaded data and swapped storage modules. Replaced battery connections with female connectors to easily connect to batteries. Took out the two oldest battery (left no battery in box on the ground). For next time, replace or secure the door hinge on the enclosure. Found shattered solar panel about 100 m down wind of site. Weather: 30 mph winds and zero degrees C Temp.

January 20, 2009: The cross bar on tripod had broke in two. Wind sensor was smashed on the ground and solar radiation sensor was hanging and lodged between air temp shield and mast. Top part of air temp radiation shield was broken off, but still good. Replaced cross bar (added two cross bars), R.M. Young wind sensor, and solar radiation sensor. Everything else was working okay. Downloaded data and swapped storage modules. Replaced one 24 Ahr battery and added a third battery. Station clock was 30 s behind. Lithium battery was reading 3.05 volts. The MRC was 14.5 cm out of the ground. Wrapped white electrical tape around the exposed MRC probe. Replaced solar panel with one that has a bracket—reinforced the panel to the box with wire. Added two rivets to the door hinge. Everything was working okay. Weather: 6-7 mph winds and -6 degrees C Temp. Bring guy wire kit for next time, and replace vital #6—10 cm depth and vital #7—15 cm depth.

January 16, 2010: Downloaded data and swapped storage modules. Replaced one 24 Ahr battery. Station clock was 8.5 minutes behind; reset clock. Lithium battery was reading 3.06 volts. The MRC was 14 cm out of the ground. Installed hydra-probes; one at 10 cm and 15 cm depths, and two at 20 cm depth. Everything was working okay. Weather: 5 to 10 mph winds and 0.3 °C Temp. Everything seemed to be working OK. Did not put up guy kit (did not have a way to connect the guy wires).

January 20, 2011: Downloaded data and swapped storage modules. Replaced one 24 Ahr battery. Station clock was 1 hour behind; reset clock. Corrected raw data for incorrect setting of the clock last time. Lithium battery was reading 3.07 volts. The MRC was 14 cm out of the ground. Installed guy wires. Everything was working okay. Added two desiccant packs. Weather: 0 to 7 mph winds and -0.5 °C Temp. Change bearings in R.M. Young wind sensor for next time.

January 14, 2012: Downloaded data and swapped storage modules. Replaced one 24 Ahr battery. Station clock was 30 seconds behind. Lithium battery was reading 3.07 volts. Battery voltage was 13.48. The MRC was 13.5 cm out of the ground. Replaced the nose of the wind sensor (to replace bearings). Guy wires came undone; reassembled guy wires and secured with wire. Everything was working okay. Added two desiccant packs. Weather: 8 mph winds and -4°C Temp; it was partly cloudy.

December 15, 2012: Downloaded data and swapped storage modules. Replaced one 24 Ahr battery. Station clock was 1 minute behind. Lithium battery was reading 3.06 volts. Battery voltage was 13.9 volts. The MRC was 13.5 cm out of the ground. Wind sensor was okay. Two of the guy cables came undone/broke; reassembled what we could of the guy wires; re-enforced remaining guy cables. For next time, need new stronger turn buckles and a better way to secured them, both on the mast and tripod legs. Everything was working okay. Weather: 5 mph winds and -1°C Temp; it was overcast with high thin clouds.

January 15, 2014: Swapped storage modules. Battery voltage was 13.94 V. Replaced one 24 Ah battery. Weather condition: air temp -5.1ºC, 3.1 mph winds.

January 8, 2015: 1435 NZDT. Downloaded datalogger and swapped storage modules. Lithium battery was 3.08 V. Difference between station and PC time was 2 min 10 sec. MRC probe height was 15 cm out of ground (including 5 cm of probe head). Eletrical tape worn and could be replaced next time. Hydra-probes #4, 20 and 32 showing 6999. Weather measured on hand-held kestrel 3500; Measurement time1455 NZDT; Wind max (for prev 2 mins) 6.8 Knots, Wind ave (2 mins) 2.9 Knots, Temp 33.1 Degrees F, Temp 3 Degrees C, RH: 89.9 %, Dewpoint 29.8 Degrees C, Wetbulb 31.7 Degrees C, Air pressure 988.9 hPa.

