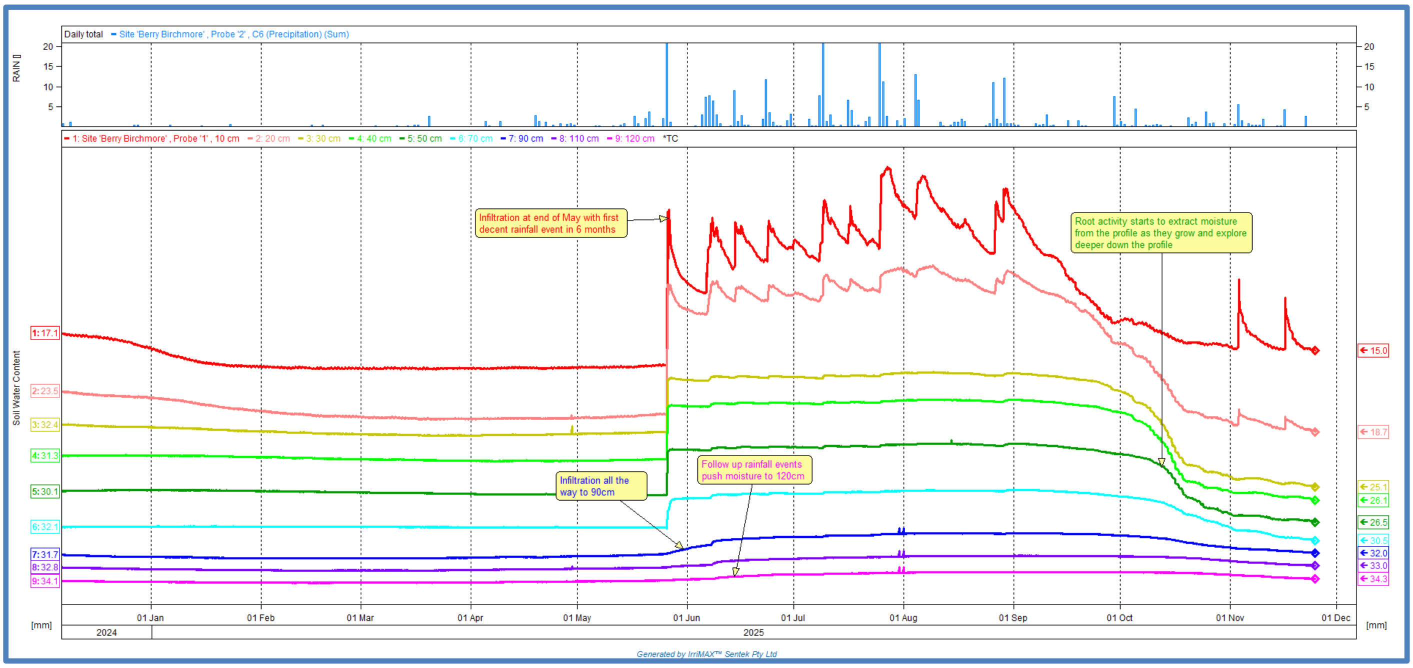
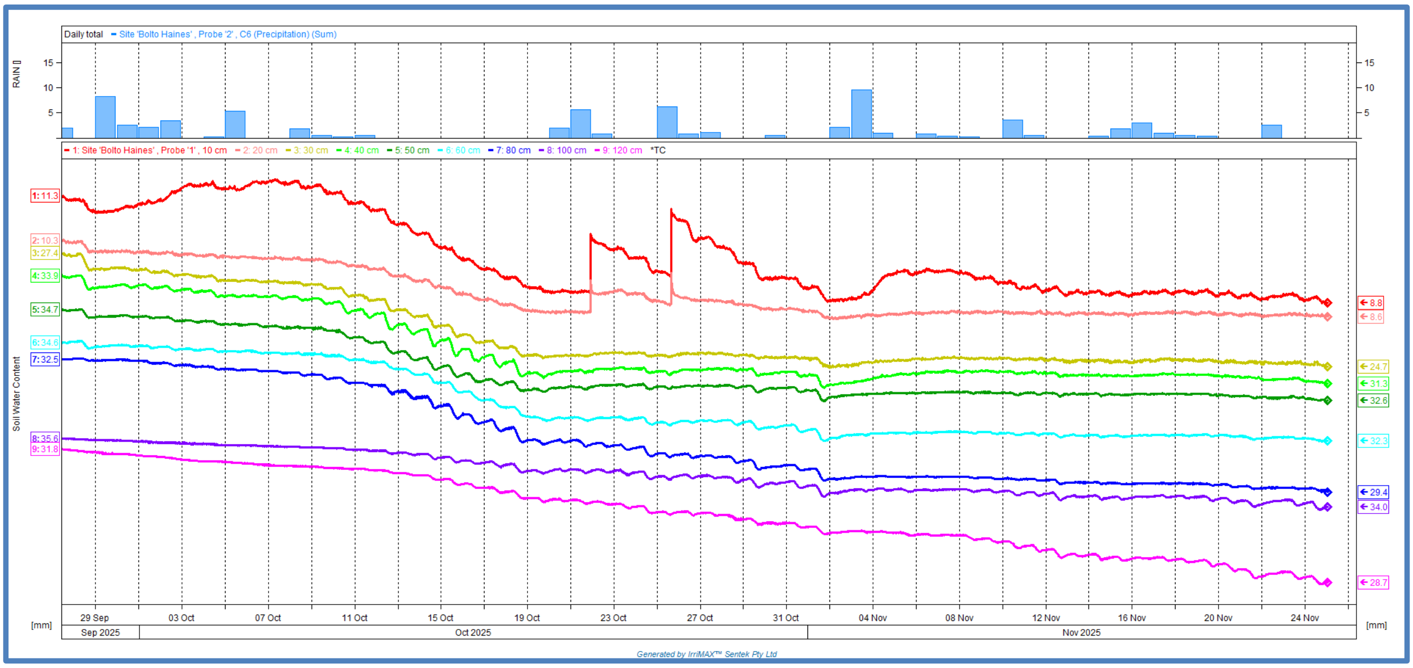
Kangaroo Island soil moisture probe graph interpretation

