Aeolian dust in vineyard soils in Australia and New Zealand: how their properties may influence wine quality

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Outline of seminar

- Introduction on Role of Terroir and incl. video on vineyard soils
- Study sites
- Hypothesis to be tested
- Background to drying curves
- Samples collected
- Results and discussion
- Conclusions

Introduction

- Terroir is a term used to define the features of a wine growing region that reflect the region's physical qualities such as climate, geology, topography, and soils. There is an increasing interest in understanding the overall role of soil properties in determining the quality of wine from vineyards (Bramley et al. 2011).

- There is also strong anecdotal evidence from Australia, Europe and New Zealand, that transported aeolian materials (parna/loess) in the soil are critically important in wine quality.

- Therefore as a vigneron being able to obtain soils with parna is important for good wine quality.

TIM KIRK

2016 Shiraz Viognier released

David Reist, September 4, 2017

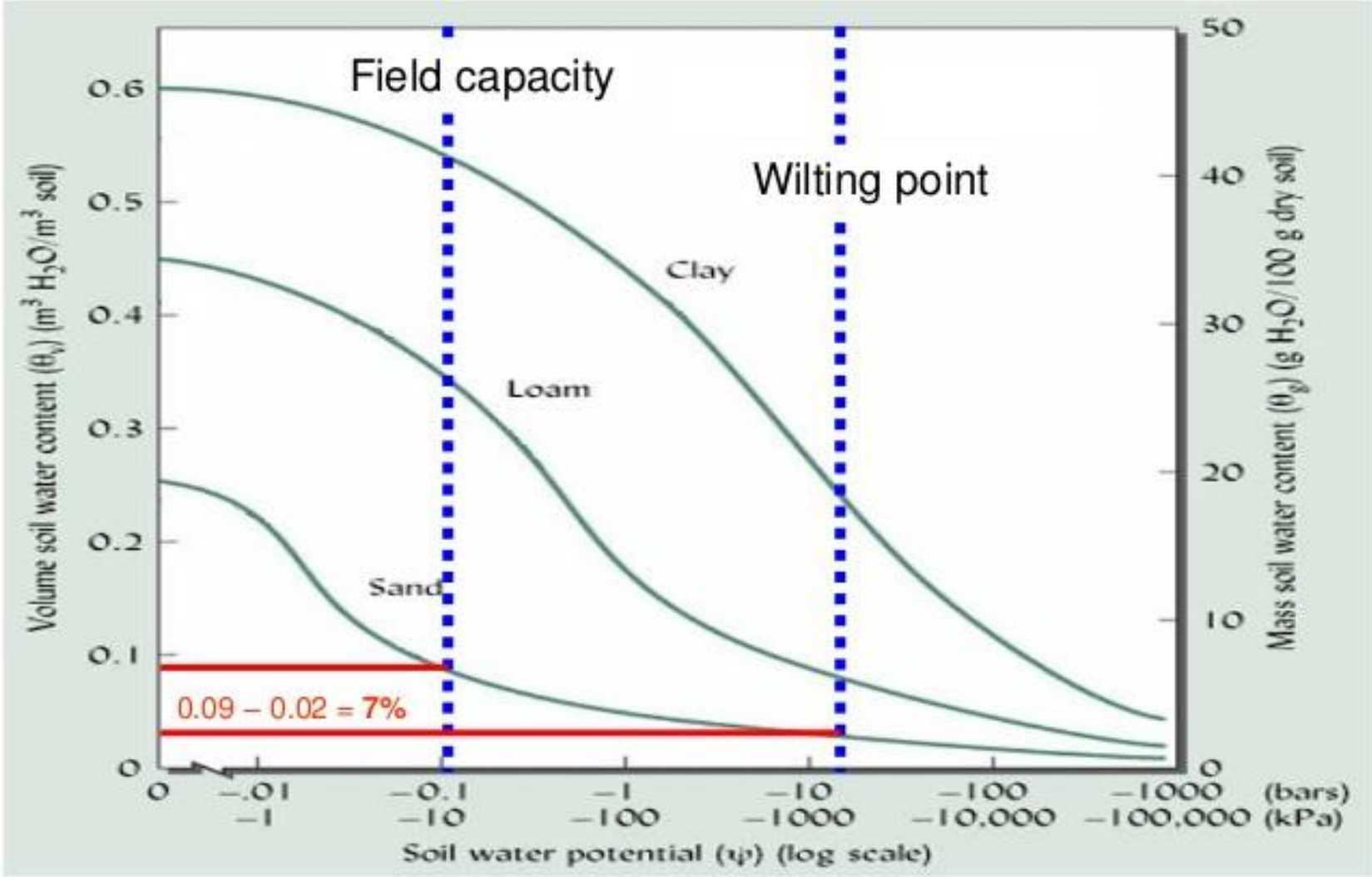
The 2016 vintage was generous and early. Late summer temperatures were consistently warmer than average and a larger than average crop proved to be a double blessing, slowing the ripening, which would have otherwise raced ahead, and filling the fermenters in our newly expanded winery with some of the most opulent, spice laden, dark berry fruit we have seen. A powerful vintage with great cellaring potential.