January 14, 2016: Downloaded datalogger and swapped storage modules. Lithium battery was 3.09 V. Station clock was 3 min behind. The RM Young wind monitor was replaced due to damage (specifically, sensor broken off at mount). The sensor recorded wind speeds in excess of 120mph (~197 km/h) prior to damage. The functioning of the new wind sensor installed was checked and found that the wind direction was a factor of 1.6 out. This issue was not resolved on site. The decision was made for the instrument to remain at site for replacement in 2017. No other instruments were removed or replaced at Minna Bluff or the remaining SCS. MRC probe was 16.5 cm above the ground. The oldest battery was replaced. Pyranometer was not level (level for next time). Solar charging was not operating due to a compromised cable. The cable was repaired on site and issue resolved. The timing of breakage and repair were sufficient that batteries were not deep discharged. Bring electrical tape to replace degrading tape.

January 6, 2017: Downloaded datalogger and swapped storage modules.

January 23, 2018: Downloaded datalogger and swapped storage modules. MRC Height

159mm. Blade and nose of RM young had come off. The nose was found near the station. Installed new RM Young, HMP45C, and updated the program. Replaced oldest battery.

January 16, 2019: Downloaded datalogger and swapped storage modules.

December 22, 2019: Downloaded datalogger and swapped storage modules.

February 2, 2021: Downloaded datalogger and swapped storage modules. The RM Young wind sensor was damaged and replaced. There was no data on the storage module from March 2020 onward.

February 8, 2021: Downloaded datalogger and swapped storage modules. Swapped battery. MRC height above ground is 16 cm. Reset Clock (NZST). Replaced damaged air temp and RH shields. Some ice in box, which was removed, and adjusted putty to seal box.

December 20, 2022: Downloaded datalogger and swapped storage modules. MRC height above ground is 16.5 cm. Reset Clock to UTC. (11:24am to 12:13am)

| MULTIPLEXER  POSITION | STACK | PROBE | DEPTH  (cm) | COMMENTS |
| --- | --- | --- | --- | --- |
| 1 | 1 | Vitel # 1 | 37 | Measured from MRC probe as reference. Subtracted 10 cm. |
| 2 | 2 | Vitel # 2 | 37 | Measured from MRC probe as reference. Subtracted 10 cm. |
| 3 | 1 | Vitel # 3 | 20 | Measured from MRC probe as reference. Subtracted 12 cm. |
| 4 | 2 | Vitel # 4 | 20 | Measured from MRC probe as reference. Subtracted 12 cm. |
| 5 | 1 | Vitel # 5 | 15 | Measured from MRC probe as reference. Subtracted 9 cm. |
| 6 | 2 | Vitel # 6 | 15 | Measured from MRC probe as reference. Subtracted 9 cm. |
| 7 | 1 | Vitel # 7 | 10 | Measured from MRC probe as reference. Subtracted 3 cm. |
| 8 | 2 | Vitel # 8 | 10 | Measured from MRC probe as reference. Subtracted 3 cm. |
| 9H1 | 1 | Campbell 107 # 1 | 84 | Measured from MRC probe as reference. Subtracted 10 cm. |
| 9L1 | 2 | Campbell 107 # 2 | 84 | Measured from MRC probe as reference. Subtracted 10 cm. |
| 9H2 | 1 | Campbell 107 # 3 | 37 | Measured from MRC probe as reference. Subtracted 10 cm. |
| 9L2 | 2 | Campbell 107 # 4 | 37 | Measured from MRC probe as reference. Subtracted 10 cm. |
| 10H1 | 1 | Campbell 107 # 5 | 20 | Measured from MRC probe as reference. Subtracted 12 cm. |
| 10L1 | 2 | Campbell 107 # 6 | 20 | Measured from MRC probe as reference. Subtracted 12 cm. |
| 10H2 | 1 | Campbell 107 # 7 | 15 | Measured from MRC probe as reference. Subtracted 9 cm. |
| 10L2 | 2 | Campbell 107 # 8 | 15 | Measured from MRC probe as reference. Subtracted 9 cm. |
| 11H1 | 1 | Campbell 107 # 9 | 10 | Measured from MRC probe as reference. Subtracted 3 cm. |
| 11L1 | 2 | Campbell 107 # 10 | 10 | Measured from MRC probe as reference. Subtracted 3 cm. |
| 11H2 | 1 | Campbell 107 # 11 | 5 | Just under gravel layer. |
| 11L2 | 2 | Campbell 107 # 12 | 5 | Just under gravel layer. |

