

I K Caldwell Technical Services

Soil Moisture and Weather Monitoring System

1. System Overview

The system uses a GSM telemetry based platform to collect data from in-field sensors. A solar powered remote telemetry unit (RTU) is fitted to the site. The signal from the RTU feeds to a server and in turn the Adcon platform. Users then view data via any smart phone, tablet or computer with an internet connection.

2. Software

The inherent flexibility of the Pro 6 software makes it an ideal tool for displaying weather and soil moisture data. Pro 6 not only displays data graphically but informs and/or alarms the user about specific events, provides a number of tools to process the data according to your needs, be it a simple report, an advanced statistic, or disease model. I K Caldwell run their own version of this software and offer it as a service to you.

3. Accessing and Viewing Data

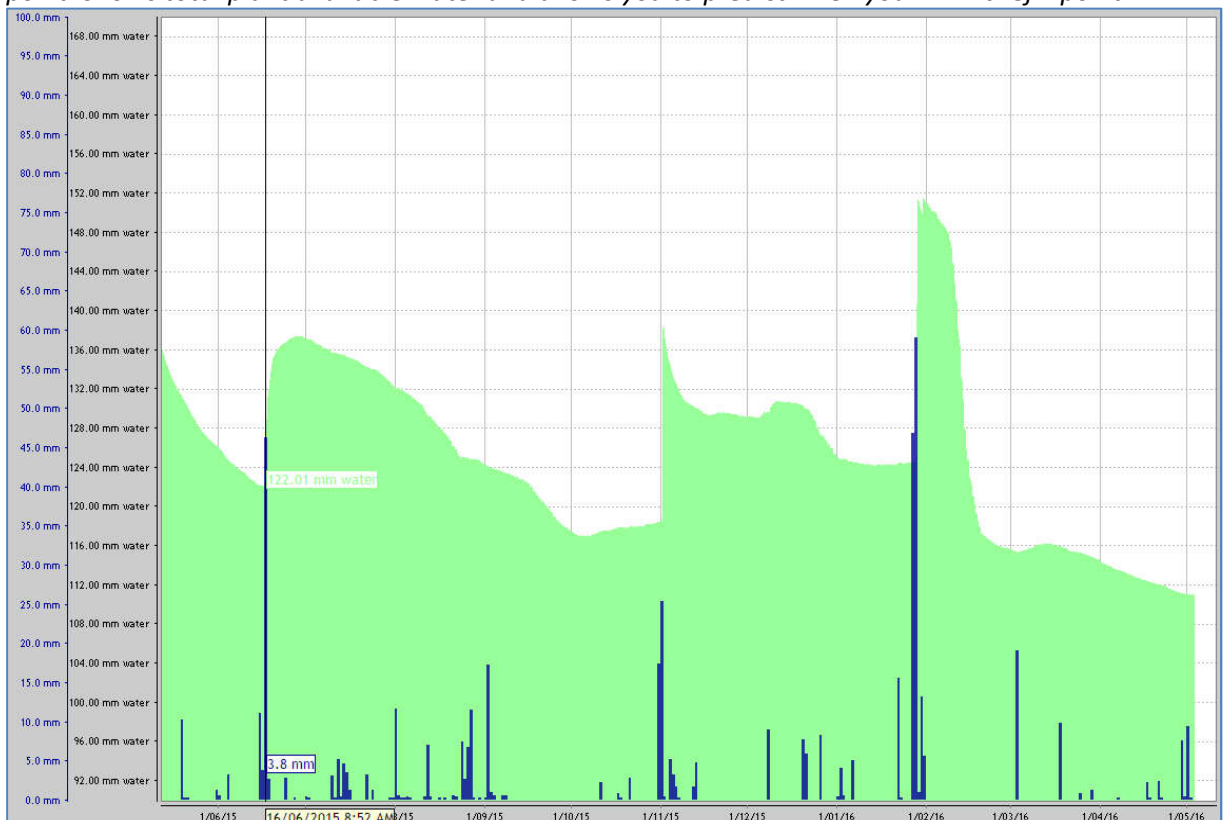
The system gives you many options when it comes to accessing and viewing your data.