From deep within the vineyards at Clonakilla Tim speaks about the soil structure and its impact on the wine.

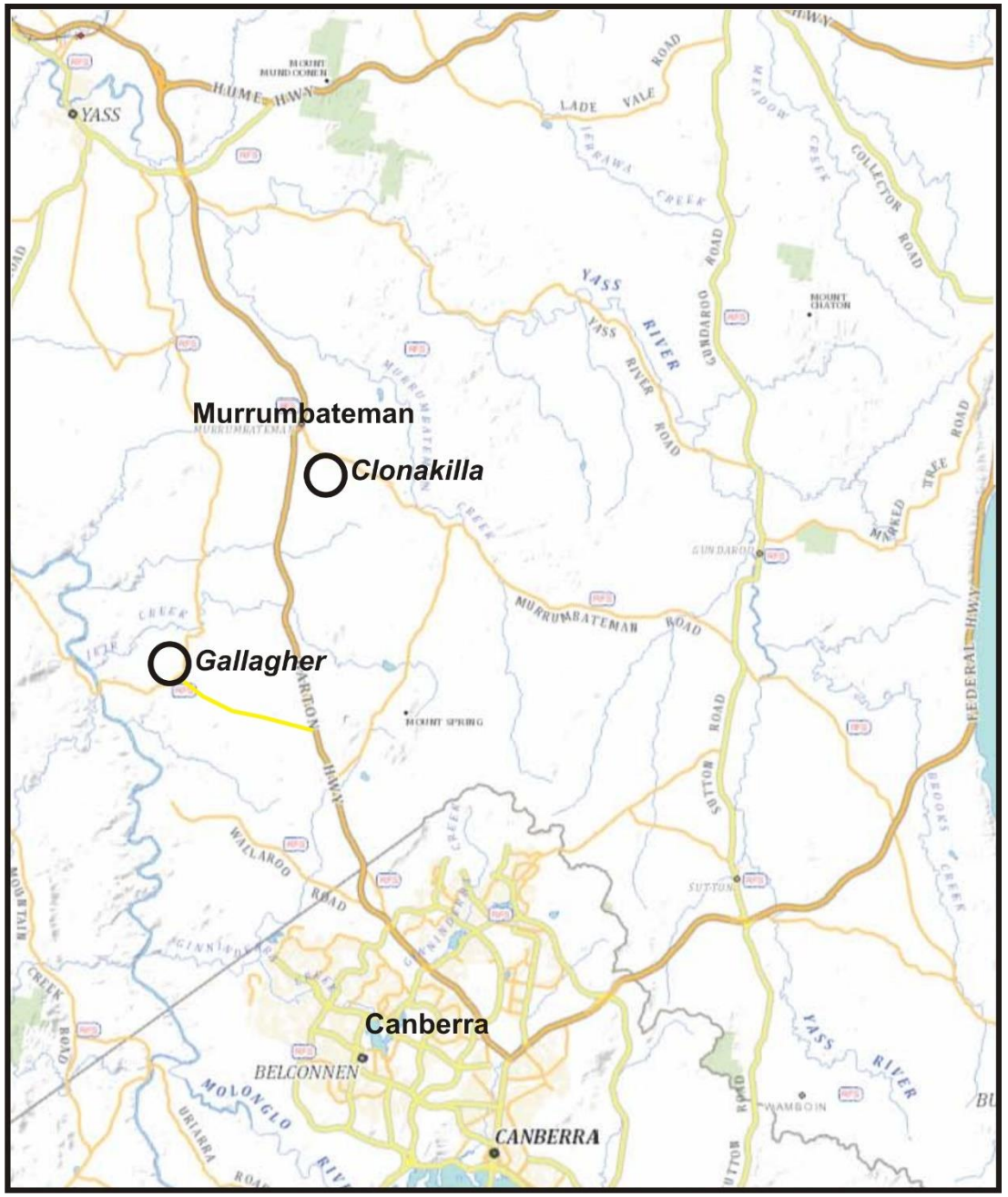
http://www.clonakilla.com.au/category/tim-kirk/

- The key hypothesis put forward in this paper is that the particle size and aggregation of the parna/loess component of these soils confers advantages to the quality of the wine produced on them. It does this through the moisture retention properties of the soil: i.e. by creating appropriate tensions during the key periods in vine ripening to create the right amount of stress for optimal production of secondary metabolites (e.g. tannins).