**DATA:**

DATALOGGER OUTPUT:

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 009 |
| 2 | Year | N/A | N/A | Campbell CR10 |  |
| 3 | Day | N/A | N/A | Campbell CR10 |  |
| 4 | Time | N/A | N/A | Campbell CR10 | NZ standard time |
| 5 | Datalogger ID | N/A | N/A | Campbell CR10 | 74 |
| 6 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 7 | Int Temp | ºC | Datalogger | Campbell CR10 |  |
| 8 | Air Temp | ºC | Air 2 m | Vaisala HMP45C | Avg. hourly. |
| 9 | Air Temp | ºC | Air 2 m | Vaisala HMP45C | Max hourly. |
| 10 | Air Temp | ºC | Air 2 m | Vaisala HMP45C | Min hourly. |
| 11 | RH | % | Air 2 m | Vaisala HMP45C |  |
| 12 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
|  | Net Rad |  |  | No sensor | 0 |
| 13 | Wind Speed | mph | Air 3 m | Met One | Hourly average |
| 14 | Wind Dir | azimuth | Air 3 m | Met One | True North |
| 15 | Wind Speed | mph | Air 3 m | Met One | Max 10-s avg. |
| 16 | 1V1 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 17 | 1V2 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 18 | 1V3 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 19 | 1V4 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 20 | 2V1 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 21 | 2V2 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 22 | 2V3 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 23 | 2V4 | Volts | Soil 37 cm | Vitel Soil Moisture/Temp |  |
| 24 | 3V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 25 | 3V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 26 | 3V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 28 | 4V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 29 | 4V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 30 | 4V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 32 | 5V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 33 | 5V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 34 | 5V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 35 | 5V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 36 | 6V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 37 | 6V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 38 | 6V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 39 | 6V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 40 | 7V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 41 | 7V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 42 | 7V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 43 | 7V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 44 | 8V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 45 | 8V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 46 | 8V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 47 | 8V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp |  |
| 48 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | Removed 1/9/06 |
| 49 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | Removed 1/9/06 |
| 50 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 51 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 52 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 53 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature | Reburied 1/9/06 |
| 54 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 55 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 56 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 57 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 58 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature | Reburied 1/9/06 |
| 59 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature | Reburied 1/9/06 |
| 60 | Soil Temp | ºC | \*Air 4 in | MRC soil temperature probe | \*0 |
| 61 | Soil Temp | ºC | \*Air 1 in | MRC soil temperature probe | \*3 in |
| 62 | Soil Temp | ºC | \*Soil 2 in | MRC soil temperature probe | \*6 in |
| 63 | Soil Temp | ºC | \*Soil 5 in | MRC soil temperature probe | \*9 in |
| 64 | Soil Temp | ºC | \*Soil 8 in | MRC soil temperature probe | \*12 in |
| 65 | Soil Temp | ºC | \*Soil 14 in | MRC soil temperature probe | \*18 in |
| 66 | Soil Temp | ºC | \*Soil 20 in | MRC soil temperature probe | \*24 in |
| 67 | Soil Temp | ºC | \*Soil 26 in | MRC soil temperature probe | \*30 in |
| 68 | Soil Temp | ºC | \*Soil 32 in | MRC soil temperature probe | \*36 in |
| 69 | Soil Temp | ºC | \*Soil 38 in | MRC soil temperature probe | \*42 in |
| 70 | Soil Temp | ºC | \*Soil 44 in | MRC soil temperature probe | \*48 in |
| 71 | Ref |  |  | MRC soil temperature probe | Reference |
| 72 | Blank |  |  |  |  |
| 73 | Blank |  |  |  |  |

