FILE NAME: StationRecordGraniteHarbour.doc

LAST UPDATED: 3/16/2023

STATION RECORD

## GRANITE HARBOUR

**ANTARCTICA**

**STATION:** GRANITE HARBOUR (ANT010)

|  |  |  |  |
| --- | --- | --- | --- |
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**LOCATION:** Granite Harbour, Antarctica.

GPS (01/12/03): 77º 00’ 23.6” S

162º 31’ 32.4” E

15 ft elevation

GPS (01/08/04): 77º 00’ 23.5” S

162º 31’ 32.3” E

10 ft elevation

GPS (01/17/05): 77º 00’ 23.5” S

162º 31’ 33.0” E

GPS (01/10/06): 77º 00’ 23.7” S

162º 31’ 32.1” E

49 ft elevation

GPS (01/21/11): 77º 00’ 23.6” S

162º 31’ 32.2” E

21 ft elevation

**INSTRUMENTATION:**

Summary

|  |  |  |
| --- | --- | --- |
| Quantity | Description | Comments |
| 1 | Campbell CR-10X-2M-XT datalogger S/N: X24401. Wiring panel S/N: 10179. | Installed 01/03 |
| 1 | Campbell AM416XT multiplexer S/N: 13628. | Installed 01/03 |
| 1 | Campbell SM4M storage module S/N: 3470 (Granite Harbour (A)); alternate S/N: 3480 (Granite Harbour (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 |
| (1) | MetOne wind sensor. | Installed 01/03, removed 01/12 |
| 1 | R.M. Young wind sensor | Installed 01/12 |
| 1 | Vaisala HMP45C air temperature/RH sensor. | Installed 01/03 |
| 1 | Campbell solar radiation shields for HMP35/45C air temperature/relative humidity sensors. | Installed 01/03 |
| 1 | Campbell 107 air temperature sensor | Installed 01/03 |
| 1 | Campbell solar radiation shields for 107 air temperature sensors. | Installed 01/03 |
| 1 | Licor LI200X solar radiation sensor. | Installed 01/03 |
| 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 |
| 6 | Vitel dielectric constant soil moisture/temperature sensors. | Installed 01/03 |
| 12 | Campbell 107 soil temperature sensors | Installed 01/03 |

**HISTORY:**  January 7-11, 2003: Station initiated. Soil sensors were installed by Megan Balks and Don Huffman. Six Vitel Hydra probes were installed. The Vitel probes were attached to a Campbell Scientific CR10X-2M-XT datalogger. Twelve Campbell 107 temperature sensors were installed and attached to the datalogger. A MRC soil temperature probe was installed at an angle. The length of the probe is 125 cm and the depth of the end is 90 cm below the soil surface. The top sensor is at the soil surface. The MRC probe was connected using a pair of matched 10.00 kΩ low thermal coefficient (TC = 50 ppm/ºC). Above ground sensors are one Vaisala HMP45C air temperature/RH sensor, one Campbell 107 air temperature 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 at 80 inches above the ground surface. The air temperature/RH sensor was mounted in a solar radiation shield on the tripod at 63 inches 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, *Ant10* 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, and air temperature 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 75.

January 8, 2004: Retrieved the Campbell SM4M storage module S/N: 3470 (Granite Harbour (A)) and installed the alternate S/N 3480 (Granite Harbour (B)). Installed a third Campbell BP24 24-amp-hr YUASA battery. Replaced the desiccant. Checked the Li battery.

January 17, 2005: Retrieved the alternate Campbell SM4M storage module S/N: 3480 (Granite Harbour (B)) and installed S/N 3470 (Granite Harbour (A)). Ron P. felt that the batteries may have frozen last winter. They appeared to be OK, but all three were swapped, as a precaution. Used crimp type butt splices to connect the wiring. Put date on all new batteries. Outside wiring was encased in automotive wire sheathing. Swapped desiccant packs. Voltages: SPR-13.48vdc, station batteries-12.55 vdc, Li battery-3.09 vdc. Station time 1:21 PM, actual time 1:50 PM, NZST. Station was reset back to NZST. Drift spans two years because time was not reset last season. Wiring was secure. Anemometer was sound. Wiped off the LI200 pyranometer. Took station pictures looking N,E,S,W. Re-buried a Vitel and a 107 that had been placed near the surface, in a wet area, near the rock slope. Surface run-off had exposed them. Weather conditions: high thin clouds, -3C, calm.