Different soils have different characteristic curves



Site locations Yass Valley, NSW



Vineyard soils on loess deposits, C. Otago, NZ

Loess dust storm Cromwell Valley

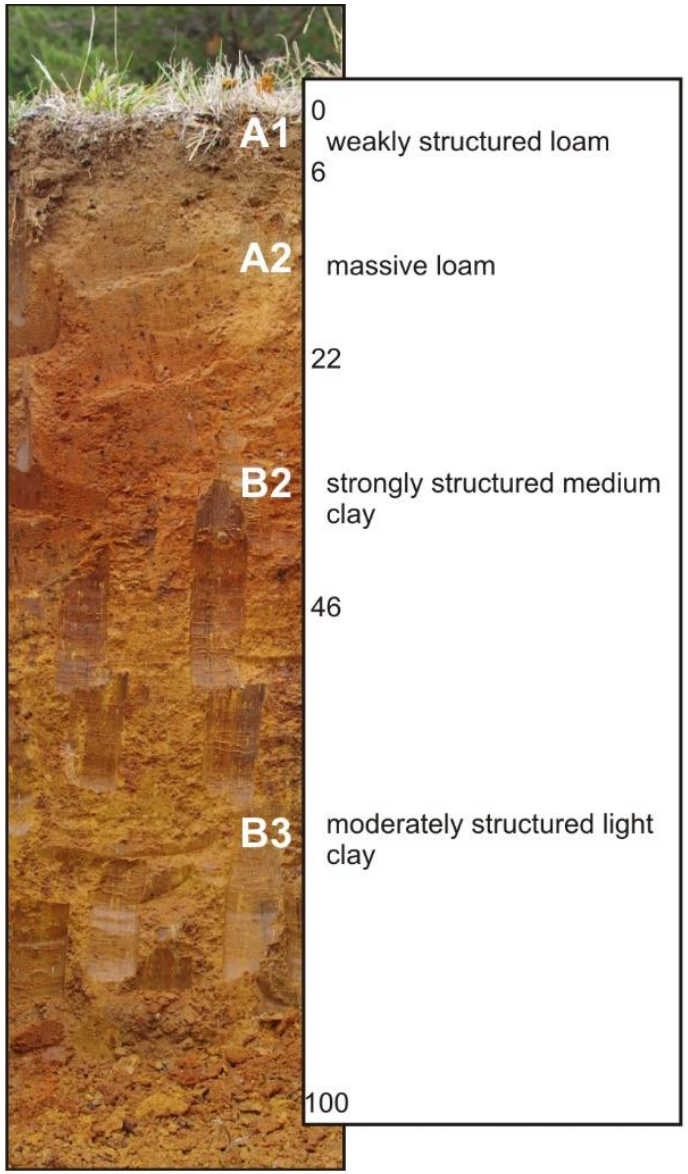
Soil sampling at Clonakilla

Ws1 Vineyard Profile

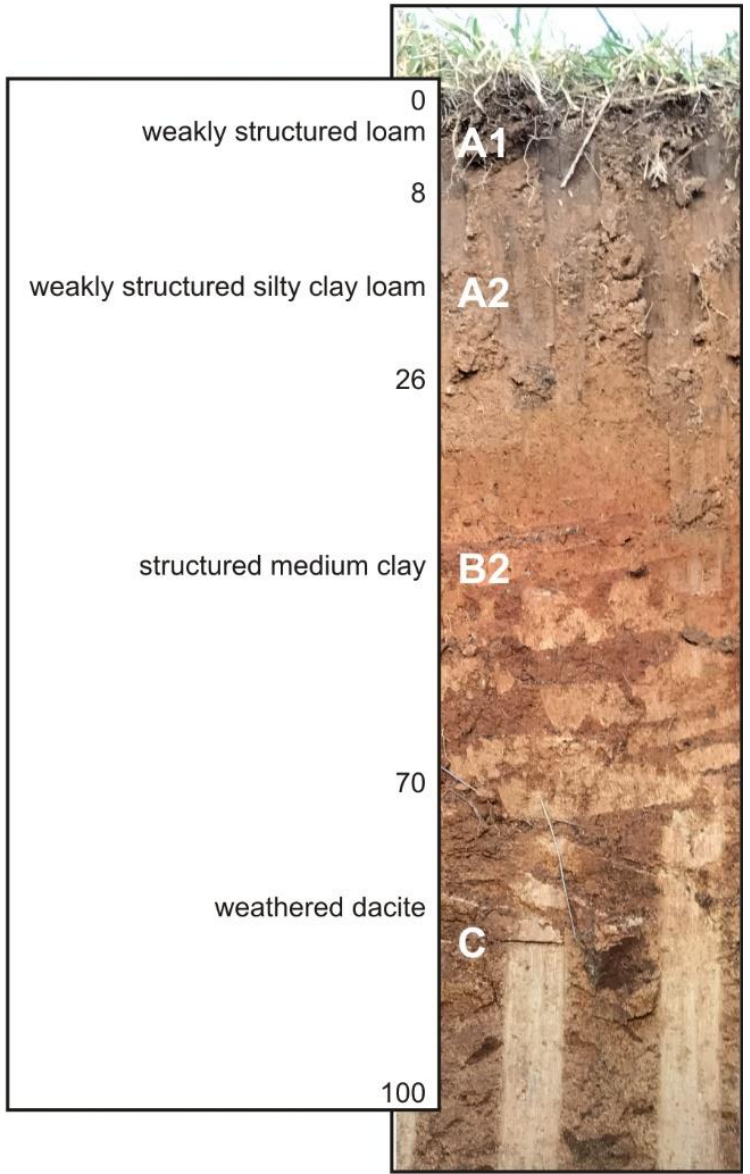
Profile 3 New Block

Profiles sampled

Clonakilla Ws1



Profile 3 New Block



