FILE NAME: StationRecordMarblePoint.doc

LAST UPDATED: 3/16/2023

STATION RECORD

## MARBLE POINT

**ANTARCTICA**

**STATION:** MARBLE POINT (ANT004)

|  |  |  |  |
| --- | --- | --- | --- |
| **STATION MANAGER:**  Phone:  FAX:  E-mail: | Cathy Seybold  USDA NRCS  Federal Bldg., Rm. 152  Lincoln, NE 68508  USA  (402) 437-4132  (402) 437-5336  cathy.seybold@usda.gov | Deb Harms  USDA NRCS  Federal Bldg., Rm. 152  Lincoln, NE 68508  USA  (402) 437-5336  deb.harms@usda.gov |  |
|  |  |  |  |
| **PROJECT PERSONNEL:**  Phone:  FAX:  E-mail: | Tanya O’Neill  University of Waikato  Private Bag 3105  Hamilton, 3240 NZ  tanya.oneill@waikato.ac.nz | Megan Balks  Dept. of Earth Sciences  University of Waikato  Private Bag 3102  Hamilton, NZ  +647 8562 889  +647 8560 115  m.balks@waikato.ac.nz |  |
|  |  |  |  |
| Phone:  FAX:  E-mail: | Iain Campbell  23 View Mount  Stoke 7001  Nelson, NZ  64 3 547 3329  64 3 547 3329  campbell.lsc@xtra.co.nz | Malcolm McLeod  Landcare Research  Private Bag 3127  Hamilton, NZ  +647 858 4926  mcleodm@landcare.cri.nz | David Saul  School of Biological Sciences  University of Auckland  Private Bag 92019  Auckland, NZ  64 9 373 7599 x 87712  d.saul@auckland.ac.nz |
|  |  |  |  |

**LOCATION:** Marble Point, Antarctica.

GPS (01/08/99): 77° 25’ 10.5” S

163° 40’ 55.3” E

ft elevation

GPS (12/04/99): 77° 25’ 10.2” S

163° 40’ 57.2” E

6 ft elevation

GPS (12/05/99): 77° 25’ 10.4005” S

163° 40’ 56.9197” E

50.282 m (164.97 ft) elevation

NOTE: Differential GPS at the MRC probe by Erol Balks

GPS (12/13/00): 77° 25’ 10.5” S

163° 40’ 57.0” E

206 ft elevation

GPS (01/02/02): 77° 25’ 10.5” S

163° 40’ 57.8” E

185 ft elevation

GPS (01/11/03): 77° 25’ 10.4” S

163° 40’ 57.1” E

172 ft elevation

GPS (01/07/04): 77° 25’ 10.4” S

163° 40’ 57.2” E

154 ft elevation

GPS (01/17/05): 77° 25’ 10.3” S

163° 40’ 56.6” E

GPS (01/10/06): 77° 25’ 10.6” S

163° 40’ 56.8” E

167 ft elevation

GPS (01/24/11): 77° 25’ 10.4” S

163° 40’ 56.9” E

153 ft elevation

**INSTRUMENTATION:**

Summary

|  |  |  |
| --- | --- | --- |
| Quantity | Description | Comments |
| (1) | Campbell CR-10X-2M datalogger S/N: X14675. Wiring panel S/N: 6326. | Installed 1999. Replaced 12/00 because of factory recall. |
| 1 | Campbell CR-10X-2M datalogger S/N: X24400. Wiring panel S/N: 6326. | Installed 12/00, Replaced 01/12 |
| 2 | Campbell AM416 multiplexers S/N: 12103 (top), 12101 (bottom). | Installed 1999. |
| 1 | Hinged multiplexer bracket. | Installed 1999. |
| 1 | Campbell SM4M storage module S/N: 3467 (Marble Point (A)); alternate S/N 2800 (Marble Point (B)) | Installed 1/11/03. |
| 3 | Campbell BP24 24-amp-hr YUASA battery | Installed 2009, 2010, 2011. |
| (1) | Power-Sonic 30AH battery | Installed 1999. Supplied by Ron Sletten. Removed 2005. |
| 1 | Campbell CH12R charger/regulator S/N: 1891. | Installed 1999. |
| 1 | Campbell MSX-20 Solar panel. | Installed 1999. |
| 1 | Campbell ENC 16/18 enclosure. | Installed 1999. |
| 1 | Campbell CM10 3-m tower | Installed 1999. |
| 1 | NEMA box | Installed 1999; Removed Dec 99 |
| 12 | Vitel dielectric constant soil moisture/temperature sensors. | Installed 1999. |
| (12) | Vitel dielectric constant soil moisture/temperature sensors. | Installed 1999, remote site |
| 6 | Campbell 107B soil temperature sensors | Installed 1999. |
| (12) | Campbell 107B soil temperature sensors | Installed 1999, remote site. |
| 1 | MRC soil temperature probe | Installed 1999. |
| 1 | Vaisala HMP45C temp/relative humidity sensors. | Installed 1999. |
| 1 | Campbell solar radiation shields for HMP35C or HMP45C temperature/humidity sensors. | Installed 1999. |
| 1 | Campbell 107 air temperature sensor. | Installed 01/11/03 |
| 1 | Campbell solar radiation shields for107 air temperature sensor. | Installed 01/11/03 |
| 1 | LiCor LI200X pyranometer solar radiation sensors. | Installed 1999. |
| 1 | LiCor pyranometer solar radiation sensor leveling fixtures. | Installed 1999. |
| 1 | Pyranometer mounting arms. | Installed 1999. |
| (1) | Met One wind speed & direction sensor; S/N: X2164 | Installed 1999; replaced 01/02. Removed 01/09 |
| 1 | R.M. Young wind speed & direction sensor | Installed 01/09 |
| 1 | Wind sensor mounting arms | Installed 1999. |

