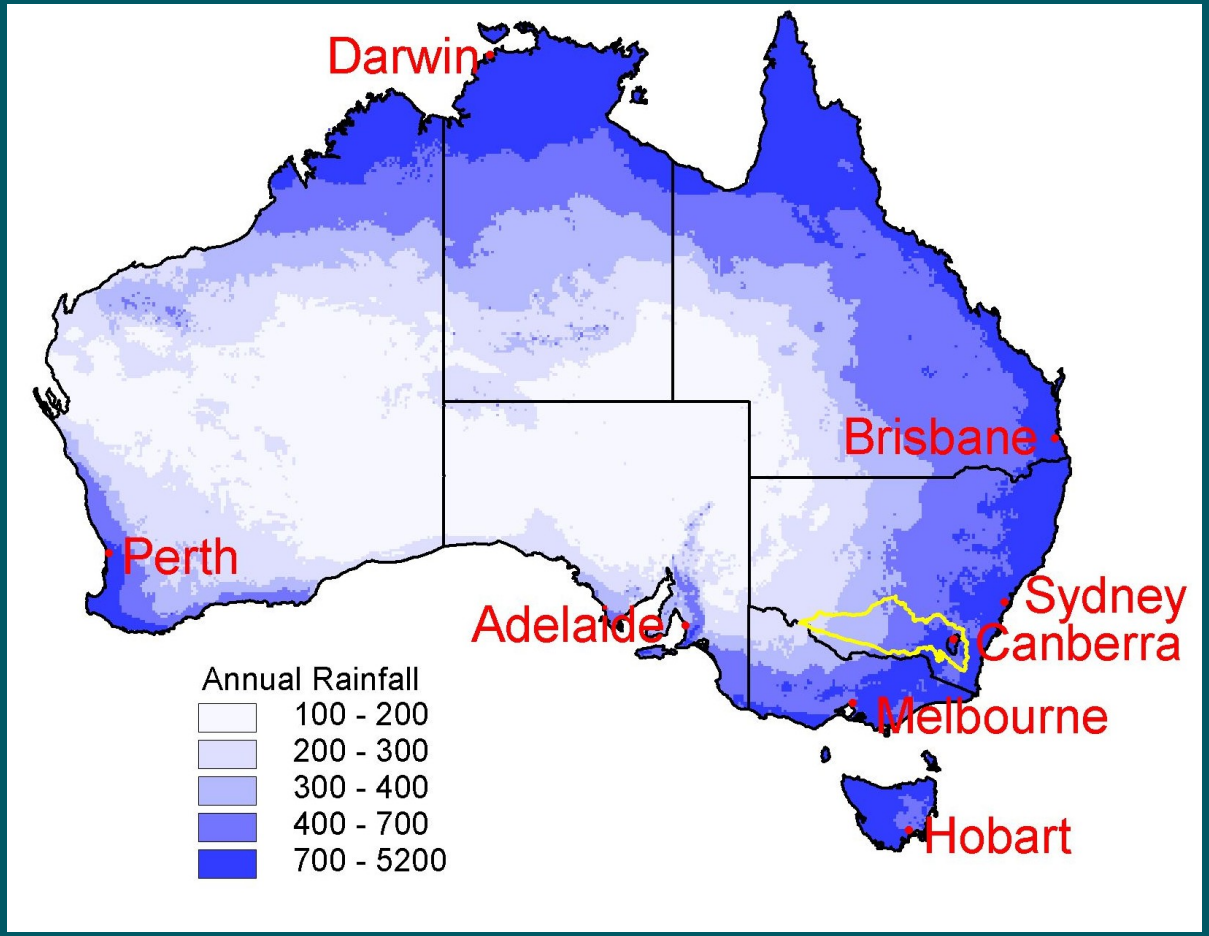
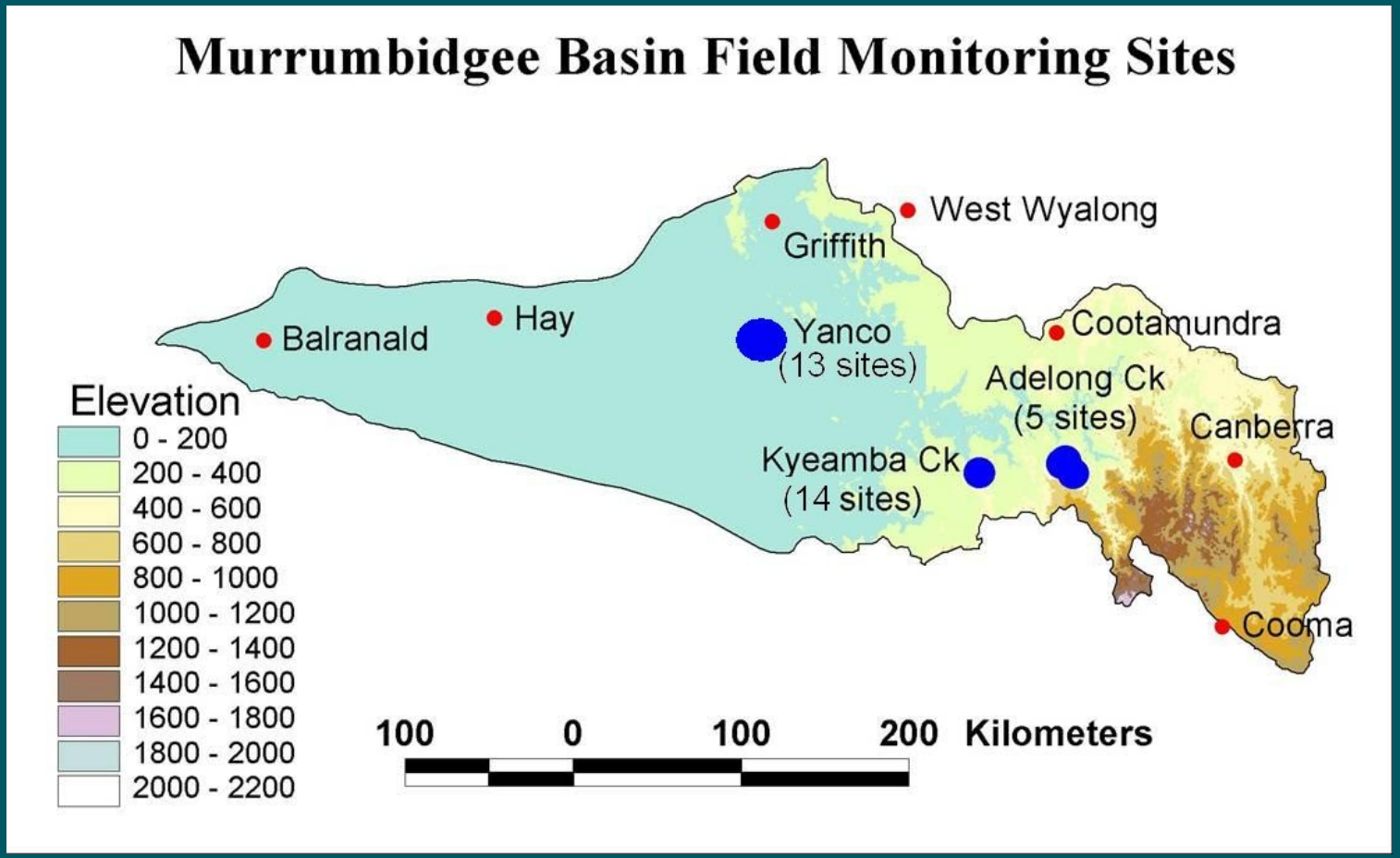
OzNet Monitoring Network
AACES Workshop
Feb 2011