Berry Birchmore stacked graph, 365-day view



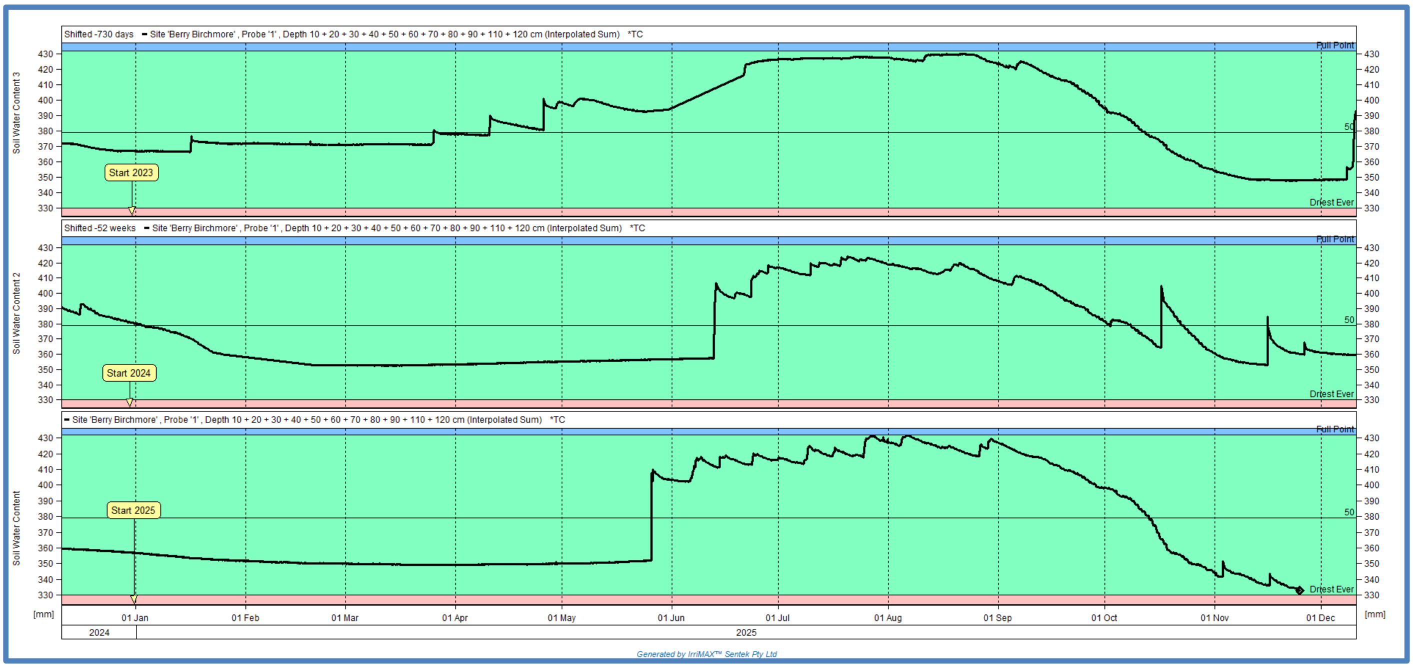
This is a 365-day view and has figures on the LHS and RHS of the graph. These figures are mm of soil moisture and the ones on the left show the figure at the start of the line (365 days ago) and the figures on the right show the current readings. This gives you a good idea of what soil moisture was at depth last year and what is it this year. This graph is a good way to get an overview of the depth of infiltration from rainfall events throughout the year.

Bolto Haines stacked graph, 60-day view



The second display also shows a stacked sensor graph, but this is zoomed in more to a 60-day view. This allows for better interrogation of rainfall infiltration to see where recent rain has soaked to. Also, during the Spring time, it shows where roots are active with *diurnal fluctuation* occurring as the daily 'steps' that occur when plants are photosynthesising and extracting moisture via their roots. In the case of this graph, the pasture roots are active to 120cm (pink line) from mid-October. Different species will have different rooting depth – typically cereals/grasses and canola will access deeper moisture, whilst pulses will be shallower.