January 10, 2006: Added one new battery containment box that is located on the ground. Replaced one 24 amp-hr battery, which was on the ground. Did not have enough insulated spade terminals (red color), used butt slices. Secured box in place with rocks. The vital under the moss patch was lying on the ground; probably was washed out. The vital was reburied just below the surface in approximately the same location. Downloaded data and program from datalogger. Swapped storage modules. There was no difference between PC and station clock. Uploaded new program (GRANITEREV3.dld). The new program corrected the RH multiplier (to 0.1 from 0.01) and to read 6 vitels instead of 10. Everything else seemed to be working okay. There was no regulator; need to install one for next time. Added three packs of desiccant. Weather conditions: cloudy, 0°C, calm.

January 18, 2007: Downloaded data and swapped storage modules. Station clock was 3.5 minutes behind. Installed a regulator. Plugged one battery into the “int” socket of regulator. Connected the other two batteries together (in parallel) and plugged them into the “ext” socket of regulator. Replaced one battery (24Ah). Everything seemed to be working okay. Two soil temperature sensors were lying on the surface uncovered and one vital was uncovered. All three sensors were covered with about 1-2 cm of soil. MRC probe was sticking out of the ground 3 cm. The MRC was buried, so sensor #1 was at the surface. Added two desiccant packs.

January 18, 2008: Downloaded data and swapped storage modules. Station clock was one hour behind. Reset clock. Downloaded revised program (GRANITEREV3.1) to read one additional slot on the MRC probe (reference). Replaced one 24 Ah battery. Replaced battery connection with female connectors to easily connect to batteries. MRC probe was sticking out of the ground 3 cm. Added two desiccant packs.

January 21, 2009: Downloaded data and swapped storage modules. Station clock was 1.5 min behind. Lithium battery was reading 3.13 volts. Replaced one 24 Ah battery. MRC probe was sticking out of the ground 3 cm. Everything seemed to be working okay.

January 15, 2010: Downloaded data and swapped storage modules. Station clock was 2 min behind. Lithium battery was reading 3.17 volts. Replaced one 24 Ah battery. MRC probe was sticking out of the ground 5 cm. Everything seemed to be working okay.

January 21, 2011: Downloaded data and swapped storage modules. Station clock was 3 min behind—reset clock. Lithium battery was reading 3.15 volts. Replaced one 24 Ah battery. MRC probe was sticking out of the ground 4.5 cm. Everything seemed to be working okay. Added two desiccant packs. There seems to be more salt on everything at the site. Air temp 0.3ºC, winds 4 mph.

January 21, 2012: Downloaded data and swapped storage modules. Station clock was 30 sec behind. Lithium battery was reading 3.2 volts and battery voltage was 13.49. Replaced one 24 Ah battery. MRC probe was sticking out of the ground 4.5 cm. Everything seemed to be working okay. Replaced the MetOne wind sensor with an RM Young sensor and downloaded the new program. Everything seemed to be working okay. Added two desiccant packs. Air temp -3ºC, winds calm.

December 18, 2012: Downloaded data and swapped storage modules. Station clock was less than 1 minute behind. Lithium battery was reading 3.16 volts and battery voltage was 13.4. Replaced one 24 Ah battery. MRC probe was sticking out of the ground 4.0 cm. Everything seemed to be working okay. Weather condition: air temp -4.9ºC, 2.9 mph winds, overcast.

January 15, 2014: Swapped storage modules. Battery voltage was 13.76 V. Replaced one 24 Ah battery. Weather condition: air temp 1.7ºC, 1.8 mph winds.

January 9, 2015: 1725 NZDT. Downloaded datalogger and swapped storage modules. Lithium battery was 3.185 V. Difference between station and PC time was 3 min 31 sec. MRC probe height was 7 cm out of ground (including 5 cm of probe head). One vitel is visible at the surface (photo – mrb) prongs are buried in sand. I did not move as it is capturing overland flow at the ground surface – there is evidence of water-deposited sand accumulating against it and moss growing immediately upslope from it. Weather measured on hand-held kestrel 3500; Measurement time1750 NZDT; Wind max 4 Knots, Temp 3.2 Degrees C, RH: 74 %, Dewpoint -0.9 Degrees C, Wetbulb 1.1 Degrees C, Air pressure 986.9 hPa.

