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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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Comment 1.1: This paper analyses the relation between the Grape Harvest Dates (GHD) series of Burgundy (France), published in Chuine et al. (2004), and climate parameters (temperature, SST, SLP and total cloud cover). The main result of the paper is that the GHD is connected to April to August temperature. A second order relation between GHD and winter temperature is evidenced. The authors points to a non stationarity of the GHD winter temperature relation which is attributed to the non-stationarity of winter-summer temperature. As the dependence of GHD to April-August temperature as been evidenced in several publications (Chuine et al., 2004; Menzel, 2005 ; Meier et al., 2007 ; Etien et al., 2008, 2009 ; Garcia de Cortazar et al., 2010), the main result of the paper cannot be said new. The significant correlation between GHD and low-pass filtered winter temperature is new and very interesting and would deserve more investigation. The other results are not very convincing. The authors indeed tend

to over-interpret correlations which are low or even not statistically significant. The added value of the correlations of GHD with SLP, cloud cover and SST is slight.

Reply: We would like to thank the reviewer for the helpful comments. Following the suggestions, we restructured our manuscript and omitted insignificant correlation results. The first part will be shortened, correlations with SLP, cloud cover and SST will be omitted and the lagged GHD series will not be analysed. Instead, we deepened our investigations on the winter relationship. We performed a multivariate model approach that shows that AAT and decadal winter temperature contribute significantly to the GHD variations. We further show that the increase of the winter-to-summer temperature relationship can explain the increase of the winter-GHD and the AAT-GHD relationship. Please see also our general comment to all reviewers.

Comment 1.2: Page 1528: The authors evaluate the strength of the correlation between the GHD series and the four seasons near surface temperatures from CRU. They conclude that GHD is poorly correlated with winter (DJF) temperature (in some regions of Ireland, Spain and Morocco), strongly with spring (MAM) and summer (JJA) temperature and not with autumn (SON) temperature. This last result is quite comforting as harvests take place generally in September that is at the very beginning of autumn. Even if the authors evaluate the effect of one year and two years lag, considering a different cut-out, complying with the biological year (beginning in October), would be more judicious.

Reply: In the revised version, Fig. 2 will be omitted as it is not obligatory. We showed all four seasons of the correlation because we wanted to give an overview. We did not skip the autumn season as the average GHD is 27th Sept. Thus, there is a potential influence of the September temperature. The negligible autumn correlation matches with the fact that the last 33 days before harvest are only slightly influenced by temperature (Chuine et al.(2003)).

Comment 1.3: "1529: The authors calculate running correlation coefficients between

the GHD series and an index of April-to-August temperature over France. How is this index calculated? It is succinctly said in page 1531, but should be explained here. There may be a benefit of using such index rather than local (Dijon for instance) homogenised temperature series, but it should be discussed in the paper. It is shown that the correlation between GHD and France temperature Index increases, from r=-0.6 to r=-0.85, over the last century, being centred on 1975. Cannot this improvement of the correlation be related to the fact that there is a steep trend in the French temperature series since ca. 1975 (and a correlative GHD trend)?"

Reply: The index is based on a spatial average of temperature over France (5.5° W to 6° E; 42° N to 51.5° N). In the revised manuscript, this will be explored in the Method section. We thank the reviewer for the hint with the "steep trend". The correlation increase is slightly less pronounced when the AAT time series is detrended (Fig. R1)

Comment 1.4: Page 1530: Line 14: the authors say they investigate the relation between April-August index temperature and the other dataset... but do not show any result (but in figure 10b) while it is an important element towards understanding the meaning of the GHD – climate parameters correlations.

Reply: We agree with the reviewer on this point. In the revised version, we will discuss the AAT-climate relation in more detail.

Comment 1.5: "Line 24: "All of Europe is correlated slightly negative. Only Asia Minor has a slightly positive correlation": As can be seen in figure 2a, all these correlations are not statistically significant anyway."

Reply: To keep the manuscript more focused, Fig. 2 will be omitted in the revised version. (see also our general comment)

Comment 1.6: Page 1531: Line 3: "If the total period is partitioned": the authors cut arbitrarily the whole series in two equal parts (before and after 1947), while the turning point they have identified previously is 1975. Do they obtain different results if they

change the partitioning?