**HISTORY:**  January 10, 1999: Station initiated. Three stacks of four Vitel Hydra probes were installed and attached to a Campbell Scientific CR10X-2M datalogger. Six Campbell 107 temperature sensors were installed and attached to the datalogger. Above ground sensors are one LiCor pyranomerer, one Met One wind speed and direction sensor, and one Vaisala HMP45C air temperature and relative humidity sensor. The above ground sensors were mounted on the tower using appropriate brackets. The air temperature/relative humidity sensor was mounted in a solar radiation shield. The wind and solar radiation sensors were mounted three meters above the ground surface. The air temperature/relative humidity sensor was mounted approximately 1.6 meters above the ground surface. The datalogger, a Campbell AM416 multiplexer, and a Campbell BP24 power supply, were located inside of a Campbell ENC16/18 enclosure. The enclosure was mounted on a Campbell CM10 3-m tower. Power is supplied by a Campbell (SolarX) MSX20 solar panel, mounted on the tower. The solar panel faces true north and is perpendicular to the surface of the earth. Datalogger was set to New Zealand Standard Time. Midnight is 2400. The datalogger program, *Ant4*, was downloaded to the datalogger. Measurements are made at 20-minute intervals and averaged and recorded every hour. Measurements of solar radiation and wind are made at 10-second intervals and averaged and recorded every hour. Sub-station established in oil spill site approximately 400 ft from main station. Two 37-conductor cables were used to connect the remote sub-station with the main station. A NEMA box with terminal strips was used to connect the sensors at the remote station to the 37-conductor cable. Sensors at the remote sub-station were 12 Vitel soil moisture sensors and 12 Campbell 107 temperature sensors. Problems with remote Vitel sensors. Can only get three to work. If try to connect more than three to datalogger, get -99999.

December 4-6, 1999: Downloaded data. Everything looks OK. There is a little rust on the counter weight for the wind direction sensor. The solar panel is OK — no sandblasting. The ground clamp for the second battery was loose. Disconnected remote site and upgraded it to a stand-alone station. Downloaded new *ANT4* program to datalogger to account for the elimination of the remote station. Changed readings from every two hours to hourly.

December 13, 2000: Ground wire for extra battery had fallen off. It was attached with an alligator clip because I was unable to get the solder to make a good connection when installed. Don Huffman tried to solder it to the main battery terminal without success. Connected the ground wire for the extra battery to the ground on the CH12R regulator. Downloaded data to Ant4.dat. Replaced recalled CR10X-2M with new CR10X-2M-XT. Downloaded *Ant4 v.2.00*. Everything looks like it is working OK. Added desiccant.

January 2, 2002: Downloaded data to Ant4.dat. Wind speed sensor not working. Replaced with new MetOne wind sensor. Battery shows evidence of small leak. Replaced battery with one from the Scott Base Oil station that was dismantled. Everything looks like it is working OK.

January 11, 2003: Downloaded data to SM4M storage module Marble Point (B). Battery case still shows results of last year’s leaky battery. Removed old desiccant and added new desiccant. Installed Campbell 107 air temperature sensor and 6-plate radiation shield at 80 inches. HMP45C air temperature/RH sensor is at 60 inches. Downloaded new datalogger program Ant4 v.2.01. Program adds avg, max, and min values for the 107 air temperature sensor. It also gives max 10-s wind speed. Datalogger Li battery is 3.097 V. Set datalogger ID to 72. One 107 soil temperature wire was exposed. Covered it with a thin layer of soil about 3mm. Another soil temperature sensor (#3) is taped to the underside of a flat rock and was partially exposed. A small rock was added to its side to shade it. Everything looks like it is working OK.