Rodger Young

Murrumbidgee Basin OzNet Station Location



Murrumbidgee Catchment Topography



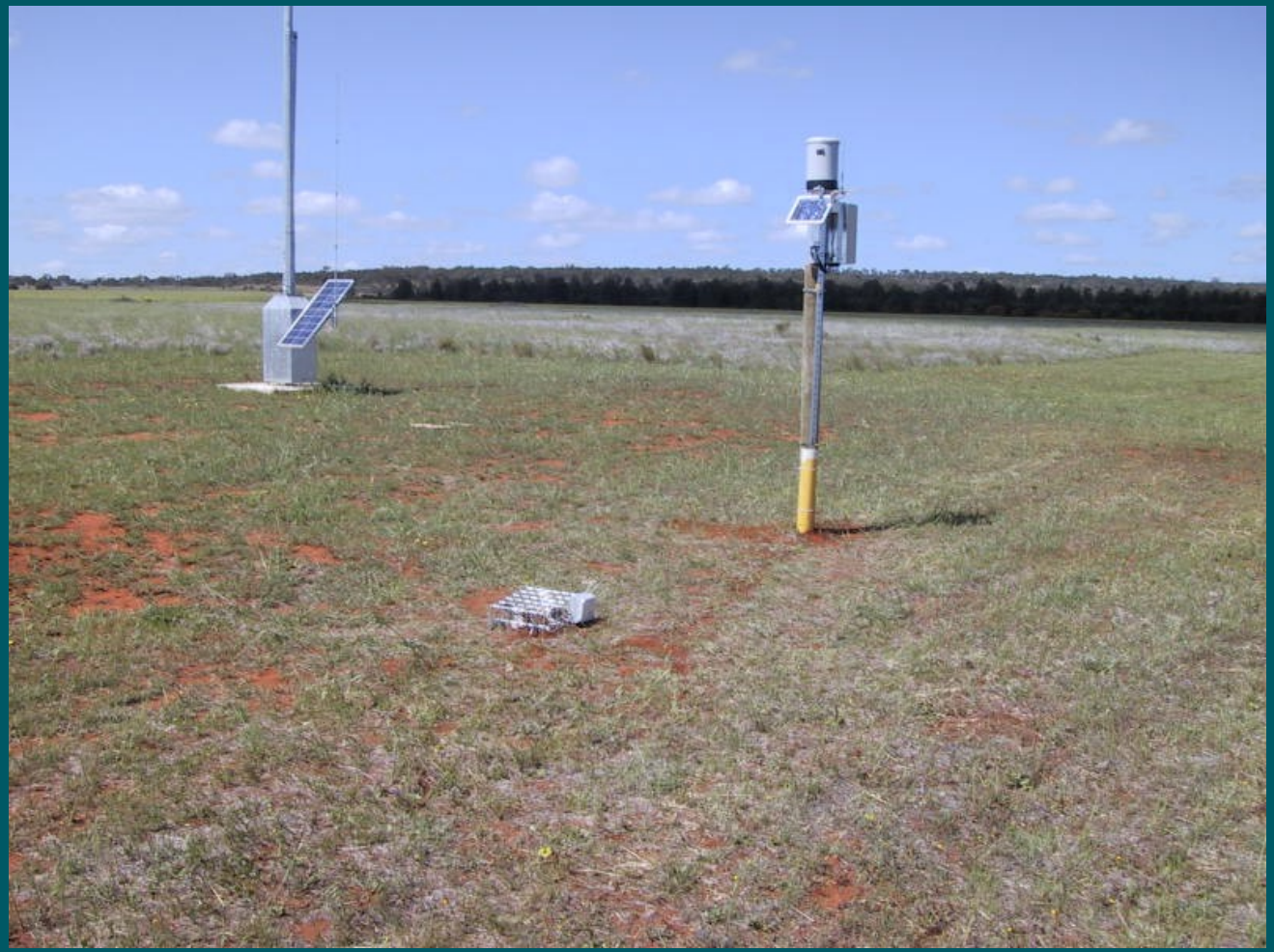
Cooma Aerodrome

Adelong Creek

Kyeamba Creek

Yanco Site

Griffith Aerodrome



Balranald Site

Murrumbidgee OzNet Monitoring Site Locations and Evolution

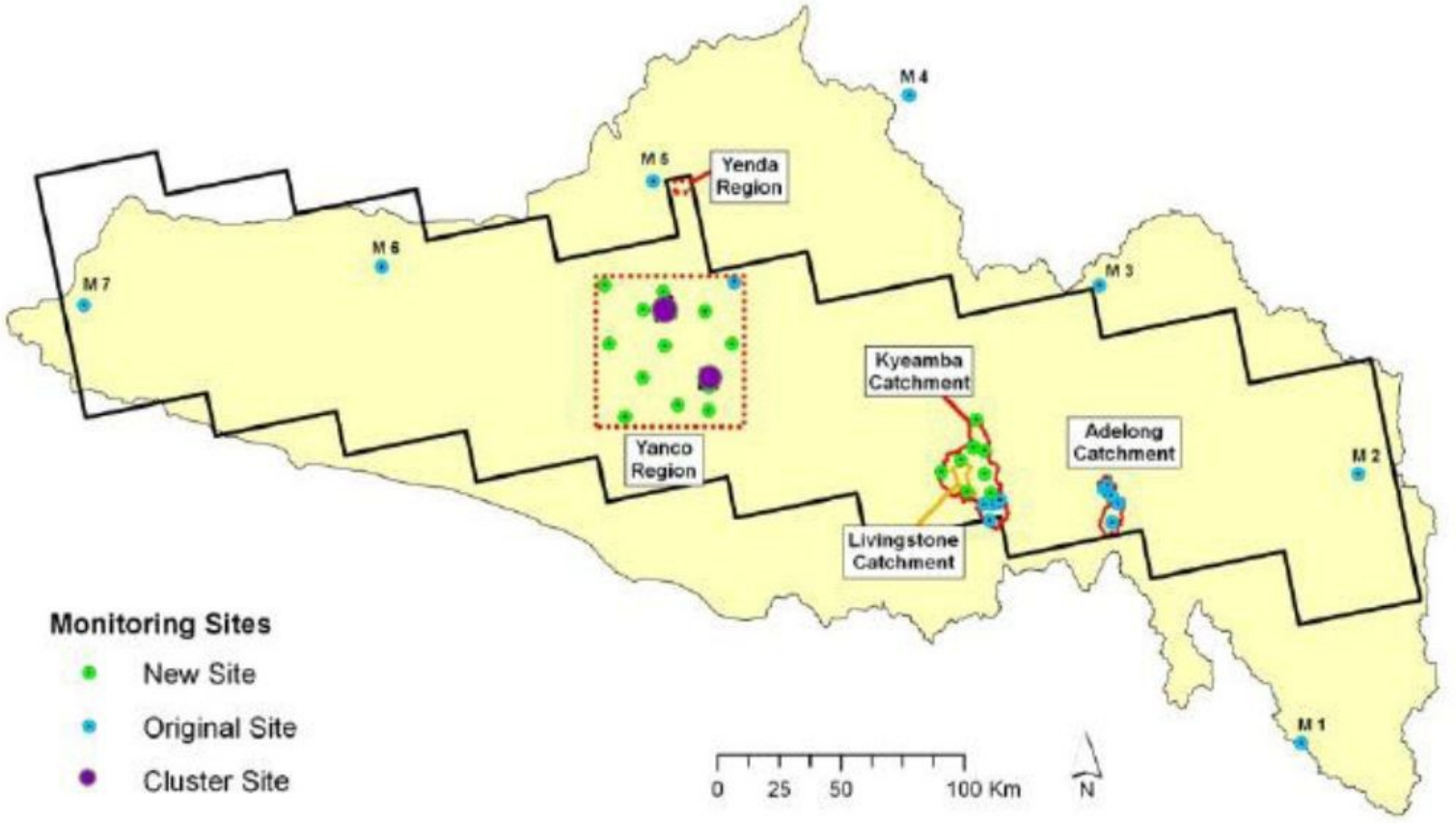
