Review: Downscaling of climate change scenarios for a high resolution, site–specific assessment of drought stress risk for two viticultural regions with heterogeneous landscapes

This paper presents a summary of a study focused on the effects of climate change on two viticultural regions in west-central Germany. Methods used include downscaling of Coupled Model Intercomparison Project 5 (CMIP5) using a stochastic weather generator data, high resolution soil map data (soil type and water capacity), high resolution digital elevation model, scaling down to individual vineyards (accounting for slope steepness and aspect). For validation purposes, the study compared historical weather observations from nearby long-term weather stations with historical synthetic time series.

General comments: The manuscript needs some editing for grammar and usage (e.g., abstract 2nd and 3rd sentences are unclear and confusing). There is little discussion of relative humidity, a critical component of any evapotranspiration discussion (ET ~ f(T, RH, U)), other than reference to Supplement Table S3, which shows little change in future RH—that in itself is interesting, given the sensitive of RH to changes in temperature. (How future climate change trends maintain an equilibrium in RH is an interesting find in itself.) Table S3 is rather confusing—based upon the Table caption it appears these values represent the sensitivity of ET to changes in one variable while maintaining others at baseline values. It would provide more insight if the authors explored changes in conservative variables such as specific humidity (or vapor pressure and saturation vapor pressure) and examined projected changes in the vapor pressure deficit (not mentioned at all in the manuscript). Overall, the study presents interesting and valuable results regarding the potential effects of climate change on viticulture in Germany. The study's techniques are transferable to other viticultural (agricultural) regions providing similar data are available for input.

Specific comments:
Page 1, line 27 (first line of Introduction): this sentence is confusing as the actual language in the WMO report cited here states that "[s]ince the 1980s, each successive decade has been warmer than any preceding one since 1850."
Page 2, line 67: Need to spell out ADVICLIM.
Page 4, line 159: Same for ENSEMBLES.
Page 5: Figure 1 would be helpful if you can show the wine growing regions as an inset to a larger map of Germany.
Page 6, lines 206 - 208: "The impact of degree of slope on runoff was neglected, because several authors reported no clear findings…." Would this be the case during periods of drought (harder soil surface)?
Page 13, lines 387 - 388: "In general, this indicates an increase of precipitation in winter *possibly connected* with a decrease of precipitation in a future summer." (Italics added.) Why would an increase in winter precipitation be connected with a decrease in summer precipitation?
Page 13, general comment: What about snowfall and runoff from snow melt? Is this an issue in this region?

Page 17 and 18, Figures 11 and 12: difficult to see the changes for the ensemble median (b) and decrease (c) as changes are generally modest compared with the scale (a function of the larger changes exhibited in (a).

Page 19, lines 498-499: "… but in general, the soil maps are still describing the current situation quite well as demonstrated in a follow–up study (Zimmer, 1999)." This study is more than 20 years old.

Page 19, lines 520 et seq.: under the more extreme scenario, is the increase in the number of predicted drought days exceed any year in the past? This would also be a good place to look at changes in vapor pressure deficit, a key control on evapotranspiration (e.g., Penman-Monteith—see Monteith and Unsworth 1990 2nd Ed.)