January 7, 2004: Retrieved the Campbell SM4M storage module S/N: 3467 (Marble Point (A)) and installed the alternate S/N 2800 (Marble Point (B)). Installed a second Campbell BP24 24-amp-hr YUASA battery. Replaced the desiccant. Checked the Li battery. Did not clean the leakage from the battery holder, due to the concern of possibly damaging other components with the acidic dust.

January 17, 2005: Retrieved the alternate Campbell SM4M storage module S/N: 2800 (Marble Point (B)) and installed S/N 3467 (Marble Point (A)). Swapped outside battery. Used crimp type butt splices to connect the wiring. Put date on the new battery. Outside wiring was encased in automotive wire sheathing. Replaced the acid-contaminated mounting hardware. Used paper towels with water and baking soda to clean the NEMA. Swapped desiccant packs. Voltages: SPR-13.44 vdc, station batteries-12.51 vdc, Li battery-3.13 vdc. Station time 2:52 PM, actual time 3:58 PM, NZST. Station was reset back to NZST. Drift spans two years because time was not reset last season. Taped down loose wires. Re-buried near surface CSI-107 that had been exposed by the wind. Wiped off the LI200 pyranometer. Took station pictures looking N,E,S,W. Weather conditions: clear, -1C, calm. [Note: Located the site of the oil spill station that was removed in January of 2003. Removed 3 each of the remaining Vitel and CSI-107 sensors that had previously been frozen in the soil. The two deepest ones are still frozen in, so the wires were cut at a depth of about 18 inches, and reburied. Replaced the soil and surface stones.]

January 10, 2006: Added two new battery containment boxes that are 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 boxes in place with rocks. Downloaded data and program from datalogger. Changed the RH multiplier in the program from 0.01 to 0.1 and uploaded the revised program. Swapped storage modules. There was no difference between PC and station clock. Everything else seemed to be working okay. Added three packs of desiccant. Weather conditions: cloudy, -2°C, wind 2-5 mph.

January 16, 2007: Station clock was 4 min behind. Downloaded data and swapped storage modules. Replaced one 24 Ah battery. Added two desiccant packs. Everything seemed to be working okay.

January 17, 2008: Downloaded data and swapped storage modules. Station clock was 97 minutes behind. Reset clock. Lithium battery was 3.1 volts. Took out the empty multiplexer. Replaced one 24 Ah battery and left female battery connector wire in other battery box on the ground. Added two desiccant packs. Everything seemed to be working okay. (The marble point revised program for the R.M. Young wind sensor does not match data locations—program needs to be checked against wiring diagram or enclosure photos.)

January 19, 2009: Downloaded data and swapped storage modules. Station clock was 2.5 minutes behind. Lithium battery was 3.1 volts. Replaced one 24 Ah battery. Wind speed was not working—reading 0. Replaced a MetOne wind sensor with an R.M. Young. Put wind sensor on other side of crossarm. This side had the correct T-bracket for the R.M. Young. Uploaded new program marbleR3.dld that takes into account the R.M. Young wind sensor. Everything seemed to be working okay. Two of the surface 107s were uncovered—repositioned them below the surface. The MRC was 4 cm out of the ground.

January 15, 2010: Downloaded data and swapped storage modules. Station clock was 3 minutes behind and reset the clock. Lithium battery was 3.18 volts. Replaced one 24 Ah battery. Everything seemed to be working okay. The MRC was 5.5 cm out of the ground.

January 24, 2011: Downloaded data and swapped storage modules. Station clock was 1 minute behind. Lithium battery was 3.19 volts. Replaced one 24 Ah battery. Fixed wind sensor—propeller was rattling. Verified wind direction with GPS. Everything seemed to be working okay. The MRC was 4 cm out of the ground. Added two desiccant packs.

January 21, 2012: Downloaded data and swapped storage modules. Station clock was 1.2 minutes behind. Lithium battery was 3.19 volts. Replaced one 24 Ah battery. Replaced the nose of the wind sensor (has new bearings). Replaced the datalogger (has a new battery). Everything seemed to be working okay. The MRC was 4.5 cm out of the ground. Added two desiccant packs.

December 17, 2012: Downloaded data and swapped storage modules. Station clock was about one minute behind. Lithium battery was 3.08 volts. Replaced one 24 Ah battery. Everything seemed to be working okay. The MRC was 4.0 cm out of the ground. A battery connector is needed for the 2012 battery change out (leave one in enclosure for next time). Air temp was -2.2ºC, light breeze.

January 6, 2014: Swapped storage modules. Battery voltage was 13.89 V. Replaced one 24 Ah battery. Weather condition: air temp 2.6ºC, 3.2 mph winds.

January 12, 2015: 1120 NZDT. Downloaded datalogger and swapped storage modules. One temp sensor exposed at surface (to direct sun), buried it to about 1 cm depth. Swapped out battery in datalogger box and removed battery holder. Top of MRC just sticking out. Weather measured on hand-held kestrel 3500; Measurement time1145 NZDT; Wind max 4 Knots, Temp 0 Degrees F, RH: 76 %, Dewpoint -1.9 Degrees C, Wetbulb 2.5 Degrees C, Air pressure 979.4 hPa.