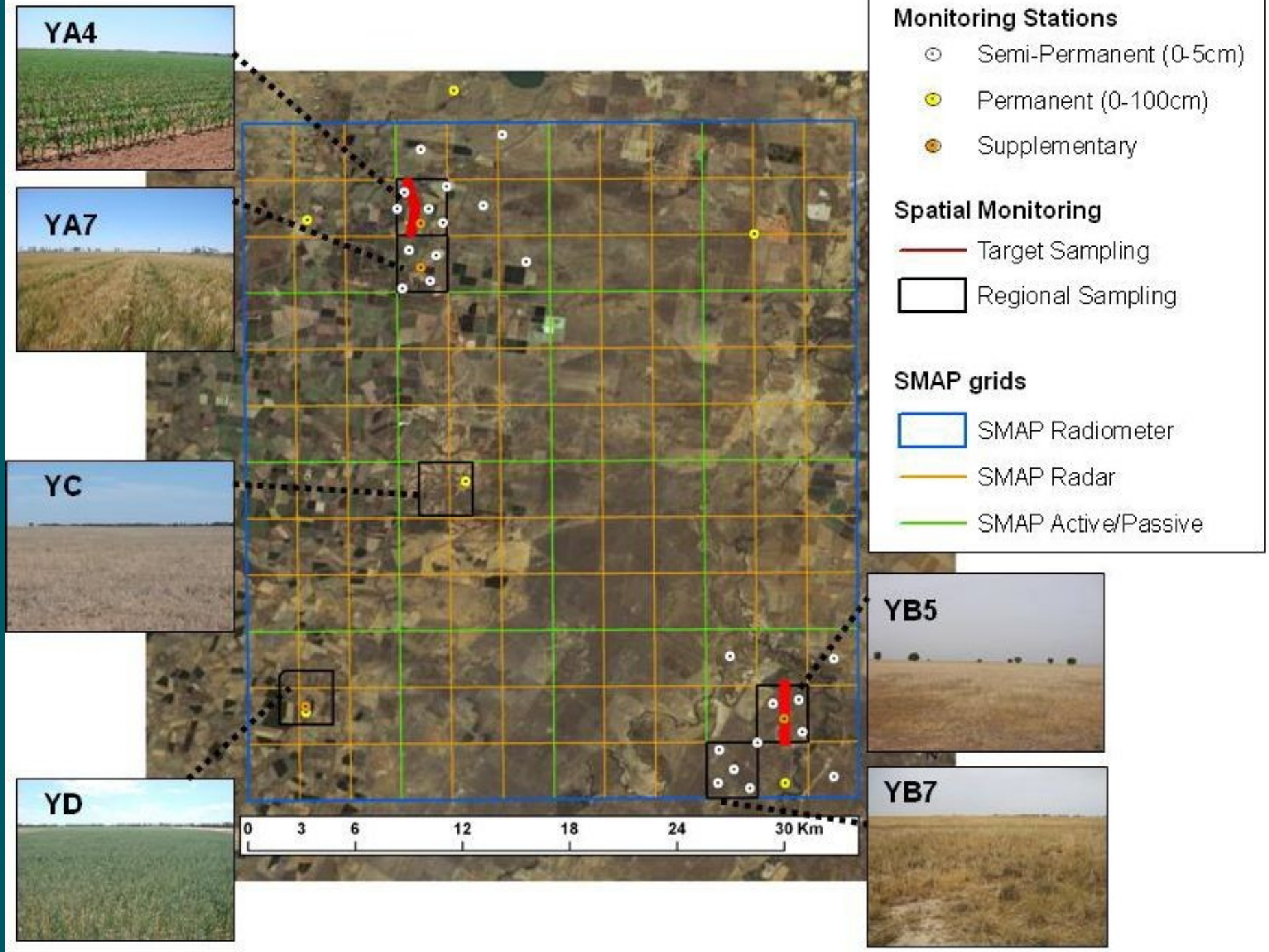
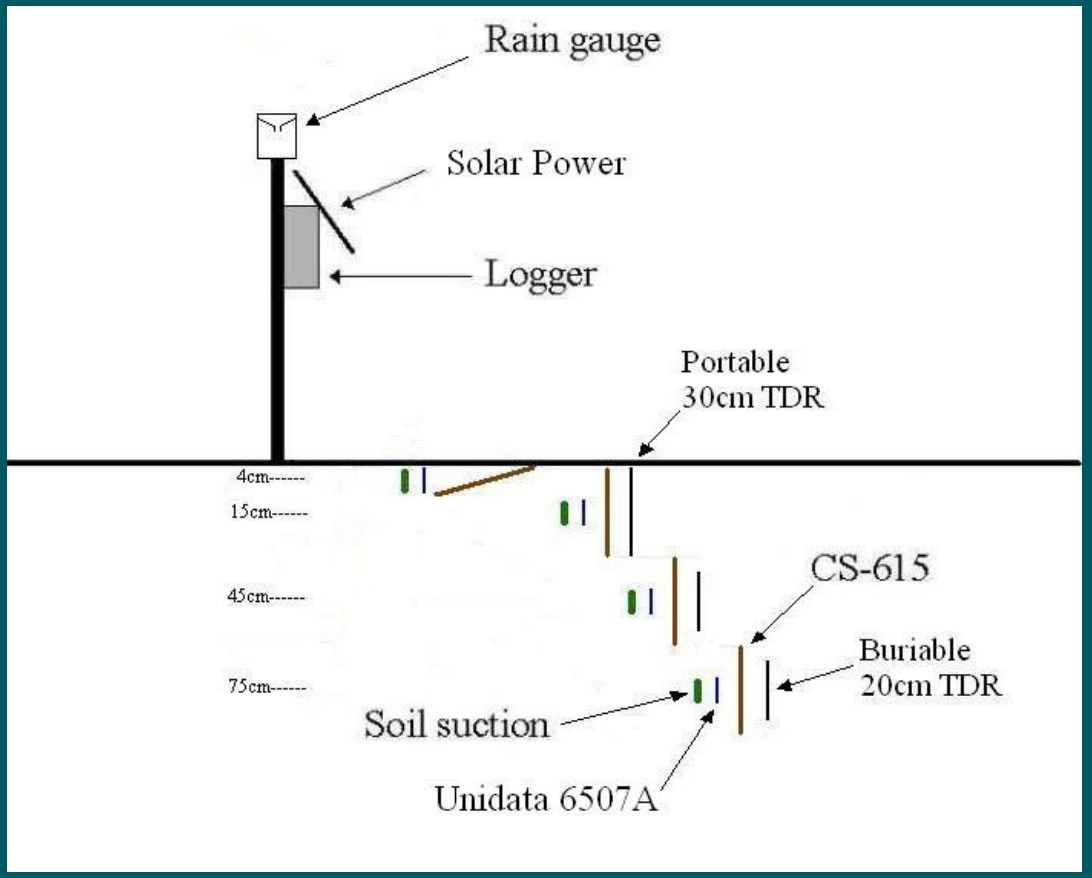


Figure 4-1. Overview of the Murrumbidgee River catchment, soil moisture monitoring sites and the Yanco study area focus of SMAPEx. Also shown in black are the flight boxes to be monitored by the AACES campaigns