DATALOGGER OUTPUT: after 1/9/06

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 009 |
| 2 | Year | N/A | N/A | Campbell CR10 |  |
| 3 | Day | N/A | N/A | Campbell CR10 |  |
| 4 | Time | N/A | N/A | Campbell CR10 | NZ standard time |
| 5 | Datalogger ID | N/A | N/A | Campbell CR10 | 74 |
| 6 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 7 | Int Temp | ºC | Datalogger | Campbell CR10 |  |
| 8 | Air Temp | ºC | Air 2 m | Campbell 107 | Avg. hourly. |
| 9 | Max Air Temp | ºC | Air 2 m | Campbell 107 | Max hourly. |
| 10 | Min Air Temp | ºC | Air 2m | Campbell 107 | Min hourly. |
| 11 | Air Temp (RH) | ºC | Air 2 m | Vaisala HMP35C | Avg. hourly. |
| 12 | Max Air Temp (RH) | ºC | Air 2 m | Vaisala HMP35C | Max hourly. |
| 13 | Min Air Temp (RH) | ºC | Air 2 m | Vaisala HMP35C | Min hourly. |
| 14 | RH | % | Air 2 m | Vaisala HMP35C |  |
| 15 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
| 16 | Wind Speed | mph | Air 3 m | Met One | Hourly average |
| 17 | Wind Dir | azimuth | Air 3 m | Met One | True North |
| 18 | Max Wind Speed | mph | Air 3 m | Met One | Max 10-s avg. |
| 19 | 1V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 20 | 1V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 21 | 1V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 22 | 1V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 23 | 2V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 24 | 2V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 25 | 2V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 26 | 2V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V1 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 28 | 3V2 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 29 | 3V3 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 30 | 3V4 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V1 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 32 | 4V2 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 33 | 4V3 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 34 | 4V4 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 35 | 5V1 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 36 | 5V2 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 37 | 5V3 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 38 | 5V4 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 39 | 6V1 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 40 | 6V2 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 41 | 6V3 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 42 | 6V4 | Volts | Soil 60 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 43 | 7V1 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 44 | 7V2 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 45 | 7V3 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 46 | 7V4 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 47 | 8V1 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 48 | 8V2 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 49 | 8V3 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 50 | 8V4 | Volts | Soil 94 cm | Vitel Soil Moisture/Temp | Disconnected 1/07 |
| 51 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | No sensor |
| 52 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | No sensor |
| 53 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 54 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 55 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 56 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 57 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 58 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 59 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 60 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 61 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 62 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 63 | Soil Temp | ºC | \*Air 15 cm | MRC soil temperature probe | \*0 |
| 64 | Soil Temp | ºC | \*Air 7.4 cm | MRC soil temperature probe | \*3 in |
| 65 | Soil Temp | ºC | \*Soil 0 cm | MRC soil temperature probe | \*6 in |
| 66 | Soil Temp | ºC | \*Soil 7.6 cm | MRC soil temperature probe | \*9 in |
| 67 | Soil Temp | ºC | \*Soil 15.2 cm | MRC soil temperature probe | \*12 in |
| 68 | Soil Temp | ºC | \*Soil 22.9 cm | MRC soil temperature probe | \*15 in |
| 69 | Soil Temp | ºC | \*Soil 30.5 cm | MRC soil temperature probe | \*18 in |
| 70 | Soil Temp | ºC | \*Soil 38 cm | MRC soil temperature probe | \*21 in |
| 71 | Soil Temp | ºC | \*Soil 45.7 cm | MRC soil temperature probe | \*24 in |
| 72 | Soil Temp | ºC | \*Soil 61 cm | MRC soil temperature probe | \*30 in |
| 73 | Soil Temp | ºC | \*Soil 76.2 cm | MRC soil temperature probe | \*36 in |
| 74 | Soil Temp | ºC | \*Soil 91.4 cm | MRC soil temperature probe | \*42 in |
| 75 | Soil Temp | ºC | \*Soil 106.7 cm | MRC soil temperature probe | \*48 in |
| 76 | Ref |  |  | MRC soil temperature probe |  |

