

# “Investigating the use of ‘Radiometrics’ as a potential tool to identify soil types in the South-East ”

Felicity Turner, [mf.turner@bigpond.com](mailto:mf.turner@bigpond.com),  
Glenn Bailey, Rural Solutions SA

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## Key Outcomes:

- The effectiveness of the Gamma sensor appears to depend on the geology of the area being surveyed.
- The Gamma sensor appeared to have very good correlations with clay % on the tertiary sediments, but further work is required on the Padthaway formation.

## Trial Objective:

- To see if there is a relationship between the surface texture of 60 known soil pits in the South-East and the Gamma Emmissions from a Gamma Ray Spectrometer.

**Trial Duration:** 2011

**Location:** South East Region (Various sites)

## Treatments:

Undisturbed areas around established soil pits were sampled; 3 Gamma-Radiometrics readings were taken using a GR-320 Hand-held Spectrometer. Total Count, Potassium, Uranium and Thorium Sensor readings were recorded. Surface soil samples (0-10cms) were also taken, bulked together and a sub-sample taken and analysed at CSBP laboratories for texture and pH.

It is thought that if a strong correlation can be established between the surface properties of the soil, then it will provide a good indication of soil distribution and properties, and allow an improved understanding of potential behaviour of the soil.

## Results:

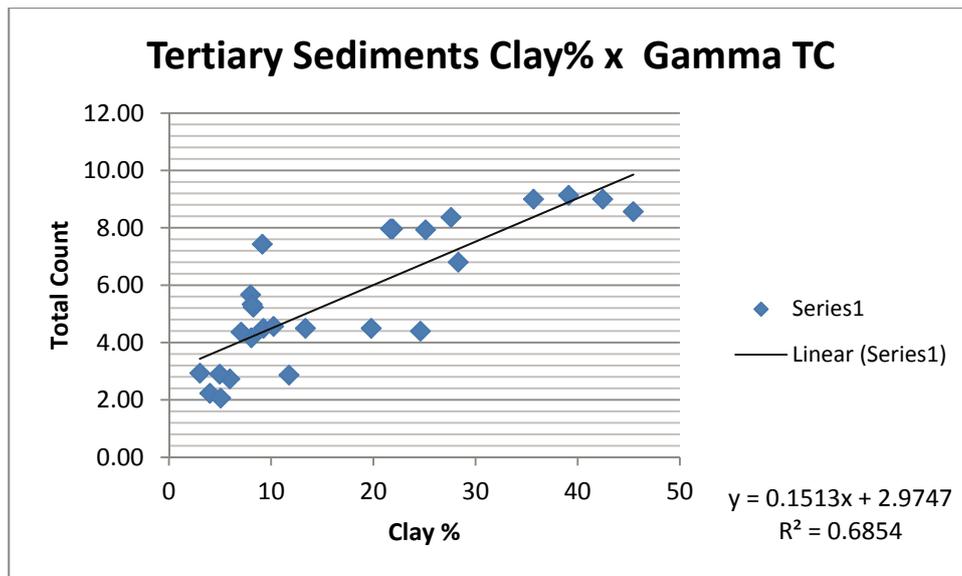
The soil data was analysed; initially the relationship between the sensors and the Clay% was there, but wasn't really strong, so the soils were split into broad geological groups to see if the relationship changed. There were 3 main geological areas identified; they were the Tertiary sediments, the Padthaway formation and the Bridgewater formation. There were also a couple of Volcanic soils sampled.

Once the soil data was split into different geologies, there appeared to be very good correlations within the Tertiary sediments between the clay% and the total count of the gamma sensors. The

relationship between surface clay % and the Gamma Sensors on the Bridgewater formation (although limited data) were also quite strong.

However the relationship between the gamma sensors and the surface clay% on the Padthaway formation wasn't very strong.

It was also found that the relationship between the Thorium sensor and the Clay% appeared to be strongest on the Bridgewater formation, whereas the Total Count and Potassium Sensors appeared to be the stronger sensors on soils classed as Tertiary sediments.



### Conclusions and Into the Paddock:

There appears to be great potential for the use of these technologies; particularly on the Tertiary sediments. Understanding how an area varies spatially has the potential to allow spatial management of both soil ameliorants and also nutrient management, as there is an improved understanding of the soils water holding capacity.

Caution does however need to be taken on the Padthaway sediments where the relationships are not as good. Further investigation within more localised areas of this formation is required to test whether a stronger relationship occurs where the sediments have a more similar origin. In some areas of the Padthaway formation - where limestone is present, EM38 has been very successful as a spatial analysis too in establishing depth of soil and subsequent water holding capacity. Further work needs to be done on the Padthaway sediments to see if Radiometrics / Gamma Spectrometry can add any further benefit.



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