Berry Birchmore summed comparison graph, 365-day view

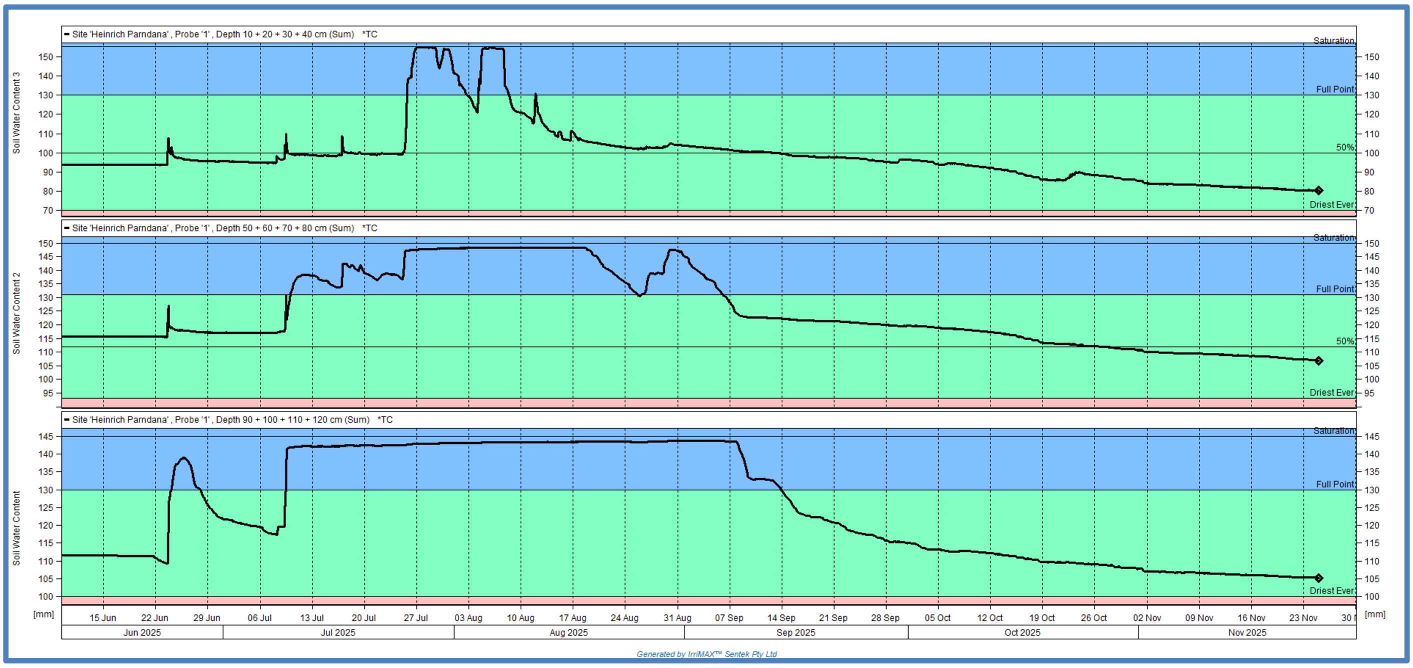


This graph is a year-on-year comparison summed graph which shows the ‘fuel gauge’ view with all the sensors on the soil moisture probe added together. With this one you will see the most current year in the bottom panel and the mid panel above it is essentially shifted back a year. The top panel is shifted back two years. This enables one to draw a line vertically to intersect the graph and see how much moisture there was at the same time in previous seasons. Once several seasons have passed and we have set the *Full Point* (drained upper limit) and *Driest Ever* (crop lower limit), we can then insert a 50% horizontal line that gives a clearer indication of moisture left in the profile.

By deducting the figure of Driest Ever from the Full Point, we can achieve a close approximation to *plant available water* in mm for the depth of the soil probe (keep in mind that roots may go deeper than the bottom of the soil probe). In this case it is 432 – 330 = ~102mm PAW for this soil type.

The steepness of the graph during the vegetative growth and grain fill period is a factor in understanding how much moisture is being used daily by the crop/pasture. The 2025 season has seen more moisture extracted out of the profile compared to the previous 2 seasons.

