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Climate of the Past Discussions

Interactive comment on "Climate signatures of grape harvest dates" *by* M. Krieger et al.

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We would like to thank the reviewers for the constructive and helpful comments.

All three reviewers noted that one result of the paper, the relationship of the grape harvest date (GHD) and the April-to-August temperature (AAT), has been already studied. They further mentioned that the presentation of the other results was unclear and not focussed enough and some conclusions were not convincing.

We think that our results are of scientific importance, but we agree that they should be presented in a much clearer way. The winter temperature-GHD relation and our hypothesis for the increase of the GHD-AAT relationship in the last decades will be explained in more detail without focusing on statistical non-significant correlations. In the following, we summarize the new points of our studies including our updated results.

- The AAT is strongly correlated to the GHD, also for the pre-instrumental period. We show the spatial correlation pattern of the AAT and compare it with the reconstructed temperature correlation pattern from 1500-1900 based on Luterbacher et al. (Figure will be added in the revised version). The analysis of the pre-instrumental period demonstrates the stability of the climate-GHD relationship and the consistency of the Luterbacher data set.

- Beside the established GHD-AAT relationship, we found a decadal connection to winter temperatures, which is independent of the AAT.

- The GHD is related to atmospheric circulation (with some projection onto NAO) through winter temperature. Our field correlation analysis helps to identify remote effects on the GHD.

- The winter result is supported by a multivariate model approach with the winter temperature and AAT as predictor variables, as proposed by reviewer #3. It shows that AAT and decadal winter temperature contribute significantly to the GHD variations.

- Besides the increase of the AAT-GHD correlation over time, which has been noted in literature (Garcia de Cortazar-Atauri et al. 2010, Meier et al. 2007), we found that the decadal winter-GHD relationship increase over time as well. The rise of both correlations is caused by the fact that the winter-to-summer relationship increased in the last decades. This hypothesis is supported by a statistical experiment using surrogate data with the same covariance structure as estimated from the temperature-GHD data.

Following the suggestions of the reviewers, we decided to keep the manuscript more focused on our main results:

- We will shorten the discussion of the known summer relationship in the last century. The seasonal temperature-GHD correlation (Fig 2) and correlations of other climate variables (Fig 4) will be omitted.

- The lagged GHD series will not be analysed.

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- The discussion of the winter-GHD relationship will be shortened. Instead, the winter-summer relationship will be discussed in more detail to better explain the increasing GHD-AAT connection.

Interactive comment on Clim. Past Discuss., 6, 1525, 2010.