3.1 Soil Moisture

Soil moisture data can be viewed as a summed, stacked or separate graphical views. Full and refill points can be added or adjusted at any time.

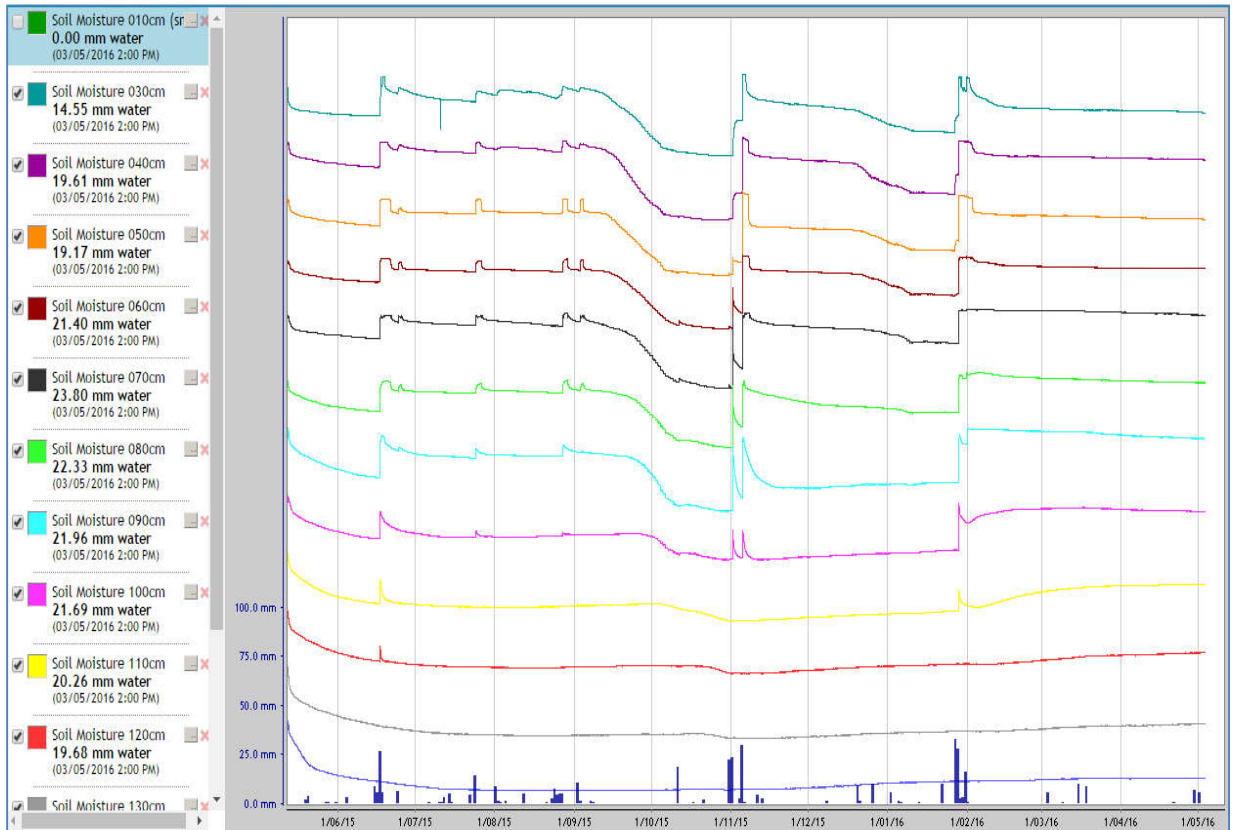
Summed graph

Shows the total value of all sensor depths and allows for the addition of irrigation (refill) point and full point. Shows total plant available water and allows you to predict when you will hit refill point.



