Macquarie Univeristy’s Automatic Weather Station Metadata.

The following is a site description of Macquarie University’s Automatic Weather Station which follows the guidelines outlined in the World Meteorological Organisation’s Guide to Meteorological Instruments and Methods of Observation (WMO-No. 8, page 39).

_Station:_ Macquarie Uni No. 2  
_Update:_ 21st of June 2012

_Elevation:_ 66.8 m  
_Latitude:_ 33° 45’ 55.1” S  
_Longitude:_ 151° 7’ 3.2” E

_Figure 1:_ Topographic map of AWS2, see Table 1 for details of sensor locations. Note the contours which detail the height variation around AWS2. These are spots fields which can be better viewed with an satellite image from nearmap.com™
Table 1:

<table>
<thead>
<tr>
<th>Label</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Radiation Sensors, Kipp &amp; Zonen CNR1 Net Radiometer (Global, Reflected, IR, Net Radiation), Middleton Solar UVR1-B (UVB), Kipp &amp; Zonen CM5 (Diffuse), Middleton RS-6 (Sunshine Duration)</td>
</tr>
<tr>
<td>B</td>
<td>Soil Temperature, Omega 44032 Thermistor (1,5,10,20,50 &amp; 100 cm depth)</td>
</tr>
<tr>
<td>C</td>
<td>Wind Tower (10 m), R.M. Young 05103 Wind Monitor (Wind Speed, Wind Direction, Wind Direction Standard Deviation)</td>
</tr>
<tr>
<td>D</td>
<td>Stevenson Screen containing Vector Instruments H301 with 4 wire PRT (Td, Tw pre 9/2011) and sensor Met One 083 Relative Humidity Probe (RH). SVP and VP also calculated here.</td>
</tr>
<tr>
<td>E</td>
<td>Rain Gauge, Hydrological Service TB3 Tipping Bucket Rain Gauge (Rainfall)</td>
</tr>
<tr>
<td>F</td>
<td>Celiometer run by Bureau of Meteorology (not recorded by Macquarie University).</td>
</tr>
</tbody>
</table>

Radiation Horizon

![Radiation Horizon](image1.jpg)

Figure 2: Panorama of Northern viewpoint from Radiation Rack. Note location of Magnetic North, North-West light tower and North-East corner of fence.

![Radiation Horizon](image2.jpg)

Figure 3: Panorama of Southern viewpoint from Radiation Rack. Note location of South-East Tree line and wind tower pole. Note that the panorama has made errors on the wind tower and tree locations.
Sensors

1) Temperature and humidity:
   a. Sensor height 125 cm
   b. Artificially ventilated via a fan inside enclosure (the fan does not expel air outside the enclosure)
   c. Enclosure is a Stevenson screen with a CBM Ident. No 5144 (SN 472), measuring 780 x 620 x 940 mm (WxDxH) with the base 1090 mm above the ground.
   d. Stevenson screen attached to concrete foundation with the same footprint as the screen
   e. Temperature Sensor: Vector Instruments H301 with 4 wire PRT (DIN 43760) (SN 1217).
      i. Accuracy 0.2°C
      ii. Temperature Range -20°C to 65°C
      iii. Response time 50 s
   f. Humidity sensor Met One 083 (SN K6338)
      i. Accuracy +/- 2%
      ii. Temperature Range -50°C to +50°C
      iii. Response time 10 sec with 2 m/s ventilation
      iv. Currently not ventilated
   g. Soil Temperature Model: Omega 44032 Thermistor encased in Epoxy and Stainless steel. Located at depths of 1, 5, 10, 20, 50 and 100 cm deep
      i. Accuracy 0.1°C
      ii. Temperature Range -40°C to +75°C
      iii. Response Time 1 s in oil; 10 s in air

2) Soil Heat Flux
   a. Soil Heat Flux Model: Hukseflux HFP-01 (SN 175 (5 cm) and SN 178 (50 cm))
      i. Accuracy +5/-15% in most soils
      ii. Temperature Range -30°C to +70°C
      iii. Response Time +/- 4 min (equals soil)

3) Pressure
   a. Pressure Model: Vaisala PTA-427 Pressure Transducer
      i. Accuracy +/- 0.3 hPa
      ii. Pressure Range 800-1060 hPa
      iii. Response Time 2 s

4) Precipitation
   a. Gauge Height 400 mm
   b. Rain Gauge Model: Hydrological Service TB3 Tipping Bucket Rain Gauge

5) Wind
   a. Wind Anemometer Model: R.M. Young 05103 Wind Monitor (SN WM40237) 14th September 2011 – Present
      i. Range: 0-100 m/s
      ii. Azimuth: 360° mechanical, 355° electrical (5° open)
iii. Accuracy: Speed +/- 0.3 m/s or 1% of reading, Direction +/- 3°
iv. Threshold: Propeller 1.0 m/s, Vane 1.1 m/s
v. Propeller Distance Constant (63% recovery) 2.7 m
vi. Vane Delay Distance (50% recovery) 1.3 m
vii. Damping Ratio 0.3
viii. Damped natural wavelength 7.4 m
ix. Previously R.M. Young 05103 Wind Monitor (SN WM40236) between 15th December 2009 till 14th September 2011
x. Previously Vaisala WS425 Ultrasonic Anemometer (SN C2050010)
xi. Previously Met One 50.5 Ultrasonic Anemometer (September 2004 – December 16th 2006)

b. Anemometer Height 10 m
c. Free standing anemometer on triangle frame tower (equilateral triangle with 20 cm sides)
d. Terrain roughness class to North TBA, to East TBA, to South TBA, to West TBA

6) Radiation
a. Net Radiometer Sensor Height: 118 cm (to centre of body)
b. Net Radiation model: Kipp & Zonen CNR1 (SN 71351)
c. UVB Sensor Height: 129 cm (to sensor surface)
d. UVB Model: Middleton Solar UVR1-B (SN P5005)
e. Sunshine Duration Sensor Height: 164 cm (to dome base)
f. Sunshine Duration Model: Middleton RS-6 (SN 1060-495)
g. Diffuse Radiometer Sensor Height: 101 cm (to sensor surface)
h. Diffuse Radiometer Model: Kipp & Zonen CM5 (SN 807658)

Remarks:

The Macquarie Uni No. 2 weather station is subject to flooding in heavy rains due to the water treatment site located to the East and South of the station (see the 4 m and 3.2 m vegetation stands in Figure 1). These vegetation stands are elevated above the AWS by about 1 m and do not allow the site to drain well. The site can remain waterlogged for days after heavy rain.

Please note that prior January 9th 1998 the Macquarie University AWS was located on campus at latitude 33°46'14.3832” South and longitude 151°6’39.0528” East and was called Macquarie Uni No. 1.