January 15, 2016: Downloaded datalogger and swapped storage modules. The oldest battery was replaced.

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

January 20, 2018: Downloaded datalogger and swapped storage modules. MRC Height

70mm.

January 24, 2018: Replaced oldest battery.

January 12, 2019: Downloaded datalogger and swapped storage modules.

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

February 2, 2021: Downloaded datalogger and swapped storage modules.

December 3, 2021: Downloaded datalogger and swapped storage modules. Battery swapped. MRC height above ground is 5.5 cm. Reset clock.

December 20, 2022: Downloaded datalogger and swapped storage modules. MRC height above ground is 6 cm. Reset clock to UTC. (10:07am to 9:45pm).

| MULTIPLEXER  POSITION (bottom) | STACK | SENSOR  # | DEPTH  (cm) | COMMENTS |
| --- | --- | --- | --- | --- |
| V1-1H1, V2-1L1, V3-1H2, V4-13H1 | 1 | Vitel 1-2 | 2 |  |
| V1-2H1, V2-2L1, V3-2H2, V4-13L1 | 1 | Vitel 1-20 | 20 |  |
| V1-3H1, V2-3L1, V3-3H2, V4-13H2 | 1 | Vitel 1-50 | 50 |  |
| V1-4H1, V2-4L1, V3-4H2, V4-14H1 | 1 | Vitel 1-80 | 80 |  |
| V1-5H1, V2-5L1, V3-5H2, V4-14L1 | 2 | Vitel 2-2 | 2 |  |
| V1-6H1, V2-6L1, V3-6H2, V4-14H2 | 2 | Vitel 2-20 | 20 |  |
| V1-7H1, V2-7L1, V3-7H2, V4-15H1 | 2 | Vitel 2-50 | 50 |  |
| V1-8H1, V2-8L1, V3-8H2, V4-15L1 | 2 | Vitel 2-80 | 80 |  |
| V1-9H1, V2-9L1, V3-9H2, V4-15H2 | 3 | Vitel 3-2 | 2 |  |
| V1-10H1, V2-10L1, V3-10H2, V4-16H1 | 3 | Vitel 3-20 | 20 |  |
| V1-11H1, V2-11L1, V3-11H2, V4-16L1 | 3 | Vitel 3-50 | 50 |  |
| V1-12H1, V2-12L1, V3-12H2, V4-16H2 | 3 | Vitel 3-80 | 80 |  |
| 1L2 | 4 | 107 Temp 0 |  | White marble (covered) |
| 2L2 | 4 | 107 Temp 1 |  | White marble (covered) |
| 3L2 | 4 | 107 Temp 3 |  | Taped to black rock |
| 4L2 | 4 | 107 Temp 4 |  | Taped to black rock |
| 5L2 | 4 | 107 Temp 6 |  | Just under soil surface |
| 6L2 | 4 | 107 Temp 7 |  | Just under soil surface |

| MULTIPLEXER\*  POSITION (top) | STACK | SENSOR  # | DEPTH  (cm) | COMMENTS |
| --- | --- | --- | --- | --- |
| V1-1H1, V2-1L1, V3-1H2, V4-13H1 | 1 | Vitel 1-2 | 2 | Remote site |
| V1-2H1, V2-2L1, V3-2H2, V4-13L1 | 1 | Vitel 1-20 | 15 | Remote site |
| V1-3H1, V2-3L1, V3-3H2, V4-13H2 | 1 | Vitel 1-50 | 25 | Remote site |
| V1-4H1, V2-4L1, V3-4H2, V4-14H1 | 1 | Vitel 1-80 | 40 | Remote site |
| V1-5H1, V2-5L1, V3-5H2, V4-14L1 | 2 | Vitel 2-2 | 2 | Remote site |
| V1-6H1, V2-6L1, V3-6H2, V4-14H2 | 2 | Vitel 2-20 | 15 | Remote site |
| V1-7H1, V2-7L1, V3-7H2, V4-15H1 | 2 | Vitel 2-50 | 25 | Remote site |
| V1-8H1, V2-8L1, V3-8H2, V4-15L1 | 2 | Vitel 2-80 | 40 | Remote site |
| V1-9H1, V2-9L1, V3-9H2, V4-15H2 | 3 | Vitel 3-2 | 2 | Remote site |
| V1-10H1, V2-10L1, V3-10H2, V4-16H1 | 3 | Vitel 3-20 | 15 | Remote site |
| V1-11H1, V2-11L1, V3-11H2, V4-16L1 | 3 | Vitel 3-50 | 25 | Remote site |
| V1-12H1, V2-12L1, V3-12H2, V4-16H2 | 3 | Vitel 3-80 | 40 | Remote site |
| 1L2 | 1 | 107 Temp 1 | 2 | Remote site |
| 2L2 | 1 | 107 Temp 2 | 15 | Remote site |
| 3L2 | 1 | 107 Temp 3 | 25 | Remote site |
| 4L2 | 1 | 107 Temp 4 | 40 | Remote site |
| 5L2 | 2 | 107 Temp 5 | 2 | Remote site |
| 6L2 | 2 | 107 Temp 6 | 15 | Remote site |
| 7L2 | 2 | 107 Temp 7 | 25 | Remote site |
| 8L2 | 2 | 107 Temp 8 | 40 | Remote site |
| 9L2 | 3 | 107 Temp 9 | 2 | Remote site |
| 10L2 | 3 | 107 Temp 10 | 15 | Remote site |
| 11L2 | 3 | 107 Temp 11 | 25 | Remote site |
| 12L2 | 3 | 107 Temp 12 | 40 | Remote site |