Samples collected

- **Disturbed samples from profiles containing +/- parna for particle size determination (mastersizer) from Yass Valley .**

- **Undisturbed cores/cods for Water Retention Curves from Clonakilla**

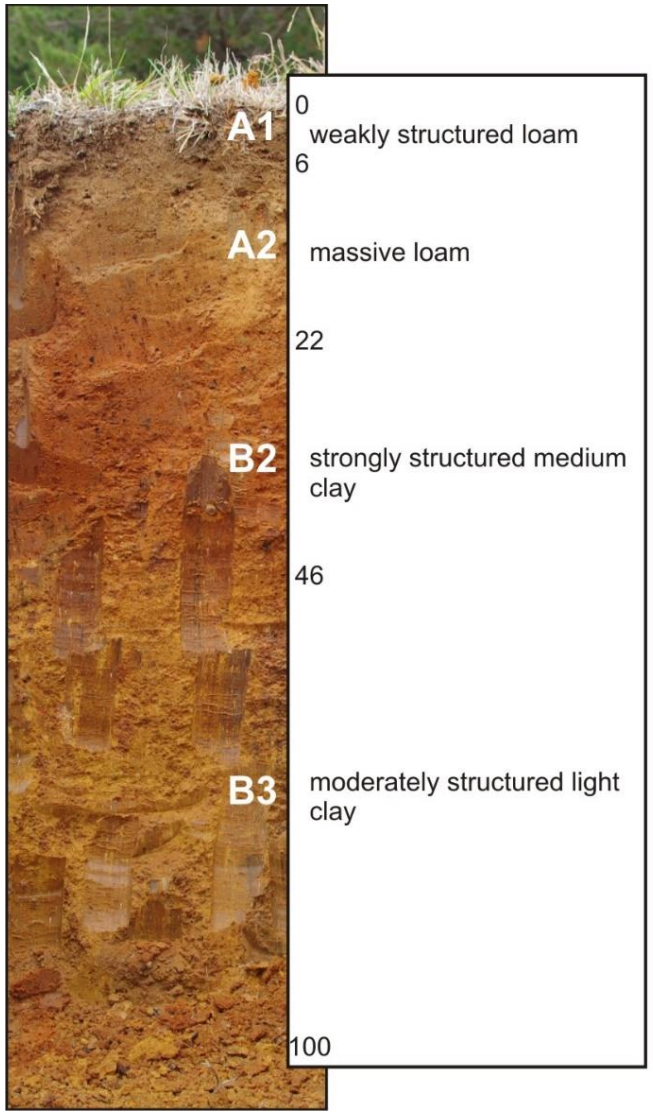
- Core 12 B3 45-90 cm Ws1;
- Core 16 B2 25-40 cm Ws1;
- Core 1 B2 26-65 cm Profile 3;
- Core 13 A2 6-22 cm Ws1;
- Core 3 A2 6-26 cm Profile 3