Heinrich Parndana summed profile breakdown

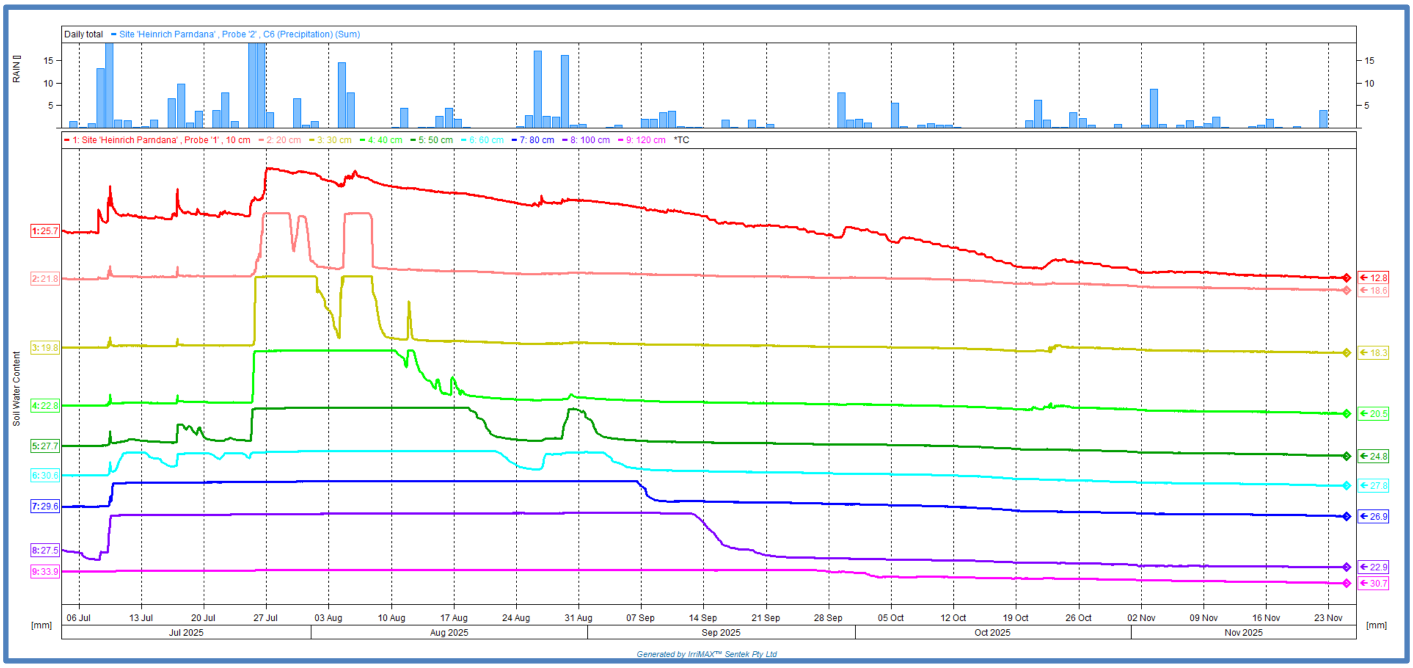


The fourth type of graph shows the sum of the various sensors going down the profile to give an indication of where moisture sits within the profile. In this graph, the 3 panels show 40cm ‘blocks’ of sensors with the sum of 10-40cm in the top panel, 50-80cm in the middle panel and 90-120cm in the bottom panel.

This gives an intuitive way of understanding how deep soil moisture is often left residual after pulse crops or oaten hay or sometimes a Summer rainfall event may soak to 50-60cm and shows as a movement upwards in the graph. Being a 365-day view, this graph shows where moisture existed at the same time last year on the right hand side of the graph.

This graph can only be set with confidence after seasons where saturation ‘full point’ and a dry spring finish with a cereal/canola crop sees ‘driest ever’ occur.