\* The top multiplexer was eliminated 12/5/99.

**DATA:**

DATALOGGER OUTPUT:

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10 | 004 |
| 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 | Battery | Volts | Enclosure | Campbell CR10 |  |
| 6 | Int Temp | °C | Datalogger | Campbell CR10 |  |
| 7 | Air Temp | °C | Air 2.0 m | Campbell 107 | Hourly avg. After 01/11/03. |
| 8 | Max Air Temp | °C | Air 2.0 m | Campbell 107 | Hourly max. After 01/11/03. |
| 9 | Min Air Temp | °C | Air 2.0 m | Campbell 107 | Hourly min. After 01/11/03. |
| 10 | Air Temp | °C | Air 1.6 m | Vaisala HMP45C |  |
| 11 | RH | % | Air 1.6 m | Vaisala HMP45C |  |
| 12 | Solar Rad | W/m2 | Air 3 m | LiCor |  |
| 13 | Wind Speed | m s-1 | Air 3 m | Met One; R.M. Young after 01/09 | Hourly avg. |
| 14 | Wind Dir | azimuth | Air 3 m | Met One; R.M. Young after 01/09 | True North |
| 15 | Max Wind Speed | m s-1 | Air 3 m | Met One; R.M. Young after 01/09 | 10-s max. After 01/11/03. |
| 16 | 1V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 17 | 2V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 18 | 3V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 19 | 4V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 20 | 5V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 21 | 6V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 22 | 7V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 23 | 8V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 24 | 9V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 25 | 10V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 26 | 11V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 27 | 12V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 29 | 1V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 29 | 2V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 30 | 3V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 31 | 4V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 32 | 5V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 33 | 6V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 34 | 7V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 35 | 8V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 36 | 9V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 37 | 10V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 38 | 11V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 39 | 12V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 40 | 1V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 41 | 2V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 42 | 3V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 43 | 4V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 44 | 5V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 45 | 6V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 46 | 7V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 47 | 8V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 48 | 9V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 49 | 10V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 50 | 11V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 51 | 12V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 52 | 1V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 53 | 2V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 54 | 3V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 55 | 4V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 56 | 5V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 57 | 6V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 58 | 7V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 59 | 8V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 60 | 9V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 61 | 10V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 62 | 11V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 63 | 12V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 64 | Soil Temp | °C |  | Campbell 107 | White marble |
| 65 | Soil Temp | °C |  | Campbell 107 | White marble |
| 66 | Soil Temp | °C |  | Campbell 107 | Black rock |
| 67 | Soil Temp | °C |  | Campbell 107 | Black rock |
| 68 | Soil Temp | °C |  | Campbell 107 | Just under soil |
| 69 | Soil Temp | °C |  | Campbell 107 | Just under soil |
| 70 | Soil Temp | °C | Soil 0 in | MRC Temperature Probe |  |
| 71 | Soil Temp | °C | Soil 3 in | MRC Temperature Probe |  |
| 72 | Soil Temp | °C | Soil 6 in | MRC Temperature Probe |  |
| 73 | Soil Temp | °C | Soil 9 in | MRC Temperature Probe |  |
| 74 | Soil Temp | °C | Soil 12 in | MRC Temperature Probe |  |
| 75 | Soil Temp | °C | Soil 18 in | MRC Temperature Probe |  |
| 76 | Soil Temp | °C | Soil 24 in | MRC Temperature Probe |  |
| 77 | Soil Temp | °C | Soil 30 in | MRC Temperature Probe |  |
| 78 | Soil Temp | °C | Soil 36 in | MRC Temperature Probe |  |
| 79 | Soil Temp | °C | Soil 42 in | MRC Temperature Probe |  |
| 80 | Soil Temp | °C | Soil 48 in | MRC Temperature Probe |  |
| 81 | Resistance |  |  | MRC Temperature Probe | Reference value |
| 82 | 1V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 83 | 2V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 84 | 3V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 85 | 4V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 86 | 5V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 87 | 6V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 88 | 7V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 89 | 8V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 90 | 9V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 91 | 10V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 92 | 11V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 93 | 12V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 94 | 1V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 95 | 2V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 96 | 3V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 97 | 4V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 98 | 5V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 99 | 6V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 100 | 7V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 101 | 8V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 102 | 9V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 103 | 10V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 104 | 11V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 105 | 12V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 106 | 1V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 107 | 2V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 108 | 3V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 109 | 4V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 110 | 5V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 111 | 6V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 112 | 7V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 113 | 8V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 114 | 9V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 115 | 10V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 116 | 11V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 117 | 12V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 118 | 1V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 119 | 2V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 120 | 3V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 121 | 4V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 122 | 5V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 123 | 6V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 124 | 7V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 125 | 8V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 126 | 9V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 127 | 10V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 128 | 11V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 129 | 12V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp | Remote site\* |
| 130 | Soil Temp | °C | Soil 2 cm | Campbell 107 | Remote site\* |
| 131 | Soil Temp | °C | Soil 20 cm | Campbell 107 | Remote site\* |
| 132 | Soil Temp | °C | Soil 50 cm | Campbell 107 | Remote site\* |
| 133 | Soil Temp | °C | Soil 80 cm | Campbell 107 | Remote site\* |
| 134 | Soil Temp | °C | Soil 2 cm | Campbell 107 | Remote site\* |
| 135 | Soil Temp | °C | Soil 20 cm | Campbell 107 | Remote site\* |
| 136 | Soil Temp | °C | Soil 50 cm | Campbell 107 | Remote site\* |
| 137 | Soil Temp | °C | Soil 80 cm | Campbell 107 | Remote site\* |
| 138 | Soil Temp | °C | Soil 2 cm | Campbell 107 | Remote site\* |
| 139 | Soil Temp | °C | Soil 20 cm | Campbell 107 | Remote site\* |
| 140 | Soil Temp | °C | Soil 50 cm | Campbell 107 | Remote site\* |
| 141 | Soil Temp | °C | Soil 80 cm | Campbell 107 | Remote site\* |