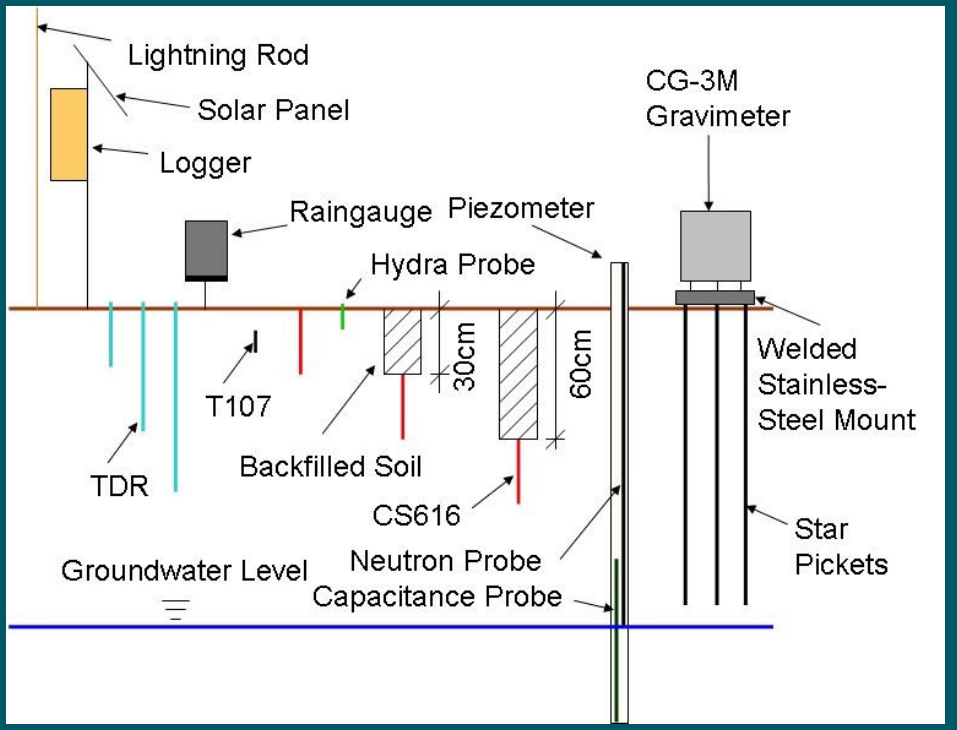

YA4
YA7
YC
YD
YB5
YB7
Monitoring Stations
Semi-Permanent (0-5cm)
Permanent (0-100cm)
Supplementary
Spatial Monitoring
Target Sampling
Regional Sampling
SMAP grids
SMAP Radiometer
SMAP Radar
SMAP Active/Passive
0 3 6 12 18 24 30 Km

Original CS615 Monitoring Stations



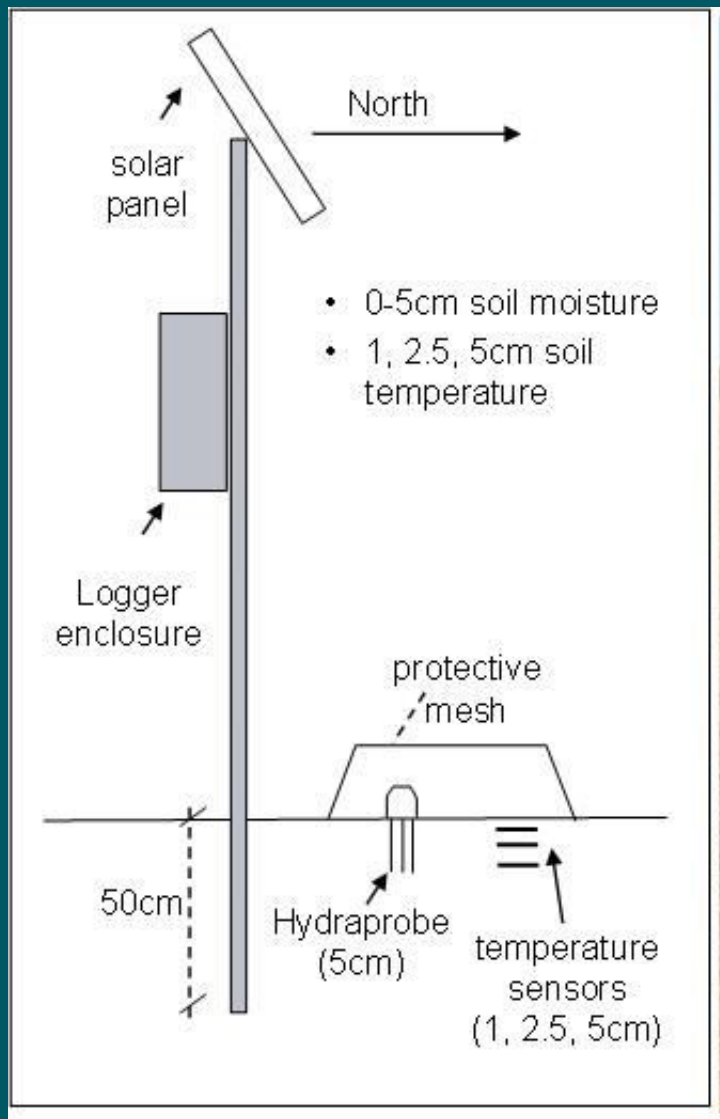
The original 18 - CS615 field monitoring stations were installed in spring 2001. The sites were chosen to cover the whole catchment with intensive study groupings of 5 sites in each of the Adelong and Kyeamba Creek sub-catchments.

Later CS616 Monitoring Stations HydroGRACE



An additional 20 - CS616 field monitoring stations were installed in spring 2004. These were located in the Yanco and Kyeamba Creek districts and arranged approximately within a 60km x 60km study area.

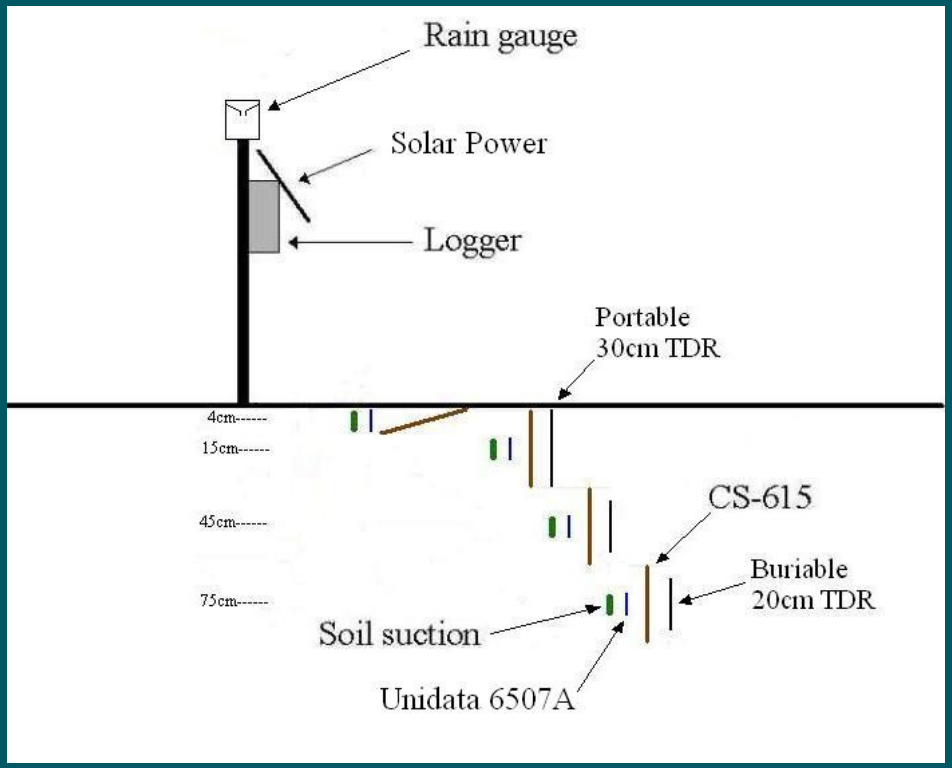
Recent Hydra Probe Monitoring Stations SMAPEX



An additional 24 – Hydra Probe field monitoring stations were installed in the Yanco-Coleambally district early in 2010.