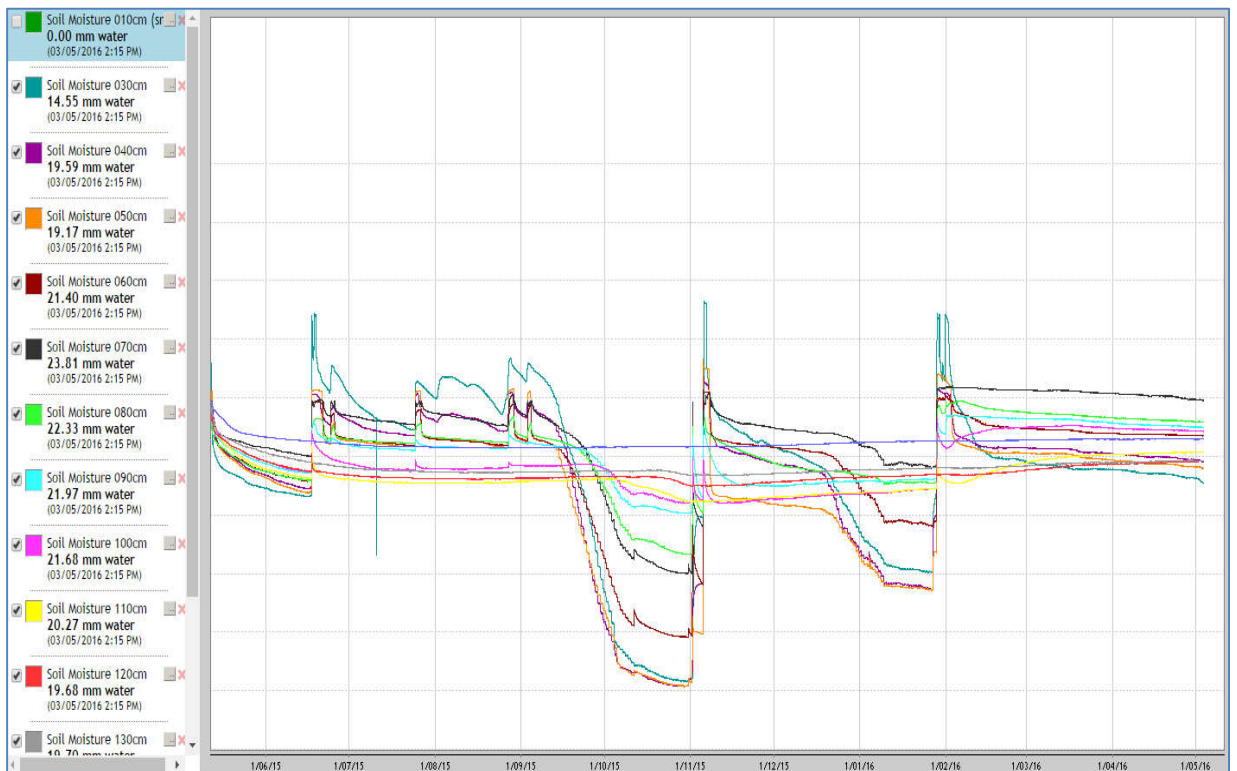
Stacked graph

Displays sensor values by depth of the sensor. Shows rainfall and irrigation penetration through the profile as well as what depths roots are using moisture.



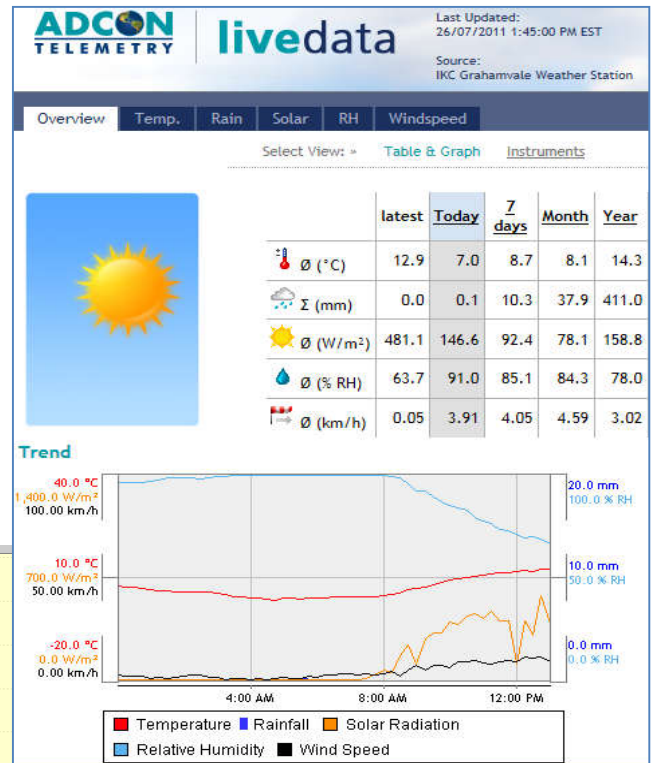
Separate graph

Displays sensor values by level of moisture. Shows how much moisture is present every 10cm relevant to other sensors.