\* Eliminated 12/5/99.

DATALOGGER OUTPUT: After 01/19/09

| COL | OUTPUT | UNITS | LOCATION | SENSOR | COMMENTS |
| --- | --- | --- | --- | --- | --- |
| 1 | Station ID | N/A | N/A | Campbell CR10X | 004 |
| 2 | Year | N/A | N/A | Campbell CR10X |  |
| 3 | Day | N/A | N/A | Campbell CR10X |  |
| 4 | Time | N/A | N/A | Campbell CR10X | NZ standard time |
| 5 | Battery | Volts | Enclosure | Campbell CR10X |  |
| 6 | Lith Batt | Volts | Datalogger | Campbell CR10X |  |
| 7 | Int Temp | °C | Datalogger | Campbell CR10X |  |
| 8 | Air Temp | °C | Air 2.0 m | Campbell 107 | Hourly avg. After 01/11/03. |
| 9 | Max Air Temp | °C | Air 2.0 m | Campbell 107 | Hourly max. After 01/11/03. |
| 10 | Min Air Temp | °C | Air 2.0 m | Campbell 107 | Hourly min. After 01/11/03. |
| 11 | Air Temp | °C | Air 1.6 m | Vaisala HMP45C |  |
| 12 | RH | % | Air 1.6 m | Vaisala HMP45C |  |
| 13 | Solar Rad | W/m2 | Air 3 m | LiCor |  |
| 14 | Wind Speed | m s-1 | Air 3 m | R.M. Young after 01/09 | Hourly avg. |
| 15 | Wind Dir | azimuth | Air 3 m | R.M. Young after 01/09 | True North |
| 16 | Max Wind Speed | m s-1 | Air 3 m | R.M. Young after 01/09 | 10-s max. After 01/11/03. |
| 17 | 1V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 18 | 2V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 19 | 3V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 20 | 4V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 21 | 5V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 22 | 6V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 23 | 7V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 24 | 8V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 25 | 9V1 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 26 | 10V1 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 27 | 11V1 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 29 | 12V1 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 29 | 1V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 30 | 2V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 31 | 3V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 32 | 4V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 33 | 5V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 34 | 6V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 35 | 7V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 36 | 8V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 37 | 9V2 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 38 | 10V2 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 39 | 11V2 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 40 | 12V2 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 41 | 1V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 42 | 2V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 43 | 3V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 44 | 4V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 45 | 5V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 46 | 6V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 47 | 7V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 48 | 8V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 49 | 9V3 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 50 | 10V3 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 51 | 11V3 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 52 | 12V3 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 53 | 1V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 54 | 2V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 55 | 3V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 56 | 4V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 57 | 5V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 58 | 6V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 59 | 7V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 60 | 8V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 61 | 9V4 | Volts | Soil 2 cm | Vitel Soil Moisture/Temp |  |
| 62 | 10V4 | Volts | Soil 20 cm | Vitel Soil Moisture/Temp |  |
| 63 | 11V4 | Volts | Soil 50 cm | Vitel Soil Moisture/Temp |  |
| 64 | 12V4 | Volts | Soil 80 cm | Vitel Soil Moisture/Temp |  |
| 65 | Soil Temp | °C |  | Campbell 107 | White marble |
| 66 | Soil Temp | °C |  | Campbell 107 | White marble |
| 67 | Soil Temp | °C |  | Campbell 107 | Black rock |
| 68 | Soil Temp | °C |  | Campbell 107 | Black rock |
| 69 | Soil Temp | °C |  | Campbell 107 | Just under soil |
| 70 | Soil Temp | °C |  | Campbell 107 | Just under soil |
| 71 | Soil Temp | °C | Soil 0 in | MRC Temperature Probe |  |
| 72 | Soil Temp | °C | Soil 3 in | MRC Temperature Probe |  |
| 73 | Soil Temp | °C | Soil 6 in | MRC Temperature Probe |  |
| 74 | Soil Temp | °C | Soil 9 in | MRC Temperature Probe |  |
| 75 | Soil Temp | °C | Soil 12 in | MRC Temperature Probe |  |
| 76 | Soil Temp | °C | Soil 18 in | MRC Temperature Probe |  |
| 77 | Soil Temp | °C | Soil 24 in | MRC Temperature Probe |  |
| 78 | Soil Temp | °C | Soil 30 in | MRC Temperature Probe |  |
| 79 | Soil Temp | °C | Soil 36 in | MRC Temperature Probe |  |
| 80 | Soil Temp | °C | Soil 42 in | MRC Temperature Probe |  |
| 81 | Soil Temp | °C | Soil 48 in | MRC Temperature Probe |  |
| 82 | Resistance |  |  | MRC Temperature Probe | Reference value |