January 16, 2016: Downloaded datalogger and swapped storage modules. Lithium battery was 3.19 V. Station clock was 8 min behind; reset clock. MRC probe height was 6 cm out of ground. Oldest battery was replaced.

January 2, 2017: Downloaded datalogger and swapped storage modules.

January 24, 2018: Downloaded datalogger and swapped storage modules. MRC Height

78 mm at 45⁰ angle. Replaced oldest battery.

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

December 23, 2019: Downloaded datalogger and swapped storage modules.

December 9, 2021: Downloaded datalogger and swapped storage modules. Swapped battery. MRC height above ground is 8 cm (at 45-degree angle), reburied. Clock ok.

January 9, 2023: Downloaded datalogger and swapped storage modules. Soil moisture probe out under rock. Reset clock to UTC. (10:50am to 10:53pm).

| MULTIPLEXER  POSITION | STACK | PROBE | DEPTH  (cm) | COMMENTS |
| --- | --- | --- | --- | --- |
| 1 |  | Vitel # 1 | 2.5 | Moss patch |
| 2 |  | Vitel # 2 | 5 | Main |
| 3 |  | Vitel # 3 | 15 | Main |
| 4 |  | Vitel # 4 | 25 | Main |
| 5 |  | Vitel # 5 | 45 | Main |
| 6 |  | Vitel # 6 | 75 | Main |
| 7 |  |  |  | Empty |
| 8 |  |  |  | Empty |
| 9 |  |  |  | Empty |
| 10 |  |  |  | Empty |
| 11H1 |  | Campbell 107 # 1 | 2 | Moss patch |
| 11L1 |  | Campbell 107 # 2 | 5 | Moss patch |
| 11H2 |  | Campbell 107 # 3 | 2 | Main |
| 11L2 |  | Campbell 107 # 4 | 5 | Main |
| 20H1 |  | Campbell 107 # 5 | 10 | Main |
| 12L1 |  | Campbell 107 # 6 | 15 | Main |
| 12H2 |  | Campbell 107 # 7 | 25 | Main |
| 12L2 |  | Campbell 107 # 8 | 35 | Main |
| 13H1 |  | Campbell 107 # 9 | 45 | Main |
| 13L1 |  | Campbell 107 # 10 | 60 | Main |
| 13H2 |  | Campbell 107 # 11 | 75 | Main |
| 13L2 |  | Campbell 107 # 12 | 90 | Main |

**DATA:**

DATALOGGER OUTPUT:

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 010 |
| 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 | 75 |
| 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 | Air Temp | ºC | Air 2 m | Campbell 107 | Max hourly. |
| 10 | Air Temp | ºC | Air 2 m | Campbell 107 | Min hourly. |
| 11 | Air Temp | ºC | Air 63 in | Vaisala HMP45C |  |
| 12 | RH | % | Air 63 in | Vaisala HMP45C |  |
| 13 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
|  | Net Rad |  |  | No sensor | 0 |
| 14 | Wind Speed | mph | Air 3 m | Met One | Hourly average |
| 15 | Wind Dir | azimuth | Air 3 m | Met One | True North |
| 16 | Wind Speed | mph | Air 3 m | Met One | Max 10-s avg. |
| 17 | 1V1 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 18 | 1V2 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 19 | 1V3 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 20 | 1V4 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 21 | 2V1 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 22 | 2V2 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 23 | 2V3 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 24 | 2V4 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 25 | 3V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 26 | 3V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 29 | 3V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 29 | 4V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 30 | 4V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 32 | 4V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 33 | 5V1 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 34 | 5V2 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 35 | 5V3 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 36 | 5V4 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 37 | 6V1 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 38 | 6V2 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 39 | 6V3 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 40 | 6V4 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 41 | 7V1 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 42 | 7V2 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 43 | 7V3 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 44 | 7V4 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 45 | 8V1 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 46 | 8V2 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 47 | 8V3 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 48 | 8V4 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 49 | 9V1 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 50 | 9V2 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 51 | 9V3 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 52 | 9V4 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 53 | 10V1 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 54 | 10V2 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 55 | 10V3 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 56 | 10V4 | Volts | Soil cm | Vitel Soil Moisture/Temp | No sensor |
| 57 | Soil Temp | ºC | Soil 2 cm | Campbell 107 Temperature | Moss Patch |
| 58 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature | Moss Patch |
| 59 | Soil Temp | ºC | Soil 2 cm | Campbell 107 Temperature |  |
| 60 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 61 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 62 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 63 | Soil Temp | ºC | Soil 25 cm | Campbell 107 Temperature |  |
| 64 | Soil Temp | ºC | Soil 35 cm | Campbell 107 Temperature |  |
| 65 | Soil Temp | ºC | Soil 45 cm | Campbell 107 Temperature |  |
| 66 | Soil Temp | ºC | Soil 60 cm | Campbell 107 Temperature |  |
| 67 | Soil Temp | ºC | Soil 75 cm | Campbell 107 Temperature |  |
| 68 | Soil Temp | ºC | Soil 90 cm | Campbell 107 Temperature |  |
| 69 | Soil Temp | ºC | Soil surface | MRC soil temperature probe |  |
| 70 | Soil Temp | ºC | Soil 2.16 in | MRC soil temperature probe |  |
| 71 | Soil Temp | ºC | Soil 4.32 in | MRC soil temperature probe |  |
| 72 | Soil Temp | ºC | Soil 6.48 in | MRC soil temperature probe |  |
| 73 | Soil Temp | ºC | Soil 8.64 in | MRC soil temperature probe |  |
| 74 | Soil Temp | ºC | Soil 10.80 in | MRC soil temperature probe |  |
| 75 | Soil Temp | ºC | Soil 12.96 in | MRC soil temperature probe |  |
| 76 | Soil Temp | ºC | Soil 15.12 in | MRC soil temperature probe |  |
| 77 | Soil Temp | ºC | Soil 17.28 in | MRC soil temperature probe |  |
| 78 | Soil Temp | ºC | Soil 21.60 in | MRC soil temperature probe |  |
| 79 | Soil Temp | ºC | Soil 25.92 in | MRC soil temperature probe |  |
| 80 | Soil Temp | ºC | Soil 30.24 in | MRC soil temperature probe |  |
| 81 | Soil Temp | ºC | Soil 34.56 in | MRC soil temperature probe |  |
| 82 | Ref |  |  | MRC soil temperature probe |  |

DATALOGGER OUTPUT: after 1/10/06

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 010 |
| 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 | 75 |
| 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 | Air Temp | ºC | Air 2 m | Campbell 107 | Max hourly. |
| 10 | Air Temp | ºC | Air 2 m | Campbell 107 | Min hourly. |
| 11 | Air Temp | ºC | Air 1.6 m | Vaisala HMP45C |  |
| 12 | RH | % | Air 1.6 m | Vaisala HMP45C |  |
| 13 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
| 14 | Wind Speed | mph | Air 3 m | Met One | Hourly average |
| 15 | Wind Dir | azimuth | Air 3 m | Met One | True North |
| 16 | Wind Speed | mph | Air 3 m | Met One | Max 10-s avg. |
| 17 | 1V1 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 18 | 1V2 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 19 | 1V3 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 20 | 1V4 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 21 | 2V1 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 22 | 2V2 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 23 | 2V3 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 24 | 2V4 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 25 | 3V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 26 | 3V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 29 | 3V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 29 | 4V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 30 | 4V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 32 | 4V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 33 | 5V1 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 34 | 5V2 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 35 | 5V3 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 36 | 5V4 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 37 | 6V1 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 38 | 6V2 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 39 | 6V3 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 40 | 6V4 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 41 | Soil Temp | ºC | Soil 2 cm | Campbell 107 Temperature | Moss Patch |
| 42 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature | Moss Patch |
| 43 | Soil Temp | ºC | Soil 2 cm | Campbell 107 Temperature |  |
| 44 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 45 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 46 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 47 | Soil Temp | ºC | Soil 25 cm | Campbell 107 Temperature |  |
| 48 | Soil Temp | ºC | Soil 35 cm | Campbell 107 Temperature |  |
| 49 | Soil Temp | ºC | Soil 45 cm | Campbell 107 Temperature |  |
| 50 | Soil Temp | ºC | Soil 60 cm | Campbell 107 Temperature |  |
| 51 | Soil Temp | ºC | Soil 75 cm | Campbell 107 Temperature |  |
| 52 | Soil Temp | ºC | Soil 90 cm | Campbell 107 Temperature |  |
| 53 | Soil Temp | ºC | Soil surface | MRC soil temperature probe |  |
| 54 | Soil Temp | ºC | Soil 2.16 in | MRC soil temperature probe |  |
| 55 | Soil Temp | ºC | Soil 4.32 in | MRC soil temperature probe |  |
| 56 | Soil Temp | ºC | Soil 6.48 in | MRC soil temperature probe |  |
| 57 | Soil Temp | ºC | Soil 8.64 in | MRC soil temperature probe |  |
| 58 | Soil Temp | ºC | Soil 10.80 in | MRC soil temperature probe |  |
| 59 | Soil Temp | ºC | Soil 12.96 in | MRC soil temperature probe |  |
| 60 | Soil Temp | ºC | Soil 15.12 in | MRC soil temperature probe |  |
| 61 | Soil Temp | ºC | Soil 17.28 in | MRC soil temperature probe |  |
| 62 | Soil Temp | ºC | Soil 21.60 in | MRC soil temperature probe |  |
| 63 | Soil Temp | ºC | Soil 25.92 in | MRC soil temperature probe |  |
| 64 | Soil Temp | ºC | Soil 30.24 in | MRC soil temperature probe |  |
| 65 | Soil Temp | ºC | Soil 34.56 in | MRC soil temperature probe |  |
| 66 | Ref |  |  | MRC soil temperature probe |  |