These were arranged in two distinct clusters, one representing irrigated crop land and the other unirrigated pasture land.

CS615 Measurement Validation



Method Used

- Temperature sensors installed to correct for temperature at each depth.
- TDR sensors were installed as an aid to CS615 calibration.
- Gravimetric sampling done to develop the calibration relationship.

CS615 General Soil Moisture Calibration Relationship

(developed by Western et al. 2000)

[redacted].4 *N*[redacted]

$$N = (P_{25} - P_{0.0}) / (P_{0.4} - P_{0.0})$$

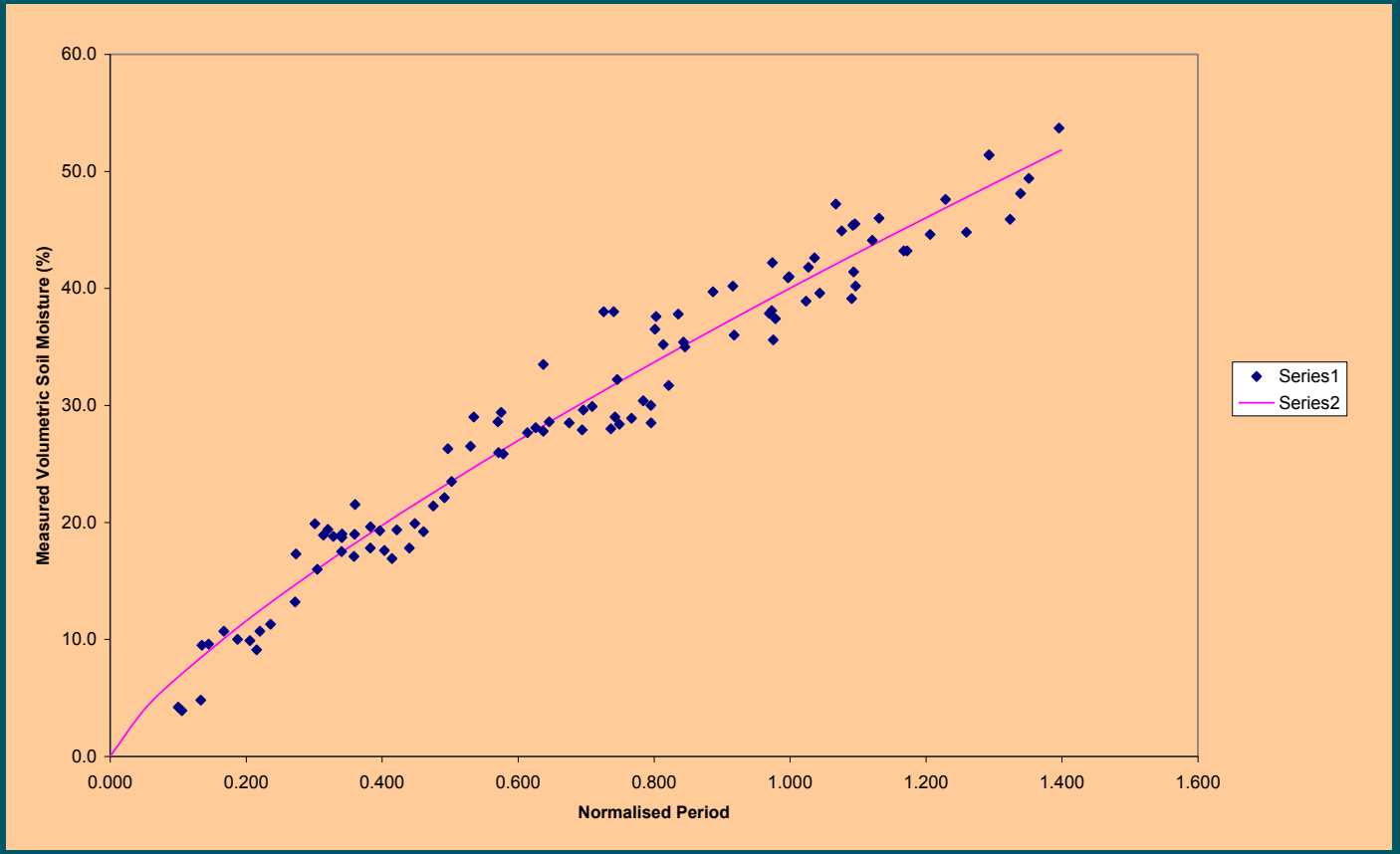
Where the temperature corrected (to 25°C) period measurement of the sensor is obtained from :

$$P_{25} = [P_{obs} - o(T - 25)] / [\ 1 + s(T - 25)]$$

Where s is the slope and o is the offset of the temperature correction function for each site :

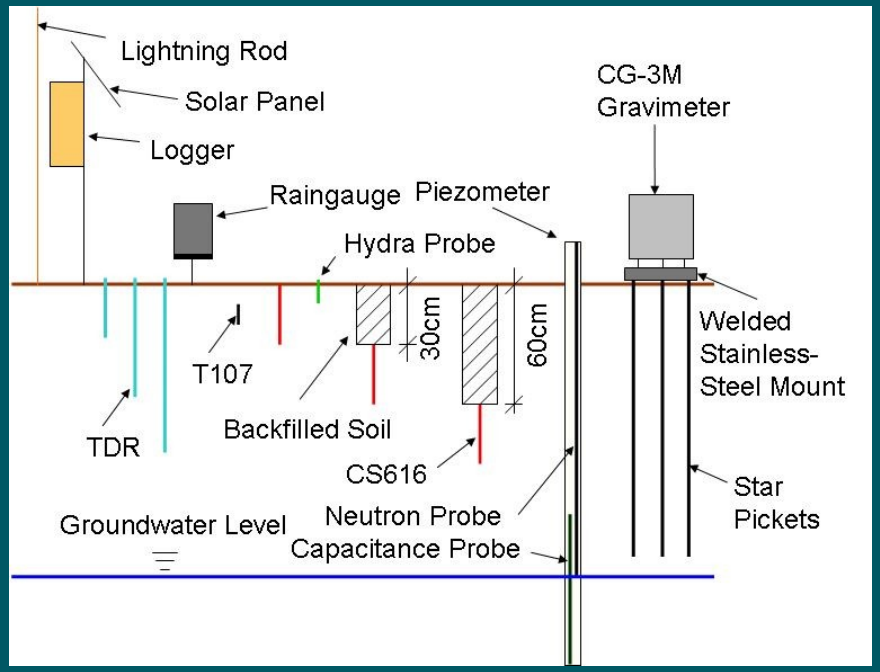
$$C^T = sP_{25} + o$$

CS615 General Soil Moisture



The figure shows a plot of the optimal normalised period N against measured soil moisture from all sites. From the high R^2 value of 0.95 and low RMS error of 2.51%v/v, the fit is acceptable.