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.

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 12 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 °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), AIR TEMP (°C), RH (%), SOLAR RADIATION (w m-2), WIND SPEED (m s-1), WIND DIR (deg from true north), 1V1 (2-cm depth, Vitel stack 1), 1V2 (2-cm depth, Vitel stack 1), 1V3 (2-cm depth, Vitel stack 1), 1V4 (2-cm depth, Vitel stack 1), 2V1 (20-cm depth Vitel, stack 1), 2V2 (20-cm depth Vitel, stack 1), 2V3 (20-cm depth Vitel, stack 1), 2V4 (20-cm depth Vitel, stack 1), 3V1 (50-cm depth Vitel, stack 1), 3V2 (50-cm depth Vitel, stack 1), 3V3 (50-cm depth Vitel, stack 1), 3V4 (50-cm depth Vitel, stack 1), 4V1 (80-cm depth Vitel, stack 1), 4V2 (80-cm depth Vitel, stack 1), 4V3 (80-cm depth Vitel, stack 1), 4V4 (80-cm depth Vitel, stack 1), 5V1 (2-cm depth, Vitel stack 2), 5V2 (2-cm depth, Vitel stack 2), 5V3 (2-cm depth, Vitel stack 2), 5V4 (2-cm depth, Vitel stack 2), 6V1 (20-cm depth, Vitel stack 2), 6V2 (20-cm depth Vitel, stack 2), 6V3 (20-cm depth Vitel, stack 2), 6V4 (20-cm depth Vitel, stack 2), 7V1 (50-cm depth, Vitel stack 2), 7V2 (50-cm depth, Vitel stack 2), 7V3 (50-cm depth, Vitel stack 2), 7V4 (50-cm depth, Vitel stack 2), 8V1 (80-cm depth, Vitel stack 2), 8V2 (80-cm depth Vitel, stack 2), 8V3 (80-cm depth Vitel, stack 2), 8V4 (80-cm depth Vitel, stack 2), 9V1 (2-cm depth, Vitel stack 3), 9V2 (2-cm depth Vitel, stack 3), 9V3 (2-cm depth Vitel, stack 3), 9V4 (2-cm depth Vitel, stack 3), 10V1 (20-cm depth, Vitel stack 3), 10V2 (20-cm depth Vitel, stack 3), 10V3 (20-cm depth Vitel, stack 3), 10V4 (20-cm depth Vitel, stack 3), 11V1 (50-cm depth, Vitel stack 3), 11V2 (50-cm depth Vitel, stack 3), 11V3 (50-cm depth Vitel, stack 3), 11V4 (50-cm depth Vitel, stack 3), 12V1 (80-cm depth, Vitel stack 3), 12V2 (80-cm depth Vitel, stack 3), 12V3 (80-cm depth Vitel, stack 3), 12V4 (80-cm depth Vitel, stack 3), SOIL T white marble °C, SOIL T white marble °C, SOIL T black rock °C, SOIL T black rock °C, SOIL T surface deg C, SOIL T surface °C, MRC1 0-in °C, MRC2 3-in °C, MRC3 6-in °C, MRC4 9-in °C, MRC5 12-in °C, MRC6 18-in °C, MRC7 24-in °C, MRC8 30-in °C, MRC9 36-in °C, MRC10 42-in °C, MRC11 48-in °C, MRC12 reference resistor, WIND (mph). **The remaining columns were transferred to *Ant5.wb2*, Dec 99:** 1V1 (2-cm depth, Vitel stack R1), 1V2 (2-cm depth, Vitel stack R1), 1V3 (2-cm depth, Vitel stack R1), 1V4 (2-cm depth, Vitel stack R1), 2V1 (20-cm depth Vitel, stack R1), 2V2 (20-cm depth Vitel, stack R1), 2V3 (20-cm