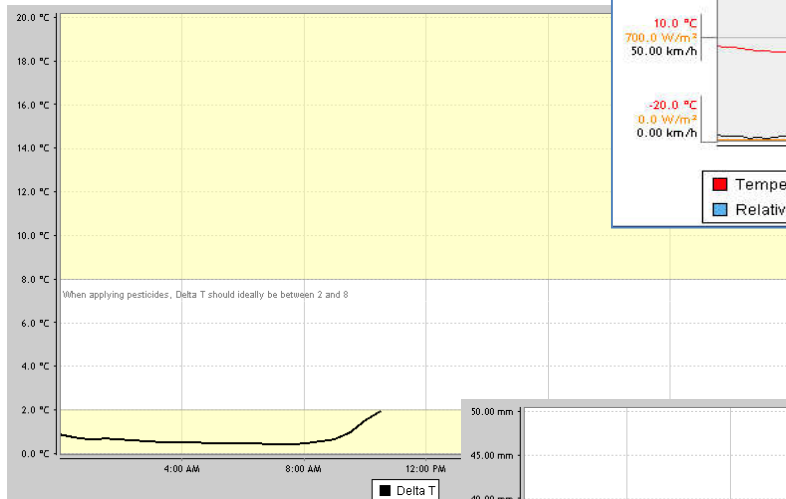


3.2 Weather Data

The Adcon platform is capable of displaying data from weather sensors such as rainfall, temperature, relative humidity, wind speed and wind direction. Like soil moisture the data can be viewed by logging into the system or by simply viewing a web page.

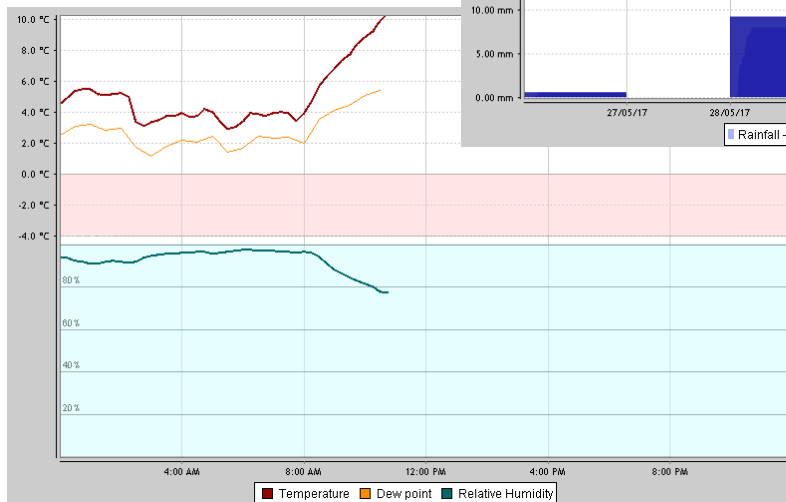
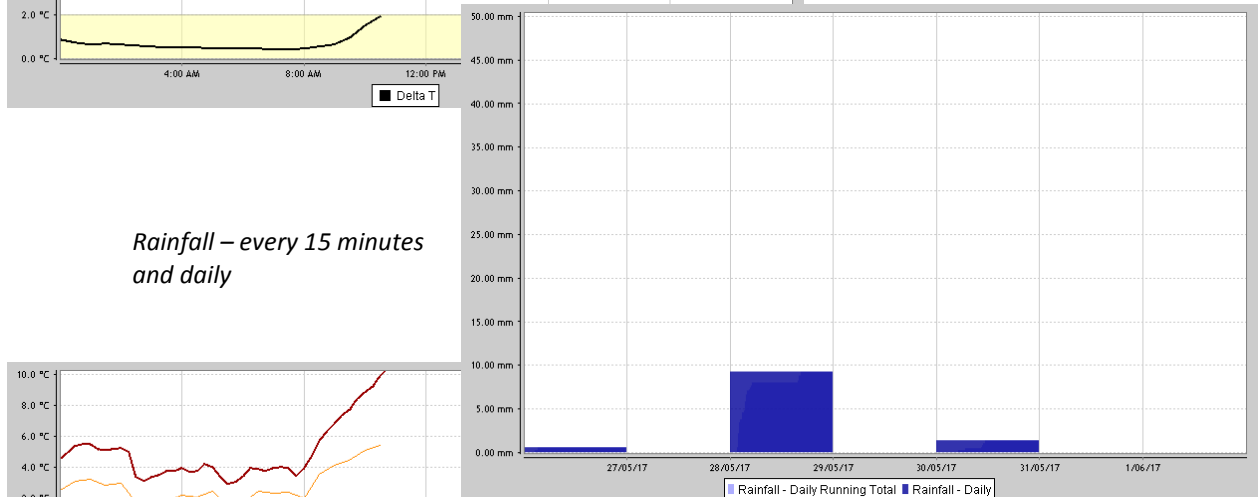