CS616 Measurement Validation



Method Used

- Temperature sensors were installed to allow for temperature correction.
- TDR sensors were installed as an aid to CS616 calibration.
- Gravimetric sampling done to develop the calibration relationship.
- Bulk sampling for laboratory calibration study after gravimetric samples proved difficult to obtain.

CS616 General Soil Moisture Calibration Relationship

(originally developed by Rüdiger et al. 2007)

Where N is the normalised period of the CS616 given by:

$N=(P_{25} – P_{0.0})/(P_{0.4}-P_{0.0})$

<u>Three Approaches Used to Develop Calibration Parameters</u>:

$P_{0.4}$ $P_{0.0}$ (further development by Yeoh et al. 2008)

1. General calibration equation approach
2. Soil texture approach
3. Proximity based approach

CS616 Soil Moisture Calibration Summary

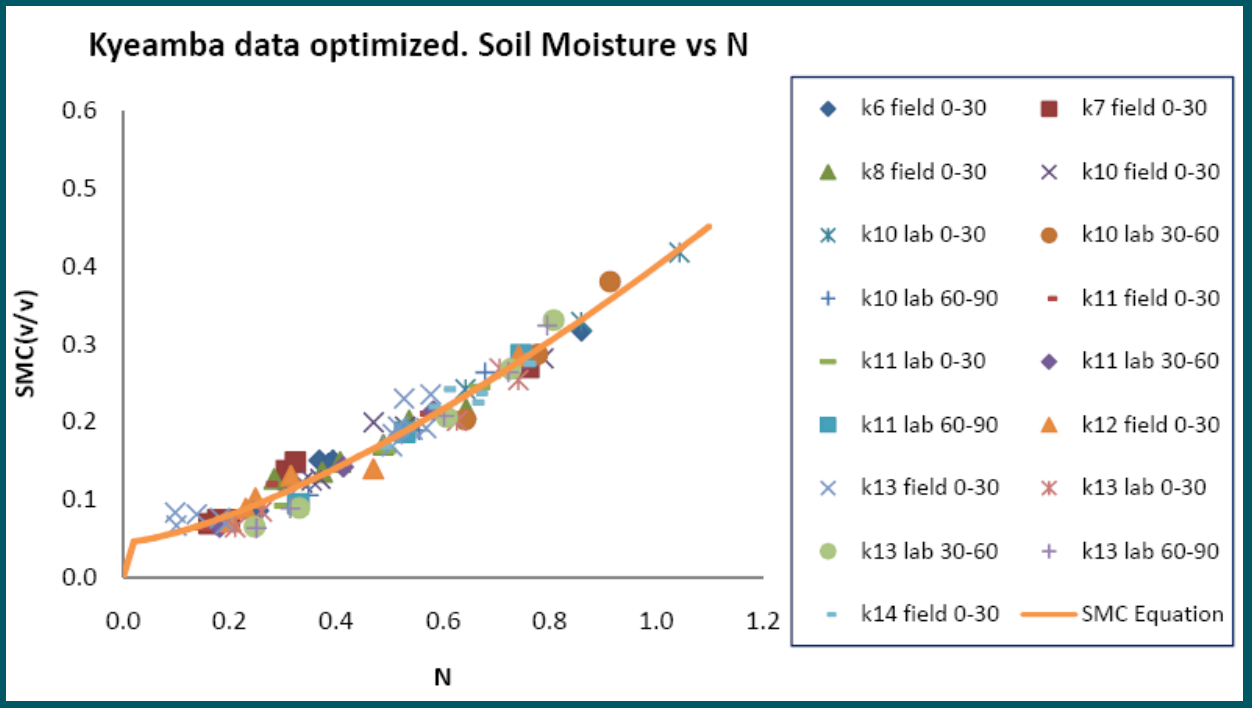
The typical root mean squared error for these three approaches, when applied to available soil moisture data, are estimated at:

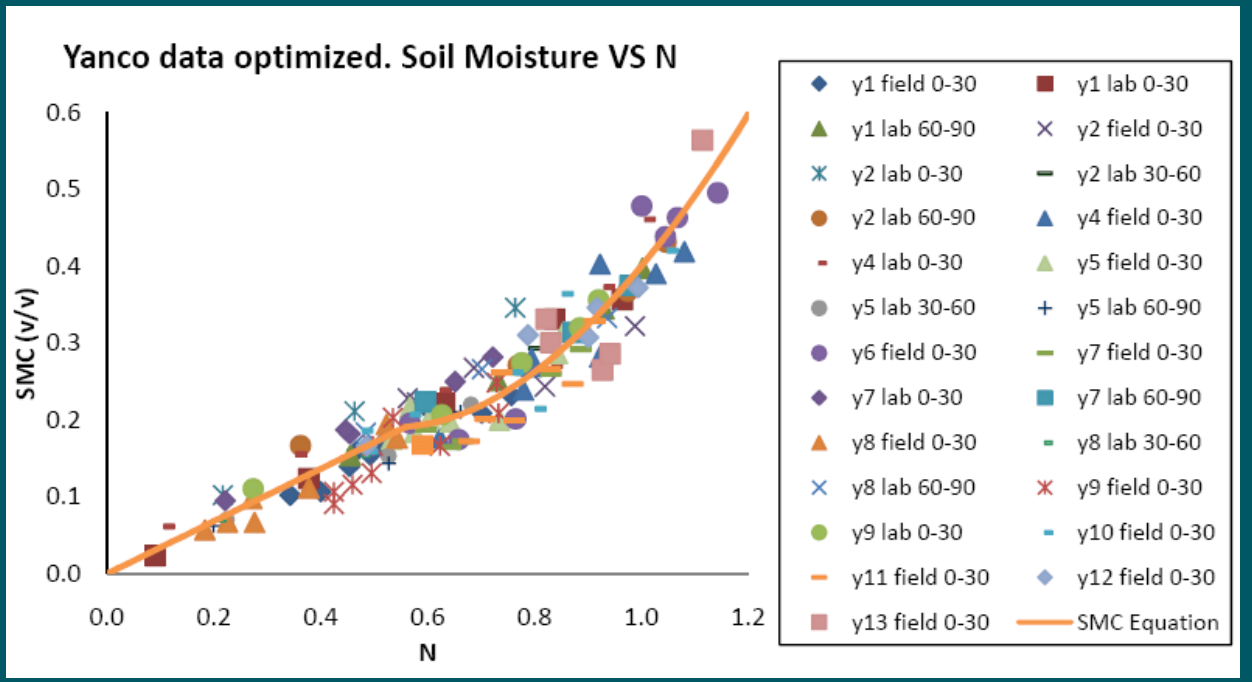
1)	site specific optimization	2.1%v/v
2)	soil texture based	5.1%v/v
3)	proximity based	3.1%v/v

However, due to the limited amount of data for development and verification of the proximity method, and an assessment with depth integrated field TDR data, it is recommended that the texture based calibration be used in preference to the proximity based calibration. The specific calibration parameters have been developed for each site.