DATALOGGER OUTPUT: after 1/21/12

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 010 |
| 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 | 75 |
| 6 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 7 | Lith Battery | Volts | Datalogger | Campbell CR10 |  |
| 8 | Int Temp | ºC | Datalogger | Campbell CR10 |  |
| 9 | Air Temp | ºC | Air 2 m | Campbell 107 | Avg. hourly. |
| 10 | Air Temp | ºC | Air 2 m | Campbell 107 | Max hourly. |
| 11 | Air Temp | ºC | Air 2 m | Campbell 107 | Min hourly. |
| 12 | Air Temp | ºC | Air 1.6 m | Vaisala HMP45C |  |
| 13 | RH | % | Air 1.6 m | Vaisala HMP45C |  |
| 14 | Solar Rad | W/m2 | Air 3 m | LiCor LI200X |  |
| 15 | Wind Speed | mph | Air 3 m | Met One | Hourly average |
| 16 | Wind Dir | azimuth | Air 3 m | Met One | True North |
| 17 | Wind Speed | mph | Air 3 m | Met One | Max 10-s avg. |
| 18 | 1V1 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 19 | 1V2 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 20 | 1V3 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 21 | 1V4 | Volts | Soil 2.5 cm | Vitel Soil Moisture/Temp | Moss patch |
| 22 | 2V1 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 23 | 2V2 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 24 | 2V3 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 25 | 2V4 | Volts | Soil 5 cm | Vitel Soil Moisture/Temp |  |
| 26 | 3V1 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 27 | 3V2 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 29 | 3V3 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 29 | 3V4 | Volts | Soil 15 cm | Vitel Soil Moisture/Temp |  |
| 30 | 4V1 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V2 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 32 | 4V3 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 33 | 4V4 | Volts | Soil 25 cm | Vitel Soil Moisture/Temp |  |
| 34 | 5V1 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 35 | 5V2 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 36 | 5V3 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 37 | 5V4 | Volts | Soil 45 cm | Vitel Soil Moisture/Temp |  |
| 38 | 6V1 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 39 | 6V2 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 40 | 6V3 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 41 | 6V4 | Volts | Soil 75 cm | Vitel Soil Moisture/Temp |  |
| 42 | Soil Temp | ºC | Soil 2 cm | Campbell 107 Temperature | Moss Patch |
| 43 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature | Moss Patch |
| 44 | Soil Temp | ºC | Soil 2 cm | Campbell 107 Temperature |  |
| 45 | Soil Temp | ºC | Soil 5 cm | Campbell 107 Temperature |  |
| 46 | Soil Temp | ºC | Soil 10 cm | Campbell 107 Temperature |  |
| 47 | Soil Temp | ºC | Soil 15 cm | Campbell 107 Temperature |  |
| 48 | Soil Temp | ºC | Soil 25 cm | Campbell 107 Temperature |  |
| 49 | Soil Temp | ºC | Soil 35 cm | Campbell 107 Temperature |  |
| 50 | Soil Temp | ºC | Soil 45 cm | Campbell 107 Temperature |  |
| 51 | Soil Temp | ºC | Soil 60 cm | Campbell 107 Temperature |  |
| 52 | Soil Temp | ºC | Soil 75 cm | Campbell 107 Temperature |  |
| 53 | Soil Temp | ºC | Soil 90 cm | Campbell 107 Temperature |  |
| 54 | Soil Temp | ºC | Soil surface | MRC soil temperature probe |  |
| 55 | Soil Temp | ºC | Soil 2.16 in | MRC soil temperature probe |  |
| 56 | Soil Temp | ºC | Soil 4.32 in | MRC soil temperature probe |  |
| 57 | Soil Temp | ºC | Soil 6.48 in | MRC soil temperature probe |  |
| 58 | Soil Temp | ºC | Soil 8.64 in | MRC soil temperature probe |  |
| 59 | Soil Temp | ºC | Soil 10.80 in | MRC soil temperature probe |  |
| 60 | Soil Temp | ºC | Soil 12.96 in | MRC soil temperature probe |  |
| 61 | Soil Temp | ºC | Soil 15.12 in | MRC soil temperature probe |  |
| 62 | Soil Temp | ºC | Soil 17.28 in | MRC soil temperature probe |  |
| 63 | Soil Temp | ºC | Soil 21.60 in | MRC soil temperature probe |  |
| 64 | Soil Temp | ºC | Soil 25.92 in | MRC soil temperature probe |  |
| 65 | Soil Temp | ºC | Soil 30.24 in | MRC soil temperature probe |  |
| 66 | Soil Temp | ºC | Soil 34.56 in | MRC soil temperature probe |  |
|  | Ref |  |  | MRC soil temperature probe | Not in program |