"LiveData" panel shows all weather data and statistics



Delta T model - weekly

Rainfall – every 15 minutes and daily

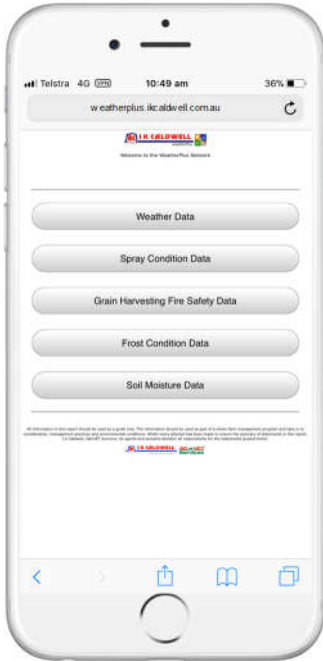


Frost graph - temperature, relative humidity and dew point

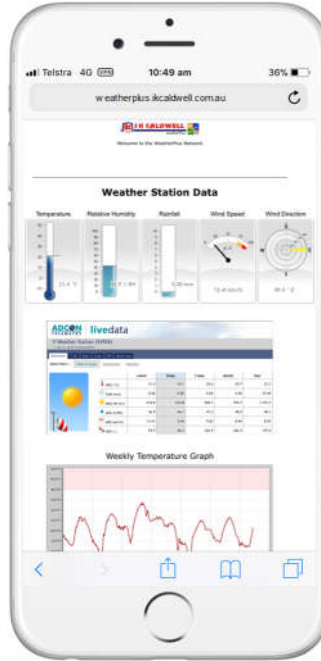
3.3 Using mobile devices

The Adcon software allows for complete flexibility in how data is displayed on mobile devices. I K Caldwell can design a web page to display graphs and instruments, that enables access to multiple sites from the one screen (as seen below). This can be viewed on any smart phone, tablet or computer with an internet connection. No log in is required.

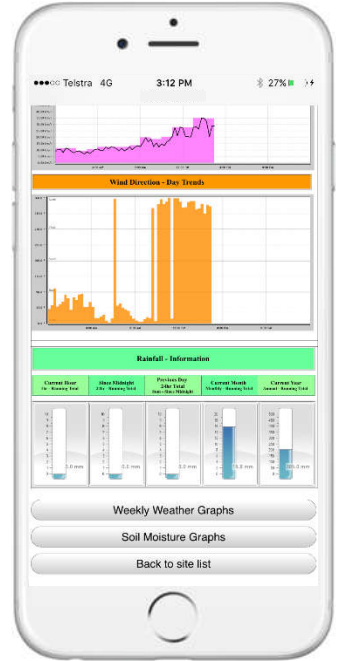
Multiple site locations for a grower group.