CS616 Soil Moisture vs Normalised Period N

after optimising for $P_{0.4}$



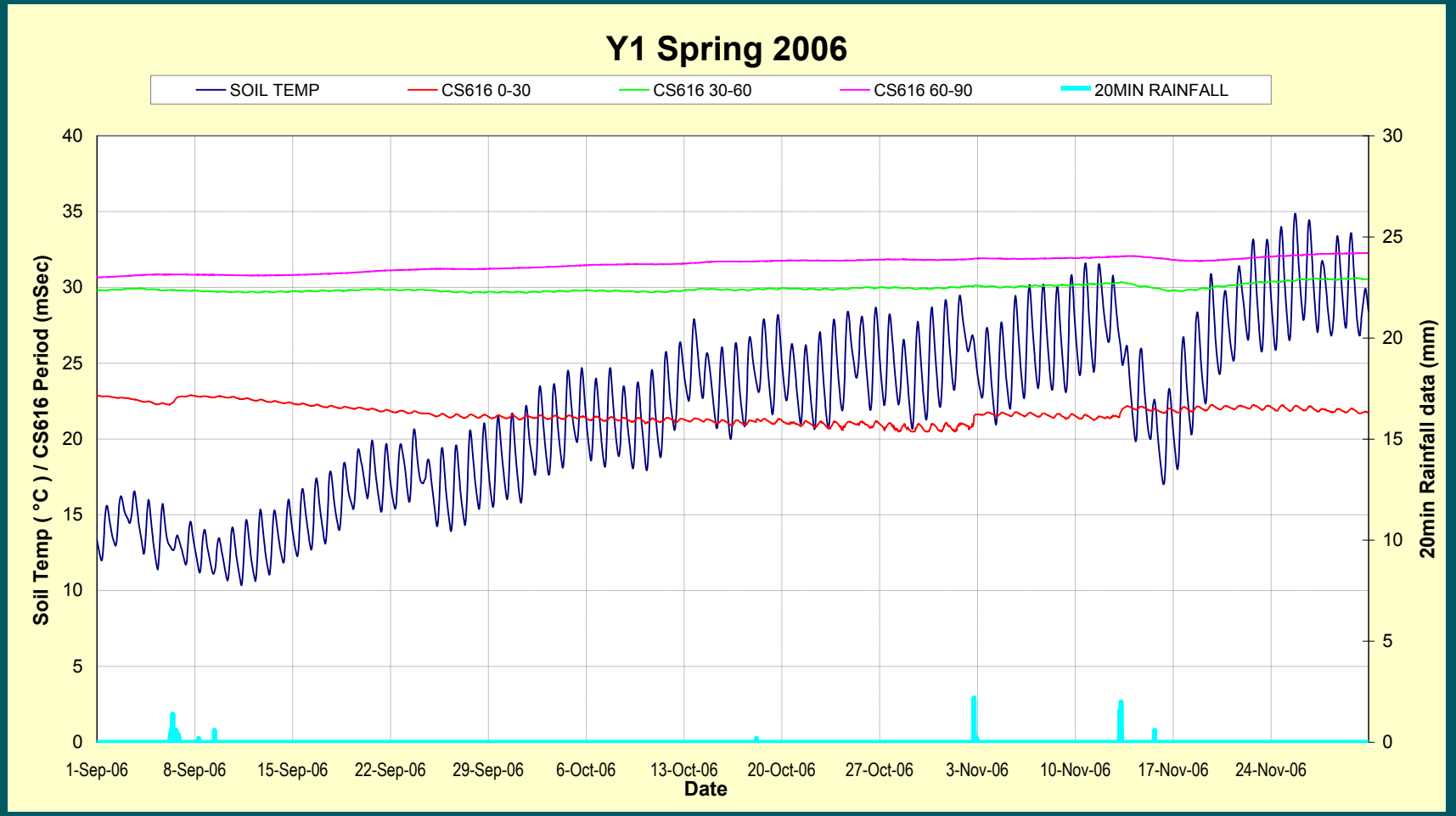


OzNet Web Site Data Availability

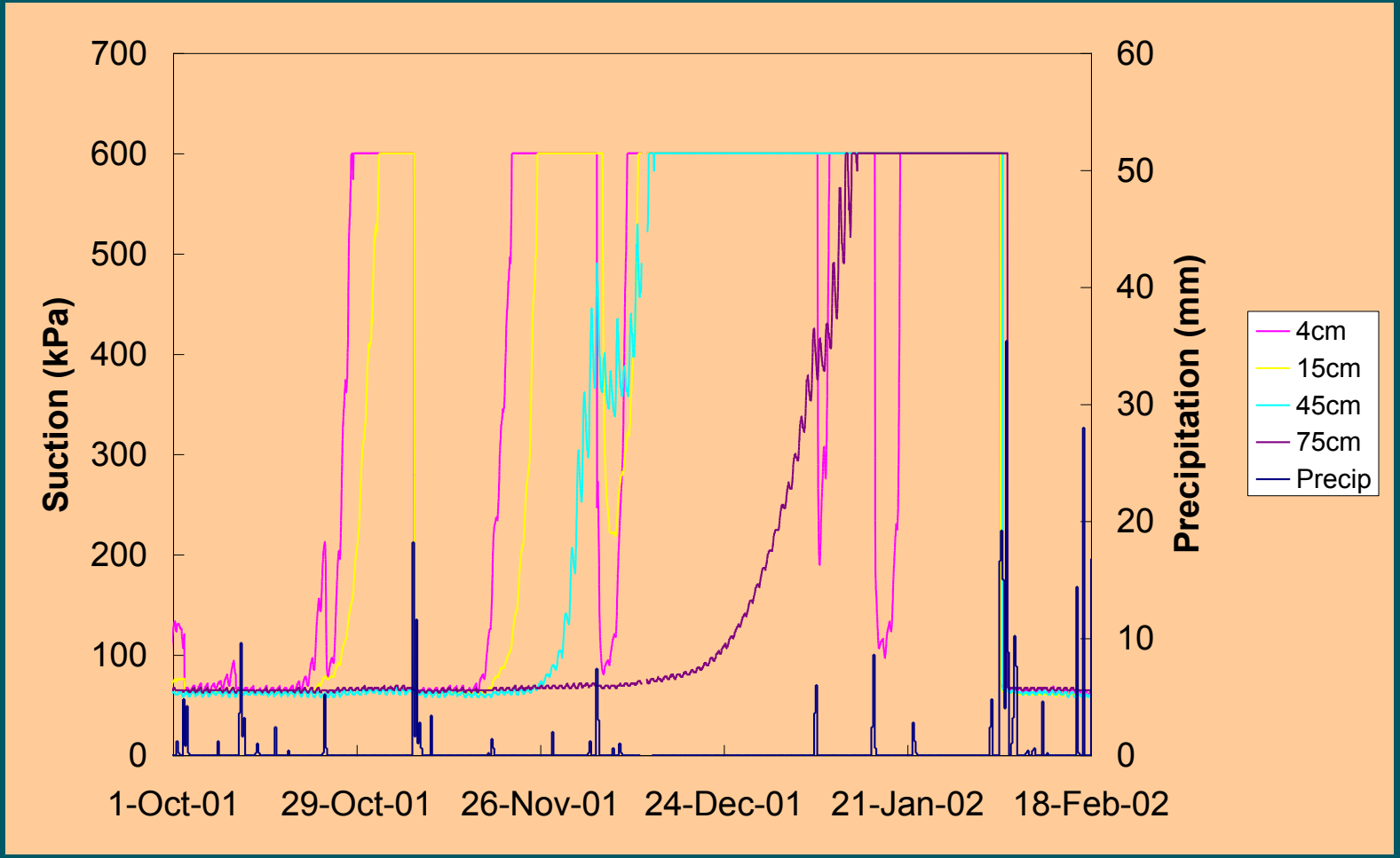
http://www.oznet.org.au

- Currently - calibrated soil moisture data is available from site installation (2001 or 2004) to end of Winter 2010.
- Full documentation of soil moisture probe calibration
- Eddy correlation raw data – available for 2005 only.
- Bureau of Meteorology forcing data

