Comments to Bonfante et al's manuscript – v3 – 23 April 2015

General comments

Again I wish to emphazise that is a very interesting and innovative approach combining soil (physical) information, the use of a deterministic model and the chain vine-grape-wine data which deserves publication in the SOIL journal. Some improvements were brought to this version of the text. The title was modified as requested. However, there still remain some additional modifications not addressed according to reviewer's comments, and which are likely to improve the final version of this manuscript prior to publication.

In particular, it is still unclear to the reader whether each of the 27 plants monitored in each HZ is unchanged over the 3 monitoring years (as suggested in section 2.8) or whether these 27 plants are likely to change and were randomly sampled at each measurement date (as suggested in section 2.7). Please clarify this. In the first case, the 54 vines locations could be shown on the map, which is impossible for the second case.

How was the set of 10 plants for Leaf water potential measurement selected? Was it included amongst the 27 monitored vines? Was it a predawn or midday Leaf water potential measurement, or several per-day measurements?

As already suggested by reviewers, section 3.1 lacks an additional topographical map showing sampled profiles, and/or pits and augers locations which shall facilitate the reading of this text. A photograph or sketch of typical soil profiles would be welcome. (In absence of location map, the reader may have to read several times as the location of the Calcisol on the upslope instead of downslope is rather unexpected…questioning the origin of its Bk horizon; is the underlaying clay a marl rather than a clay? … Where does the Cambisol colluvium originate from? It is surprising how low its carbonate content is despite its downslope position regarding to the upslope clay (marl?) and Bk horizon…such questions are of course beyond the scope of this article).

Conversely to the author's statement, both soils do not have quite the same texture. In lower horizons (Bw2 and Bw3), the Cambisol has higher clay content compared to Calcisol and this results in clay texture…This may impact vine response depending on root depth. In which horizons were the roots observed and considered "efficient", particularly in the SWAP modelling ?

Discussion section: Potential limitations of this approach? In particular, it should be emphasized that the within-HZ spatial variability was not accounted for but may impact the uncertainty of predictions (Table 2). Did the authors test SWAP modeling at each of the individual profiles within HZs and if so, which variability did they obtain? Are there other variability factors not addressed by the SWAP model?

Tables and figures

Figure 3 : ECa values should be expressed into data ranges instead of single values. How where these values thresholded? Same questions for Figure 5.

Table 1: Were these properties averaged for the profiles categorized in each HZ ? Or do they correspond to a single representative profile? Or an "ideal" modal profile synthetized from all observations ?

In any case, it would be worth showing the location of each of these representative profiles in the maps as already suggested by reviewers.

The properties Q_0, a, l should be defined; "a" (isn't alpha ?) as property is likely to be confused with "a" "absence of rock fragments".

Please write particle size fraction instead of texture.

Figure 2 and Figure 4 and section 3.2: it would be worth showing the same plots computed for or over the three monitored years: is the monitored period representative of the 2003-2013 series?

Table 2 and section 3.2: the SWAP simulation results should also be given for the 3 monitoring years…to be comparable to plant and harvest monitoring results.

In detail:

Line 134, page 3: 368 m a.s.l. instead of 368 a.s.l.

Line 142, page 3: please specify in what this "green manuring" consisted (doses/ha/y, nature?).

Line 228, page 6, Van Leeuwen instead of Van Leewen

Line 282, page 7, S instead of Sis

Lines 402-404: how were the 10 augers and 6 pits locations localized?

Line 410, page 10, how high is the active lime content of the Calcisol? Are the vines planted on Calcisols suffering chlorosis (Lines 507-512: is the lower chlorophyll content for Calcisol explained by water stress only)? The 1103 Paulsen rootstock is known to have a rather limited resistance to chlorosis.

Line 414, page 10, EC or ECa ?

Line 415, page 10, "the texture is clay loam in both soils" this does not hold true for lower horizons. Please moderate the sentence. Specify the main rooting depth in each case.

May the deep clay texture explain the highest vigour observed for Cambisol compared to Calcisol, all the more than the 1103 Paulsen rootstock might induce vigour.

Line 418, page 10, K_0 instead of k_0 ; what is "I" ?

Line 488, polyphenols not poliphenols