DATALOGGER OUTPUT: after 1/15/07

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 009 |
| 2 | Year | N/A | N/A | Campbell CR10 |  |
| 3 | Day | N/A | N/A | Campbell CR10 |  |
| 4 | Time | N/A | N/A | Campbell CR10 | NZ standard time |
| 5 | Datalogger ID | N/A | N/A | Campbell CR10 | 74 |
| 6 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 7 | Lithium Batt | Volts | Datalogger | Campbell CR10 |  |
| 8 | Int Temp | ºC | Datalogger | Campbell CR10 |  |
| 9 | Air Temp | ºC | Air 2 m | Vaisala HMP35C | Avg. hourly. |
| 10 | Max Air Temp | ºC | Air 2 m | Vaisala HMP35C | Max hourly. |
| 11 | Min Air Temp | ºC | Air 2 m | Vaisala HMP35C | Min hourly. |
| 12 | RH | % | Air 2 m | Vaisala HMP35C |  |
| 13 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
| 14 | Wind Speed | mph | Air 3 m | RM Young | Hourly average |
| 15 | Wind Dir | azimuth | Air 3 m | RM Young | True North |
| 16 | Max Wind Speed | mph | Air 3 m | RM Young | Max 10-s avg. |
| 17 | 1V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 18 | 1V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 19 | 1V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 20 | 1V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 21 | 2V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 22 | 2V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 23 | 2V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 24 | 2V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 25 | 3V1 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 26 | 3V2 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V3 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 28 | 3V4 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 29 | 4V1 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 30 | 4V2 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V3 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 32 | 4V4 | Volts | Soil 38 cm | Vitel Soil Moisture/Temp |  |
| 33 | 5V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 34 | 5V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 35 | 5V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 36 | 5V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 37 | 6V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 38 | 6V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 39 | 6V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 40 | 6V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 41 | 7V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 42 | 7V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 43 | 7V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 44 | 7V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 45 | 8V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 46 | 8V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 47 | 8V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 48 | 8V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 49 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | No sensor |
| 50 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | No sensor |
| 51 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 52 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 53 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 54 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 55 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 56 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 57 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 58 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 59 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 60 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 61 | Soil Temp | ºC | \*Air 15 cm | MRC soil temperature probe | \*0 |
| 62 | Soil Temp | ºC | \*Air 7.4 cm | MRC soil temperature probe | \*3 in |
| 63 | Soil Temp | ºC | \*Soil 0 cm | MRC soil temperature probe | \*6 in |
| 64 | Soil Temp | ºC | \*Soil 7.6 cm | MRC soil temperature probe | \*9 in |
| 65 | Soil Temp | ºC | \*Soil 15.2 cm | MRC soil temperature probe | \*12 in |
| 66 | Soil Temp | ºC | \*Soil 22.9 cm | MRC soil temperature probe | \*15 in |
| 67 | Soil Temp | ºC | \*Soil 30.5 cm | MRC soil temperature probe | \*18 in |
| 68 | Soil Temp | ºC | \*Soil 38 cm | MRC soil temperature probe | \*21 in |
| 69 | Soil Temp | ºC | \*Soil 45.7 cm | MRC soil temperature probe | \*24 in |
| 70 | Soil Temp | ºC | \*Soil 61 cm | MRC soil temperature probe | \*30 in |
| 71 | Soil Temp | ºC | \*Soil 76.2 cm | MRC soil temperature probe | \*36 in |
| 72 | Soil Temp | ºC | \*Soil 91.4 cm | MRC soil temperature probe | \*42 in |
| 73 | Soil Temp | ºC | \*Soil 106.7 cm | MRC soil temperature probe | \*48 in |
| 74 | Ref |  |  | MRC soil temperature probe |  |
|  |  |  |  |  |  |

\*The first sensor of the MRC probe was 6 inches above the level ground. These are the distances from the first sensor at the top of the MRC probe. The depths in column 4 are depths below the level ground, calculated by subtracting 6 inches from the distances of each sensor from the sensor at the top of the probe.