Clod B2 26-65 cm Profile 3

Clod BC >65 cm Profile 3

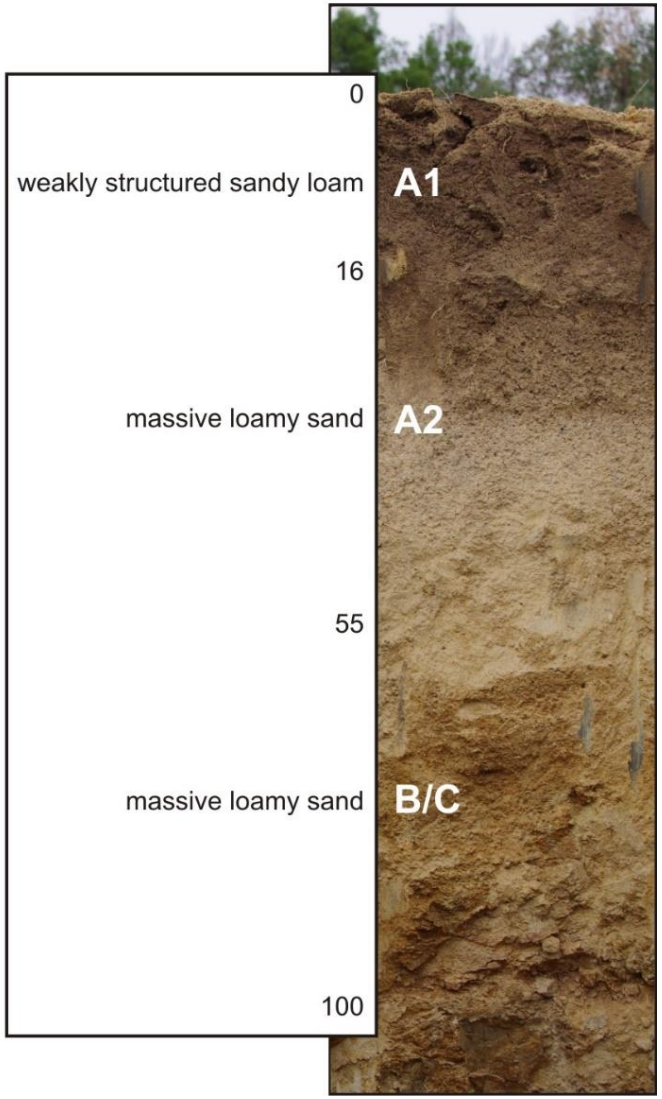
Clonakilla

Chromosol



Gallagher

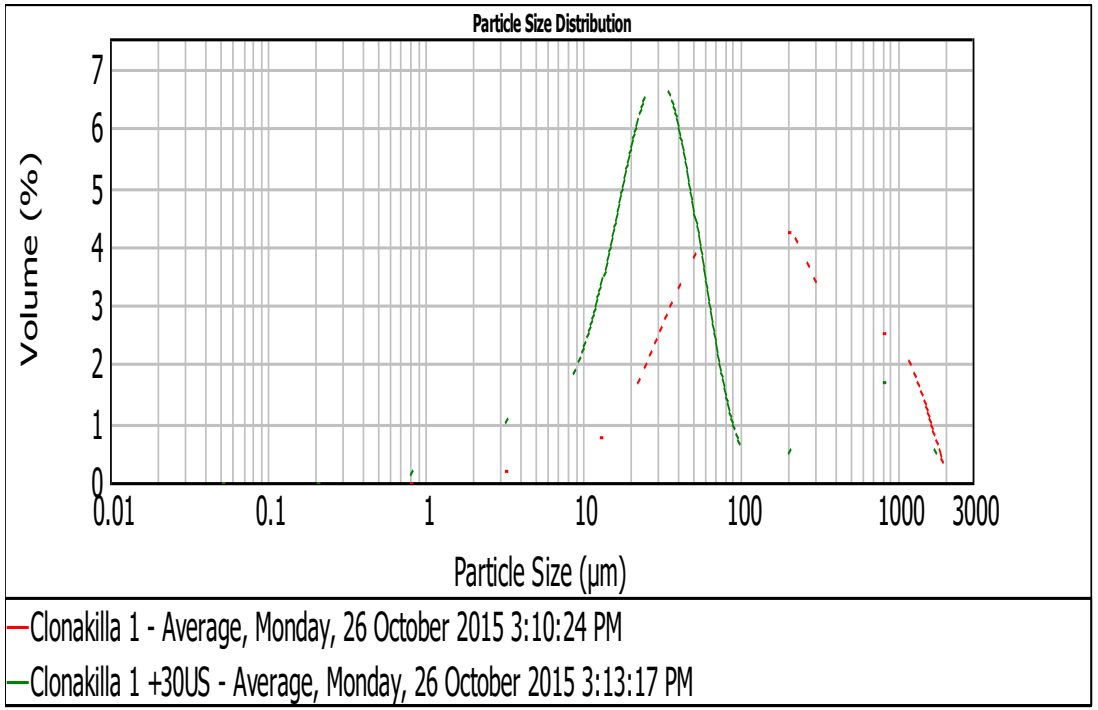
Tenosol



Results and Discussion