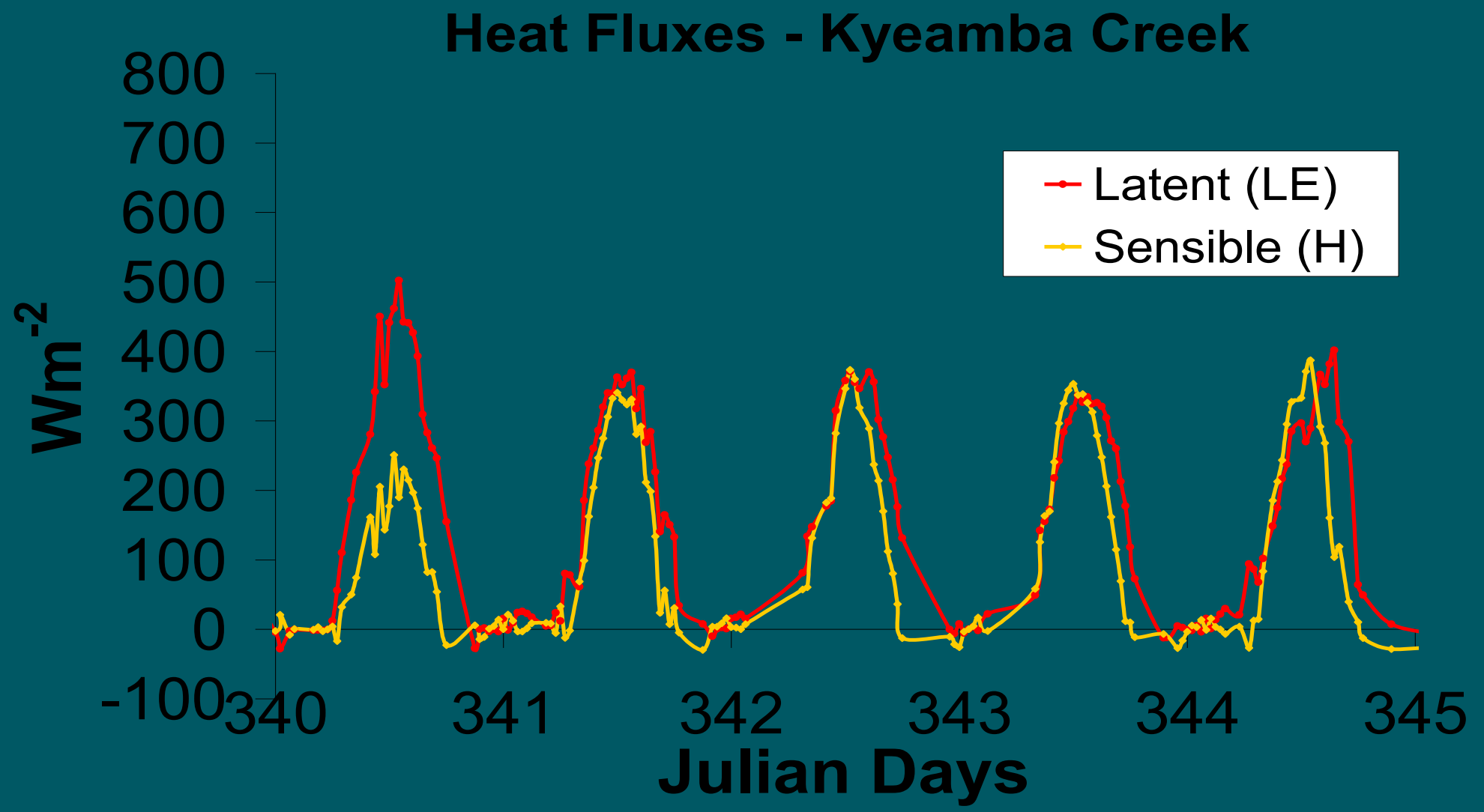
Yanco Soil Moisture & Temperature



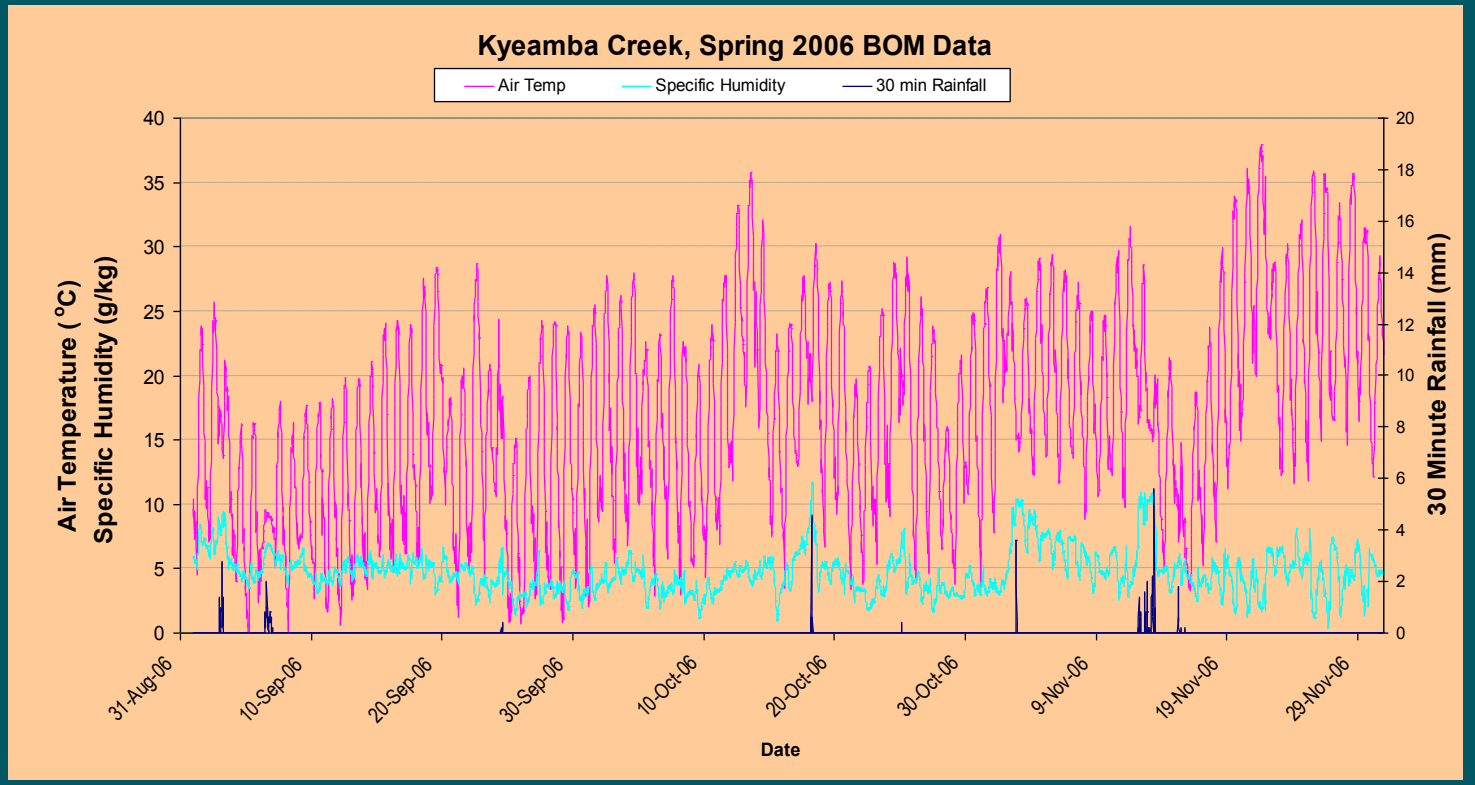
Canberra Soil Suction



Eddy Covariance Data Sample



Bureau of Meteorology Data



Forcing Data Available :

Rainfall
Air Temperature
Specific Humidity
Wind Speed
Short Wave Radiation
Long Wave Radiation


….thankyou!