DATALOGGER OUTPUT: after 1/16/2010

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 009 |
| 2 | Year | N/A | N/A | Campbell CR10 |  |
| 3 | Day | N/A | N/A | Campbell CR10 |  |
| 4 | Time | N/A | N/A | Campbell CR10 | NZ standard time |
| 5 | Datalogger ID | N/A | N/A | Campbell CR10 | 74 |
| 6 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 7 | Lithium Batt | Volts | Datalogger | Campbell CR10 |  |
| 8 | Int Temp | ºC | Datalogger | Campbell CR10 |  |
| 9 | Air Temp | ºC | Air 2 m | Campbell 107 |  |
| 10 | Max Air Temp | ºC | Air 2 m | Campbell 107 |  |
| 11 | Min Air Temp | ºC | Air 2 m | Campbell 107 |  |
| 12 | Air Temp | ºC | Air 2 m | Vaisala HMP35C | Avg. hourly. |
| 13 | Max Air Temp | ºC | Air 2 m | Vaisala HMP35C | Max hourly. |
| 14 | Min Air Temp | ºC | Air 2 m | Vaisala HMP35C | Min hourly. |
| 15 | RH | % | Air 2 m | Vaisala HMP35C |  |
| 16 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
| 17 | Wind Speed | mph | Air 3 m | RM Young | Hourly average |
| 18 | Wind Dir | azimuth | Air 3 m | RM Young | True North |
| 19 | Max Wind Speed | mph | Air 3 m | RM Young | Max 10-s avg. |
| 20 | 1V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 21 | 1V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 22 | 1V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 23 | 1V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 24 | 2V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 25 | 2V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 26 | 2V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 27 | 2V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 28 | 3V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 29 | 3V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 30 | 3V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 31 | 3V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 32 | 4V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 33 | 4V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 34 | 4V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 35 | 4V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 36 | 5V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 37 | 5V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 38 | 5V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 39 | 5V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 40 | 6V1 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 41 | 6V2 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 42 | 6V3 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 43 | 6V4 | Volts | Soil 10 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 44 | 7V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 45 | 7V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 46 | 7V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 47 | 7V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/10 |
| 48 | 8V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 49 | 8V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 50 | 8V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 51 | 8V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp | Installed 01/07 |
| 52 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | No sensor |
| 53 | Soil Temp | ºC | Soil 84 cm | Campbell 107 Temperature | No sensor |
| 54 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 55 | Soil Temp | ºC | Soil 37 cm | Campbell 107 Temperature |  |
| 56 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 57 | Soil Temp | ºC | Soil 20 cm | Campbell 107 Temperature |  |
| 58 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 59 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 60 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 61 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 62 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 63 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 64 | Soil Temp | ºC | \*Air 15 cm | MRC soil temperature probe | \*0 |
| 65 | Soil Temp | ºC | \*Air 7.4 cm | MRC soil temperature probe | \*3 in |
| 66 | Soil Temp | ºC | \*Soil 0 cm | MRC soil temperature probe | \*6 in |
| 67 | Soil Temp | ºC | \*Soil 7.6 cm | MRC soil temperature probe | \*9 in |
| 68 | Soil Temp | ºC | \*Soil 15.2 cm | MRC soil temperature probe | \*12 in |
| 69 | Soil Temp | ºC | \*Soil 22.9 cm | MRC soil temperature probe | \*15 in |
| 70 | Soil Temp | ºC | \*Soil 30.5 cm | MRC soil temperature probe | \*18 in |
| 71 | Soil Temp | ºC | \*Soil 38 cm | MRC soil temperature probe | \*21 in |
| 72 | Soil Temp | ºC | \*Soil 45.7 cm | MRC soil temperature probe | \*24 in |
| 73 | Soil Temp | ºC | \*Soil 61 cm | MRC soil temperature probe | \*30 in |
| 74 | Soil Temp | ºC | \*Soil 76.2 cm | MRC soil temperature probe | \*36 in |
| 75 | Soil Temp | ºC | \*Soil 91.4 cm | MRC soil temperature probe | \*42 in |
| 76 | Soil Temp | ºC | \*Soil 106.7 cm | MRC soil temperature probe | \*48 in |
| 77 | Ref |  |  | MRC soil temperature probe |  |
|  |  |  |  |  |  |

\*The first sensor of the MRC probe was 6 inches above the level ground. These are the distances from the first sensor at the top of the MRC probe. The depths in column 4 are depths below the level ground, calculated by subtracting 6 inches from the distances of each sensor from the sensor at the top of the probe.

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 1 (sand) is used here for the Type A probes. Note that with this program negative values of soil water are converted to zero.

The temperature sensor went out for vitel at 20 cm depth. The 107 soil temperatures at those respective depths were converted to a voltage and used in place of the bad temperature in the vitels. The four voltages were then processed (run through the hydra-probe program). These are the sensors and years that were corrected:

20 cm depth, rep 2, 2004 -2006

DATA STORAGE AND ACCESS:

Contact Cathy Seybold or Deb Harms. Data can be downloaded from the NSSC website at <http://soils.usda.gov/survey/scan/>. Data are in Excel files organized by calendar year. Each file consists of a page containing all downloaded data for that year and 8 pages of processed Vitel sensor data (one page for each sensor) with the following column headings: SENSOR, SOIL (calibration option), ER (real part of the soil dielectric constant), EI (imaginary part of the soil dielectric constant), TEMP (soil temperature ºC), 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, ID, BATT VOLT (battery voltage), INT TEMP ºC (datalogger temperature), AIR TEMP (ºC), MAX AIR T (ºC), MIN AIR T (ºC), RH (%), SOLAR RADIATION (w m-2), WIND SPEED (mph), WIND DIR (deg from true north), MAX WIND SPEED (mph),1V1 (37-cm depth, Vitel rep 1), 1V2 (37-cm depth, Vitel rep 1), 1V3 (37-cm depth, Vitel rep 1), 1V4 (37-cm depth, Vitel rep 1), 2V1 (37-cm depth Vitel, rep 2), 2V2 (37-cm depth Vitel, rep 2), 2V3 (37-cm depth Vitel, rep 2), 2V4 (37-cm depth Vitel, rep 2), 3V1 (20-cm depth Vitel, rep 1), 3V2 (20-cm depth Vitel, rep 1), 3V3 (20-cm depth Vitel, rep 1), 3V4 (20-cm depth Vitel, rep 1), 4V1 (20-cm depth Vitel, rep 2), 4V2 (20-cm depth Vitel, rep 2), 4V3 (20-cm depth Vitel, rep 2), 4V4 (20-cm depth Vitel, rep 2), 5V1 (15-cm depth, Vitel rep 1), 5V2 (15-cm depth, Vitel rep 1), 5V3 (15-cm depth, Vitel rep 1), 5V4 (15-cm depth, Vitel rep 1), 6V1 (15-cm depth, Vitel rep 2), 6V2 (15-cm depth Vitel, rep 2), 6V3 (15-cm depth Vitel, rep 2), 6V4 (15-cm depth Vitel, rep 2), 7V1 (10-cm depth, Vitel rep 1), 7V2 (10-cm depth, Vitel rep 1), 7V3 (10-cm depth, Vitel rep 1), 7V4 (10-cm depth, Vitel rep 1), 8V1 (10-cm depth Vitel, rep 2), 8V2 (10-cm depth Vitel, rep 2), 8V3 (10-cm depth Vitel, rep 2), 8V4 (10-cm depth Vitel, rep 2), SOIL T (84-cm depth 107, rep 1) ºC, SOIL T (84-cm depth 107, rep 2) ºC, SOIL T (37-cm depth 107, rep 1) ºC, SOIL T (37-cm depth 107, rep 2) ºC, SOIL T (20-cm depth 107, rep 1) ºC, SOIL T (20-cm depth 107, rep 2) ºC, SOIL T (15-cm depth 107, rep 1) ºC, SOIL T (15-cm depth 107, rep 2) ºC, SOIL T (10-cm depth 107, rep 2) ºC, SOIL T (10-cm depth 107, rep 1) ºC, SOIL T (5-cm depth 107, rep 2) ºC, SOIL T (5-cm depth 107, rep 1) ºC, MRC1 (Air 4 in, ºC), MRC2 (Air 1 in, ºC), MRC3 (2-in depth, ºC), MRC4 (5-in depth, ºC), MRC5 (8-in depth, ºC), MRC6 (11-in depth, ºC), MRC7 (14-in depth, ºC), MRC8 (17-in depth, ºC), MRC9 (20-in depth, ºC), MRC10 (26-in depth, ºC), MRC11 (32-in depth, ºC), MRC12 (38-in depth, ºC), MRC13 (44-in depth, ºC), MRC REF.

**SOILS:** Megan Balks described and sampled soil for characterization.

CLASSIFICATION:

**LANDSCAPE:**

SLOPE: %

ASPECT:

ELEVATION: m

**VEGETATION:**

GROUND COVER: None

CANOPY COVER: None

**COMMENTS:** Note: NZ standard time is used here because Scott Base uses NZ time. Actually, NZ and Scott Base use daylight savings time during the summer. The Vitel soil moisture sensors and the Campbell 107 soil temperature sensors were installed in reverse order of the way they were wired into the datalogger, resulting in the datalogger output being from deepest to shallowest on these sensors. All other stations have output from shallowest to deepest. MRC probe evidently has no sensors at the 15- and 21-inch depths. Or maybe there is an error in the program. Possibly no storage location was allocated for the last two MRC readings.

**NOTES FOR NEXT STATION VISIT:**