depth Vitel, stack R1), 2V4 (20-cm depth Vitel, stack R1), 3V1 (50-cm depth Vitel, stack R1), 3V2 (50-cm depth Vitel, stack R1), 3V3 (50-cm depth Vitel, stack R1), 3V4 (50-cm depth Vitel, stack R1), 4V1 (80-cm depth Vitel, stack R1), 4V2 (80-cm depth Vitel, stack R1), 4V3 (80-cm depth Vitel, stack R1), 4V4 (80-cm depth Vitel, stack R1), 5V1 (2-cm depth, Vitel stack R2), 5V2 (2-cm depth, Vitel stack R2), 5V3 (2-cm depth, Vitel stack R2), 5V4 (2-cm depth, Vitel stack R2), 6V1 (20-cm depth, Vitel stack R2), 6V2 (20-cm depth Vitel, stack R2), 6V3 (20-cm depth Vitel, stack R2), 6V4 (20-cm depth Vitel, stack R2), 7V1 (50-cm depth, Vitel stack R2), 7V2 (50-cm depth, Vitel stack R2), 7V3 (50-cm depth, Vitel stack R2), 7V4 (50-cm depth, Vitel stack R2), 8V1 (80-cm depth, Vitel stack R2), 8V2 (80-cm depth Vitel, stack R2), 8V3 (80-cm depth Vitel, stack R2), 8V4 (80-cm depth Vitel, stack R2), 9V1 (2-cm depth, Vitel stack R3), 9V2 (2-cm depth Vitel, stack R3), 9V3 (2-cm depth Vitel, stack R3), 9V4 (2-cm depth Vitel, stack R3), 10V1 (20-cm depth, Vitel stack R3), 10V2 (20-cm depth Vitel, stack R3), 10V3 (20-cm depth Vitel, stack R3), 10V4 (20-cm depth Vitel, stack R3), 11V1 (50-cm depth, Vitel stack R3), 11V2 (50-cm depth Vitel, stack R3), 11V3 (50-cm depth Vitel, stack R3), 11V4 (50-cm depth Vitel, stack R3), 12V1 (80-cm depth, Vitel stack 3), 12V2 (80-cm depth Vitel, stack R3), 12V3 (80-cm depth Vitel, stack R3), 12V4 (80-cm depth Vitel, stack R3), SOIL T °C (2-cm depth, stack R1), SOIL T °C (20-cm depth, stack R1), SOIL T °C (50-cm depth, stack R1), SOIL T °C (80-cm depth, stack R1), SOIL T °C (2-cm depth, stack R2), SOIL T °C (20-cm depth, stack R2), SOIL T °C (50-cm depth, stack R2), SOIL T °C (80-cm depth, stack R2), SOIL T °C (2-cm depth, stack R3), SOIL T °C (20-cm depth, stack R3), SOIL T °C (50-cm depth, stack R3), SOIL T °C (80-cm depth, stack R3).

**SOILS:**

CLASSIFICATION: Sandy-skeletal, mixed, superactive Hypergelic Calcic Anhyorthel at main site; Loamy-skeletal, mixed, Hypergellic Typic Haplorthel at remote site.

Sampled for characterization at time of station installation.

LAB PEDON NUMBER: 99P0325

SITE IDENTIFICATION NUMBER: 99FN143001

**LANDSCAPE:**

SLOPE: 3% at main site; 0 at remote site.

ASPECT: South (180º) at main site; Flat at remote site.

ELEVATION: 60 m at main site; 55 m at remote site.

**VEGETATION:**

GROUND COVER: None.

CANOPY COVER: None.

**COMMENTS:** Soil described by John Kimble and Iain Campbell. Soil samples collected for characterization.

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:**