- (i) Particle size distribution
- (ii) Drying curves

a) Mastersizer psa results of parna horizon



b). Mastersizer psa results from non-parna horizon

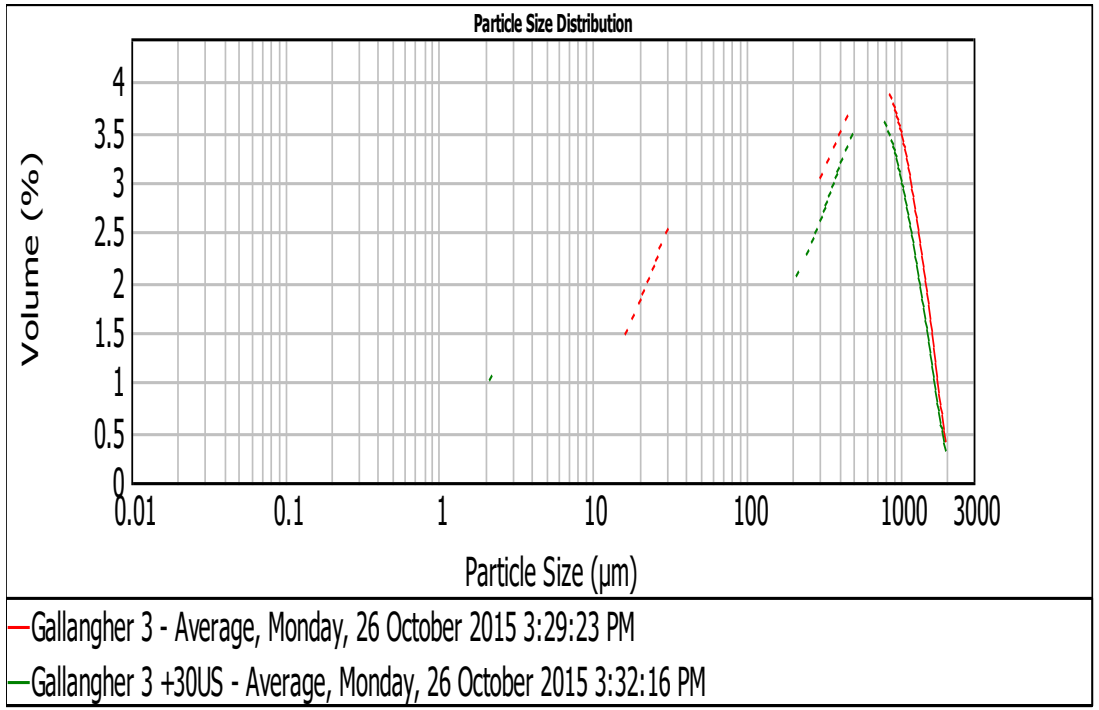
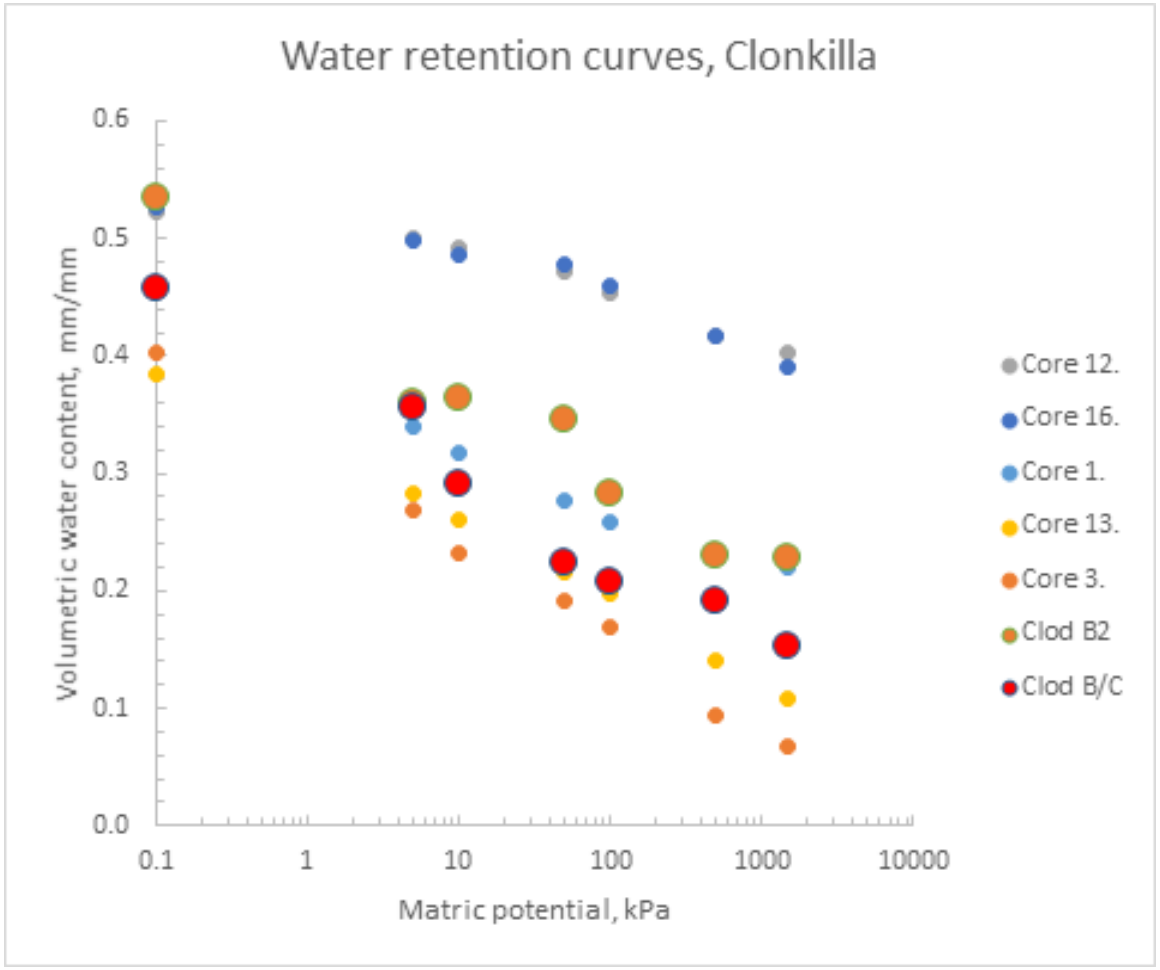