Reply: The reason is that the running correlation is positive before 1947 and negative after 1947. However, in the revised version, we will omit the figures with splitted periods as they are ambiguous and not focussed on our main results. There is no turning point at 1975. Our formulation ("The correlation coefficient decreases evenly from r=−0.6 centred at 1925 to r=−0.85 centred at 1975") was probably misunderstood and will be revised.

Comment 1.7: Line 6 "In the time section from 1901 to 1947, the entire European mainland is positively correlated": The correlations, again, are not significant. "In the time period 1948-2002, all of Europe has a strong negative correlation": can r=-0.3 be said strong?"

Reply: We agree with the reviewer on this point. This figure will be omitted in the revised version. We will discuss the change of the correlation, which is highly significant ($p<0.01$).

Comment 1.8: "Page 1532: Line 19: Again, I think the authors want to say too much from correlations which are not statistically significant."

Reply: We guess this statement refers to Page 1533, Line 19. Here, we compared the correlation of the AAT and the GHD with the DJF temperature. We agree with the referee that the correlation shown in Fig. 10b is not significant. At this point we did not want to show that DJF temperature and AAT are positively correlated but we want to point out that there is a clear difference between the GHD-DJF and the AAT-DJF relationship.

Comment 1.9: "Page 1536: Line 11: 'the results of the period from : : :are opposed": Is it a rigourous approach to say opposed some patterns when at least one of the two is under the significance level."

Reply: Fig. 8 will be omitted in the revised version as it only supports Fig. 7.

Comment 1.10: Page 1537: Line 4: “If warm (cold) winters. . . This occurred in the first half of the 20th century”: Where is it shown in this paper??

Reply: Our argumentation at this point was not detailed enough. In the revised version, we will show the interaction of the winter and summer relationship in detail. Besides the increase of the AAT-GHD correlation over time, we found that the decadal winter temperature-GHD relationship increase over time as well. The rise of both correlations can be explained by the fact that winter to summer relationship increases as well

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

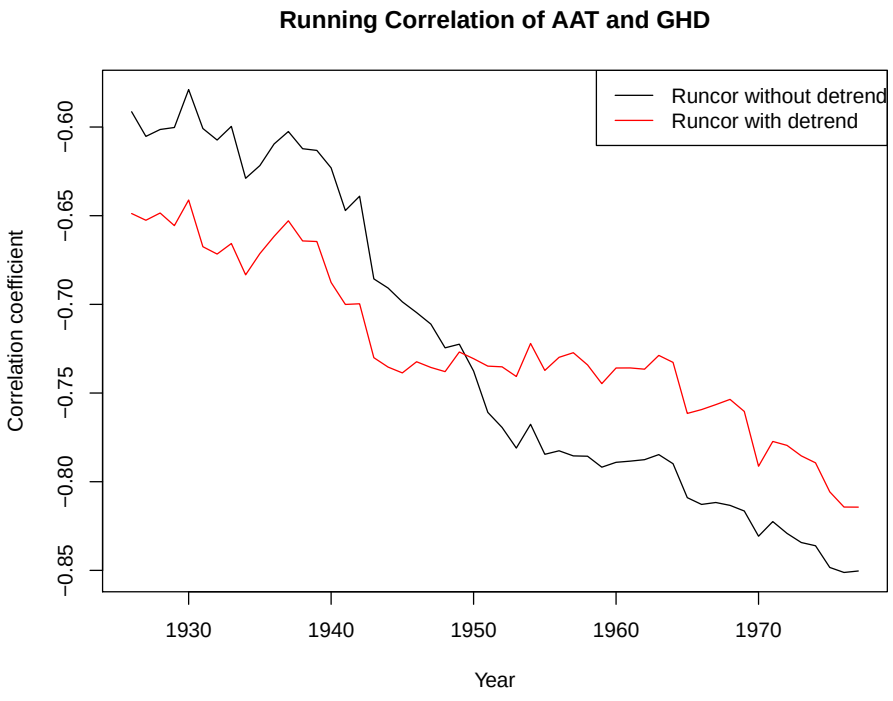

Fig. 1. Running correlation of AAT and GHD with a 50-year window.