Heinrich Parndana soil saturation example



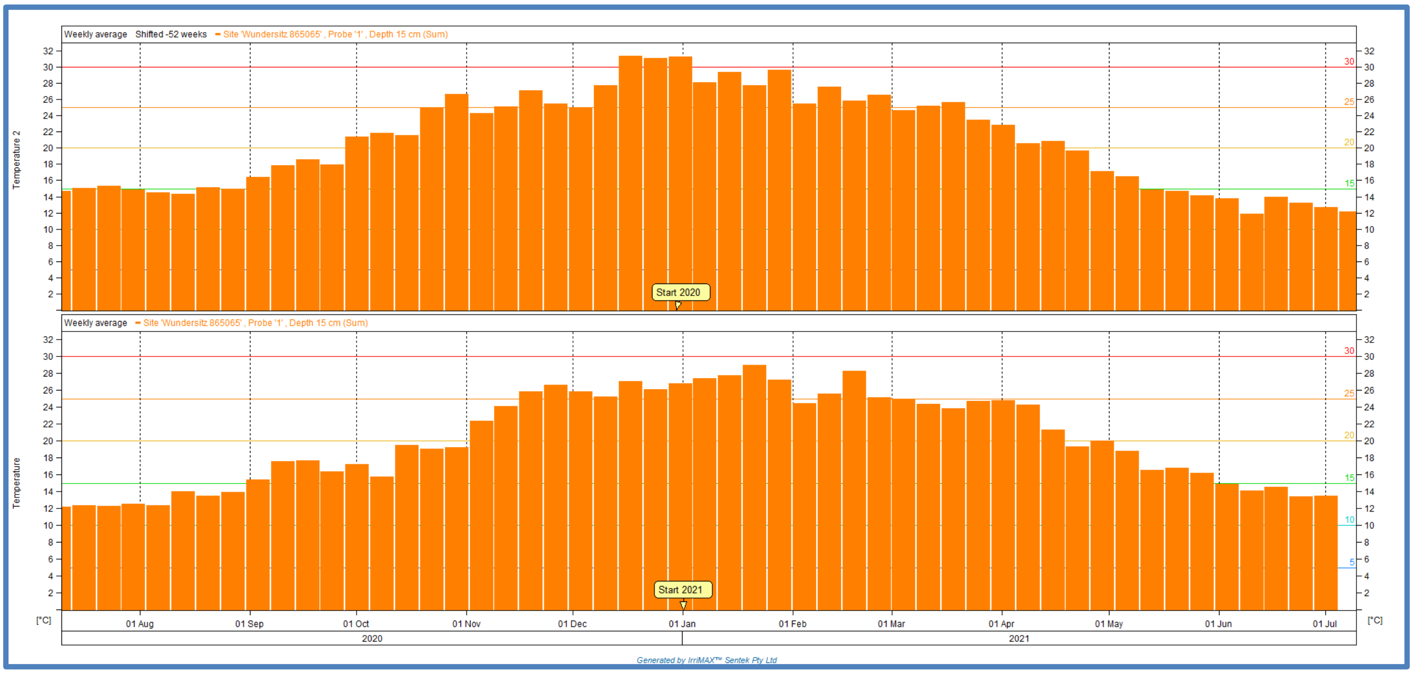
Some areas on Kangaroo Island are prone to soil saturation events during winter due to high rainfall, heavy clay sub soils and minimal early season pasture vegetative growth. The above graph shows a classic pattern of sub soil saturation working its way up to the surface.

Heavy rainfall during early July infiltrates through the dry top soil and hits the heavy clay at depth where it cannot percolate faster than it is coming from above. The lower layers reach saturation shown as a flat line which as the days progress, moves up the profile eventually reaching the 20cm sensor during late July.

Less rainfall during August sees the soil moisture infiltrate deeper and move laterally as well as pasture growth takes off, leading to increased evapotranspiration. Over the course of a few weeks, the saturation level moves back down the profile and eventually by early October, the lowest 120cm sensor shows a reduction in moisture levels after being saturated for months.

The graph is important for understanding how pastures and crops are likely to fare over the winter as the profile fills up. Due to the anerobic environment that occurs during soil saturation, minimal growth occurs and this can also lead to plants becoming sick and even dying. Nutrient uptake issues can also occur. Using the stacked sensor graph during periods of high rainfall coupled with accurate forecasting, can help users plan for rotational livestock management in order to avoid soil compaction and animal wellbeing issues on saturated soils.

Soil temperature graph, 365-day view



This graph shows average weekly soil temperature at the top sensor (10-15cm below the surface) with the date shown at the base which relates to the bottom panel. This data can give an interesting comparison of the variation of soil temperature not only over the course of a season, but also giving a comparison of temperature change from season to season. Previous seasons are shown in the middle and top panels.

Stubble load as well and air temperature conditions are the main drivers of soil temperature variation which has an impact on soil biota levels and nitrogen mineralisation. It is also interesting to track soil temperature levels after large rainfall events.