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.

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), AIR T(ºC), RH (%), SOLAR RADIATION (w m-2), WIND SPEED (mph), WIND DIR (deg from true north), MAX WIND SPEED (mph),1V1 (2.5-cm depth, Vitel), 1V2 (2.5-cm depth, Vitel), 1V3 (2.5-cm depth, Vitel), 1V4 (2.5-cm depth, Vitel), 2V1 (5-cm depth Vitel), 2V2 (5-cm depth Vitel), 2V3 (5-cm depth Vitel), 2V4 (5-cm depth Vitel), 3V1 (15-cm depth Vitel), 3V2 (15-cm depth Vitel), 3V3 (15-cm depth Vitel), 3V4 (15-cm depth Vitel), 4V1 (25-cm depth Vitel), 4V2 (25-cm depth Vitel), 4V3 (25-cm depth Vitel), 4V4 (25-cm depth Vitel), 5V1 (45-cm depth, Vitel), 5V2 (45-cm depth, Vitel), 5V3 (45-cm depth, Vitel), 5V4 (45-cm depth, Vitel), 6V1 (75-cm depth, Vitel), 6V2 (75-cm depth Vitel), 6V3 (75-cm depth Vitel), 6V4 (75-cm depth Vitel), 7V1 (-cm depth, Vitel), 7V2 (-cm depth, Vitel), 7V3 (-cm depth, Vitel), 7V4 (-cm depth, Vitel), 8V1 (-cm depth Vitel,), 8V2 (-cm depth Vitel), 8V3 (-cm depth Vitel,), 8V4 (-cm depth Vitel,), 9V1 (-cm depth, Vitel), 9V2 (-cm depth, Vitel), 9V3 (-cm depth, Vitel), 9V4 (-cm depth, Vitel), 10V1 (-cm depth Vitel,), 10V2 (-cm depth Vitel), 10V3 (-cm depth Vitel,), 10V4 (-cm depth Vitel,), SOIL T (2 cm) ºC, SOIL T (5 cm) ºC, SOIL T (2 cm) ºC, SOIL T (5 cm) ºC, SOIL T (10 cm) ºC, SOIL T (15 cm) ºC, SOIL T (25 cm) ºC, SOIL T (35 cm) ºC, SOIL T (45 cm) ºC, SOIL T (60 cm) ºC, SOIL T (75 cm) ºC, SOIL T (90 cm) ºC, MRC1, MRC2, MRC3, MRC4, MRC5, MRC6, MRC7, MRC8, MRC9, MRC10, MRC11, MRC12, MRC13, 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.

**NOTES FOR NEXT STATION VISIT:**