Figure 1: Water Retention Curves on soil samples from Profile 3 (New Block) and Ws1 Vineyard.

Core 12 B3 45-90 cm Ws1;Core 16 B2 25-40 cm Ws1;Core 1 B2 26-65 cm Profile 3;
Core 13 A2 6-22 cm Ws1;Core 3 A2 6-26 cm Profile 3 Clod B2 26-65 cm Profile 3
Clod BC >65 cm Profile 3



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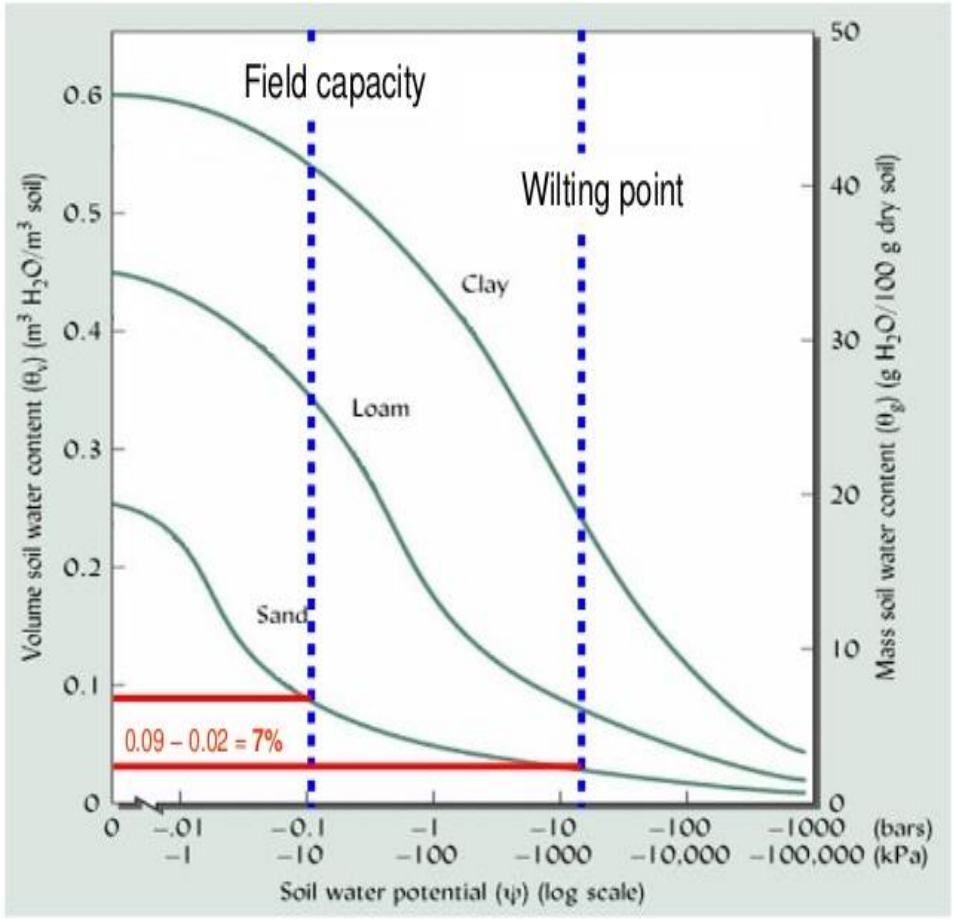
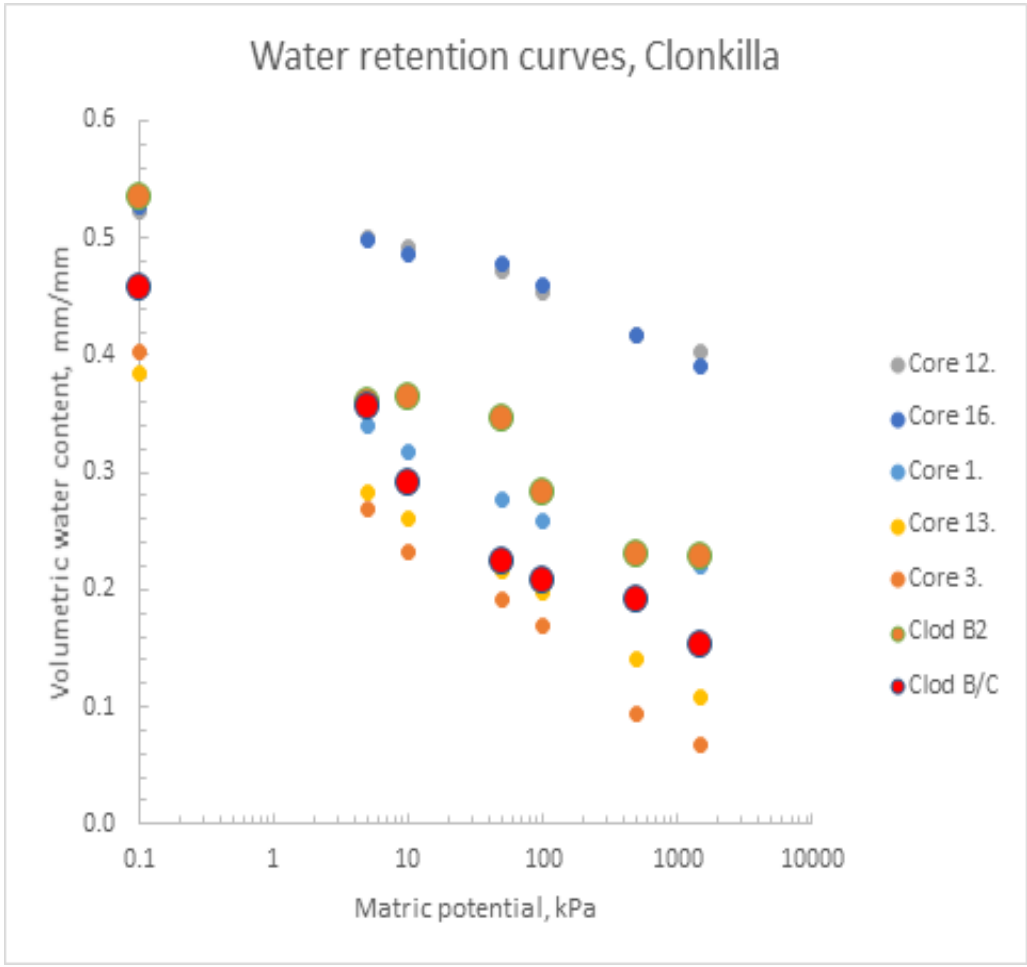
Different soils have different characteristic curves



Brady and Weil, 2002



Field Capacity, Wilting Point, and Plant Available Water Content (FC-WP) results

Sample	FC	WP	FC-WP
Core 1.	0.317	0.221	0.096
Core 3.	0.232	0.068	0.164
Core 12.	0.493	0.402	0.091
Core 13.	0.261	0.109	0.152
Core 16.	0.486	0.390	0.096
Clod B2	0.365	0.229	0.136
Clod B/C	0.291	0.153	0.138

Conclusions

- **Strong evidence from psa measurements for aeolian deposits in Yass Valley.**
- **There is some evidence that the hypothesis is partly supported by shape of the drying curves, esp. Core 1 from a parna layer.**
- **The atypical drying curves of cores from the B2 (parna) and B3 horizons (represented by cores 16 and 12 resp.) are probably a result of poor sampling.**
- **During ripening, the roots of the vine are exploring a range of soil horizons, so more work is needed to understand the role of the drying properties of these different horizons of aeolian/non-aeolian materials, in determining wine quality.**

Acknowledgements:

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