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Comment

## ***Interactive comment on “Analysis and definition of potential new areas for viticulture in the Azores (Portugal)” by J. Madruga et al.***

**Anonymous Referee #1**

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General comments:

The aim of this research was to examine the viticultural suitability of the archipelago of the Azores (Portugal) and the definition of potential new areas for viticulture, taking into account climate, soils and topography. The manuscript is interesting and the research is pertinent since I could not find any other study that focuses viticultural zoning on this specific location. The idea and formulation of the objectives are clear and the manuscript is well written, although some sections need further citations to corroborate the author’s statements. Regarding the methodologies, there are some issues that need to be addressed: My main concern relies on the scale and the time-period considered for the GDD index. The authors do not use the traditional April-October period for the calculation of this index, making it difficult to compare against other research,

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particularly other wine regions in Portugal. Additionally, using the Winkler scale will further improve this comparison. This will allow expanding/improving the results section that is currently very reduced. There are other smaller issues that also need some attention. Based on these considerations I can recommend the paper to be accepted after a major revision.

Specific comments:

This is an interesting research paper that tries to examine the potential for winegrape growth in the Azores. The results section need significant improvement and a comparison to other winemaking regions should be addressed, especially in Portugal. There are some issues that need to be corrected.

1- The main concern relies on the time period and the scale used for the GDD index. Although the March-September period may be more suitable for the Azores grapevine growing season, it would be of interest to consider the April-October period as it is considered standard. Additionally, this would allow a direct comparison of this zoning to other winemaking regions, particularly those of Portugal. I suggest calculating both periods (April-October and March-September) in Fig. 1.

2- Regarding the same index, the Winkler scale (maturity groupings) adapted for grapevines, should be used. You can find this scale in the Table S1 of the supplementary material of the research paper: Fraga, H.; Malheiro, A. C; Moutinho-Pereira, J.; Jones, G. V; Alves, F.; Pinto, J. G; Santos, J. A. 2013. "Very high resolution bioclimatic zoning of Portuguese wine regions: present and future scenarios", Regional Environmental Change 14, 1: 295 - 306. Additionally, a comparison of the growing regions of that paper can ultimately be included in the results. Note that the index showed in that paper is the Huglin index, but the maturity groupings are related to the GDD index. GDD maturity groupings (winkler scale):

Too Cool: <1111 Cool: 1111 – 1389 Temperate: 1389 – 1667 Temperate/Warm: 1667 – 1944 Warm: 1944 – 2222 Very warm: 2222 – 2500 Too Hot: > 2500 – 2778

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You can choose to keep both scales (yours and Winkler's), but this will require a restructuring of the figures.

3- Please expand the results section with a small text on the possible wine characteristics of these new potential zones in Azores (based on this and other research). There are some references of interest here: José A.B Baptista, Joaquim F.da P Tavares, Rita C.B Carvalho, Comparison of polyphenols and aroma in red wines from Portuguese mainland versus Azores Islands, Food Research International, Volume 34, Issue 4, 2001, Pages 345-355

4- Overall the Results section needs improvement with additional links to previous research on the area of viticultural zoning and terroir assessment.

Minor corrections:

Page 2 Line 25 'grape' instead of 'fruit'.

Page 2 Line 25 – This statement needs a reference “climate is recognized as the factor that exerts the most significant effect on the ability of a region to produce quality grapes” Perhaps: Jones GV (2006) Climate and Terroir: Impacts of Climate Variability and Change on Wine In Fine Wine and Terroir - The Geoscience Perspective. Macqueen, R.W., and Meinert, L.D., (eds.). Geoscience Canada, Geological Association of Canada, Newfoundland, Canada.

Page 3 – Add a reference for “It is also well accepted that the particular soil conditions are of great importance in defining the characteristics and qualities of the wine as the final product”, perhaps: Mackenzie DE, Christy AG (2005) The role of soil chemistry in wine grape quality and sustainable soil management in vineyards. Water Science and Technology 51: 27-37.

Page 12 - 'Winkler' instead of 'Winlder'.

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