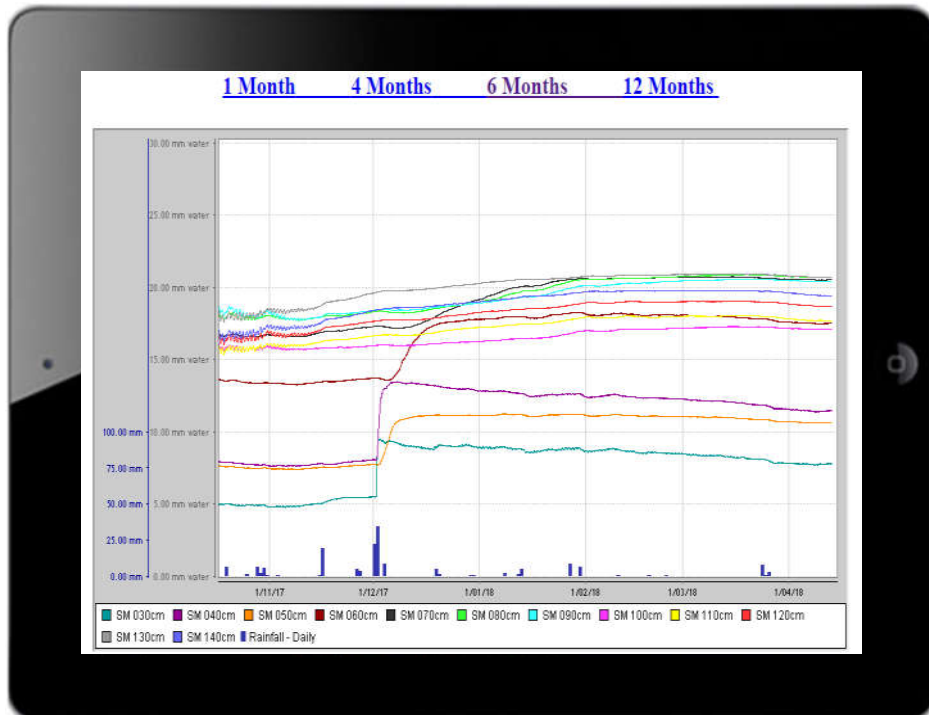
Instruments displaying latest readings.



Graphs showing weekly historical readings.



Soil moisture graph with the option of 1 month, 4 month, 6 month or 12 month view. Only one click required



4. Hardware – In the Field

Hardware in the field consists of three main components – the remote telemetry unit (RTU), the soil moisture probe and the weather sensors.

4.1 The RTU

The telemetry unit is a standalone unit that collects data on a scheduled basis and sends this data via the mobile phone network to the Adcon software. The unit is powered by a solar panel. Should the mobile phone network go down no data will be lost as the telemetry unit has plenty of internal memory.

- Compact, tough and easy to install.
- Units are compatible with a number of soil moisture probes, weather sensors and water meters.
- Next G communication with SIM card and Telstra data plan supplied as part of the hosting fees.



4.2 Soil Moisture Sensors

Adcon supports a wide variety of soil moisture probes however I K Caldwell use the sub surface EnviroPro probe.

The EnviroPro Probe is a sub-surface probe that can be completely buried along with the cable. It is a fully sealed and potted unit preventing any moisture incursion making it virtually maintenance free.



It is available in lengths of 40, 80, 120 and 160cm and has sensors every 10cm down the length of the probe. It measures soil moisture and soil temperature as standard, with an option of measuring soil EC. This probe is ideal in situations where the site needs to be trafficable i.e. spray units etc. and has a 5 year warranty.

4.3 Weather Sensors

The Adcon system is compatible with almost all weather monitoring sensors - temperature, relative humidity, precipitation, wind speed, wind direction, solar radiation (pyranometer), leaf wetness, and barometric pressure.

Right is an example of a weather station (and soil probe) installed in a dryland situation. This particular site measures temperature, relative humidity, precipitation, wind speed, wind direction and soil moisture.



5. Additional Information

- The Adcon equipment comes with a 12 month warranty.
- EnviroPro probes come with a 5 year warranty.
- Weather sensors come with a 12 month warranty.
- This system requires a Telstra mobile network signal at the site (at least 1 bar).
- An Exemption-Disclaimer form must be completed before I K Caldwell can host data on your behalf.