Topical Editor Initial Decision: Revision (21 Feb 2015) by Emmanuelle Vaudour

Comments to the Author:
Both topic and data held by this manuscript are very important for this special issue, the authors should significantly improve their manuscript in the revised version to come, provided they follow the referee's suggestions, which are very constructive and helpful.

The author's responses indicate that they have sufficient material to improve both material& methods (avoiding adding methodological details in the result or discussion sections, specifying "3 ha" in the materials) as well as their discussion section (which, all referees point out, needs improvements).

The dimension of study area (or experimental site) was already reported in the paraghraph 2.1. line 129 "*This was done on an experimental site (3 ha over an homogeneous hilly slope).*" Now we improve this information inside of the text.

All referees share critics about language quality: it needs to be revised. Beyond the English language, the text should be better structured and should avoid repetitions. The authors propose to discuss additional references in order to better justify the originality of their research and this agrees with the suggestions by referees.

The English language of manuscript was revised by external company. The additional references proposed by the referees were added to the text.

The varied questions raised by all referees should lead the authors to strengthen their demonstration.

1. **The title should be modified**: the authors agree but do not propose a new title. This should be verified in the revised version to come.

The title was modified.

2. **Model parameterization, calibration and validation should be developed in the text. It is not sufficient to quote a congress publication for justifying the model calibration, that should be explained in the text.**

Information about the model calibration now are inserted in the text. However, we would like to stress that a crucial point concerns the potentiality of the use of physically based model information (CWSI) in a procedure of viticultural zoning at farm scale. The model is applied to produce a preliminary information (a qualitative or semi-quantitative information) to zoning and planning a new vineyard plant (e.g also without local data for calibrating and validating the model). In this case the model is used as normally the bioclimatic indexes are used in viticulture (you have data and calculate the values of index (e.g. Huglin), then identify areas with different suitability for the grapevine. It is very similar concept. The difference is that the model is physically based and it simulates the soil-plant relations as unique system with climate).

3. **The authors should also discuss the failures of the SWAP model regarding the specific case of vine cultivation.**
Limitations and needs in the model application are now better reported in the text.

4. *Did they test other soil plant atmosphere models specifically programmed for vines ?*

Part of this question is replied in the point 3. In particular, in our procedure, the model is used to give a dynamic information on the relation occurred in the soil-plant and atmosphere system. Then, we want to stress these relations that are soil driven. Then we need a robust model able to describe our soil system with physical laws.

Obviously, there are other models that simulate the crop growth. For example, the new version of CropSyst (4.3) have a tool to simulate the grapevine. But, in our experience the use of these models to plan a viticultural zoning became more complex. In fact, there is an increase of model uncertainty for different reasons, first of all the need of specific parameters for specific cultivar. And the need of local calibration. In our approach, the physical system behavior coming out, and soils with different capability to produce stress are identified, and then spatially differentiated. Inasmuch as, the soil-plant and climate relations are not linear, the use of only soil features or characteristics (in static way) is not able to correctly describe the soil behavior under a specific climate conditions. Thus we use the model SWAP in our approach.

   5. **The section about sampling design and the final choice of two HZs (**instead of 4 or 5 made possible by the ECa map**) should be carefully revised.**

The questions raised by the referee about the spatial soil "micro-variability" inside of the HZ's identified by the colour changing of ECA maps (nuances), is very interesting, but it is not the approach we have undertaken. In particular, our approach at this spatial scale consisted in considering as a distinguishing parameter, the average value within the two areas visually different (in this case, red and blue color to the extremes of the scale of values)

   6. **In this manuscript, the assumption that both HZs are homogeneous is based on standard summary statistics and no detail is given on the spatial variability between the 27 vines at each site**
In our approach to identify the HZs in an area of 2.3 ha, we have used a standard soil mapping approach (landscape units, soil profiles, minipits, augers, etc.) integrated and supported by geophysical survey. The statistical analysis of HZs was successively realized as request by the editor (ANOVA), showing a significative differences between the two areas identified. (reported in the text). For the aims of our work, and the dimension of each HZs, the random selection of 27 plants in each HZs was considered a good rappresentation of interactions soil-plant.

The additional Fig. 1 proposed by the authors (C492,) is very important, as also is the fig. 2 showing CWSI obtained from measured hydraulic properties.

In conclusion, given the various points to improve, revision is advisable.

Some details:
Page 1210, Reynolds and Elrick, 2002 not in the reference list (but Reynolds et al., 2002): *Done*
Page 1211, Kroes and Van Dam, 2008 not in the reference list (but Kroes et al, 2008): *Done*
Page 1212, Ritchie et al (1972) not in the reference list (but Ritchie 1972): *Done*
Page 1215, Mattivi et al, 2002 not 2002b: *Done*