We first thank the second referee for taking time to read our paper and for his positive encouragements and comments. In the following lines we give some answers to the three main concerns pointed out in the comment.

1. **"It is particularly interesting that the new reconstruction does not corroborate the putative heatwave in 1540 CE […] ; an aspect that should be discussed in a more balanced and nuanced way than currently done."**

Natural proxy data sometimes underrate extreme events that are fully described as such by historical sources. Concerning the extreme temperature and precipitation conditions of the 1540 summer, this controversy has already been discussed in different ways (Wetter et al. 2015; Orth et al. 2016). Wetter et al. 2014 have actually demonstrated from a large array of narrative sources that the spring-summer temperature and precipitation in 1540 have been outstanding and likely more extreme than in 2003 in a large part of Europe, even thought European tree ring width (TRW) series show little evidence of a megadrought in this same year (Büntgen et al. 2015). However, close comparisons of negative TRW extremes showing droughts with documentary data shows important disagreements or inconsistency. TRW may provide responses lagged for one year because tree growth integrate effects from previous year climatic and ecological conditions leading to lagged autocorrelations (Frank et al. 2007; Pfister et al. 2015).

That the heatwave also struck the region of Burgundy in 1540 is not to be discussed. The church of Notre-Dame of Beaune organised 8 processions to call for rains from the beginning of May to the end of August (Labbé, Gaveau 2011). In the near city of Besançon (c. 100 km eastwards) a chronicler wrote that warm temperatures lasted from April to November and that the heatwave was hardly bearable during summer (Wetter et al. 2014). Consequently, it is true that we might expect the grape harvest date in 1540 to be in top three of the earlier GHD of the entire series, when it ranks only 19th. We argue however in section 4.5 of the article that the extreme conditions and hydric stress of 1540 certainly contributed to block the development of the grape in Burgundy which can explain why the harvest did not occur as early as might be expected. In particular, it can be concluded from the sources that mature berries were dried out in early August, after a completely rainless month of July involving temperatures beyond 40°C leading to frequent forest fires. Vine-growers stopped picking grapes until the next rain-spell to get more juice into the berries. Thus, rainfall rather than temperature determined to begin of harvest. As with TRW, it is important to assume that GHD may integrate ecological factors influencing the growth of the vineyards. We believe this is an important improvement in GHD series analysis method that calls for further researches in the future.

We agree however with the reviewer that this question has to be expressed in a more nuanced way in the text of the article and we will add in section 4.5 this sentence: "It is puzzling that the exceptional heat and drought in 1540 ranks only 19th in the statistic. Possible reasons were brought forward by Büntgen et al. (2015), though their arguments are thought to be questionable (Pfister et al. 2015). The modelling of 1540 attempted by Orth et al. (2016) provides a more balanced view. In particular, Wetter et al. (2014) demonstrated from the sources that precipitation, not temperature mattered for the grape harvest in 1540, as many grapes were dried out in early August".

2. **"[…] the article would benefit from an assessment of the persistence (i.e. autocorrelation structure) in Beaune's new GHD-based April-July temperature reconstruction compared to the possibly inflated long-term persistence in tree ring width records"**

This is a helpful suggestion that can improve the analysis of the Beaune GHD-based AMJJA temperature reconstruction. We will add the following paragraph in section 4.3

"The autocorrelation structure of the Beaune based temperature reconstruction (black in attacked figures; regression model A and B lead to equal results) is very similar to the tree-ring reconstruction from the Pyrenees (blue) but has clearly less autocorrelation than the tree-ring reconstruction from the Lötschental, Switzerland (red). The time series reveal the autocorrelation differences in their multi-decadal and lower variability (same colors as above and anomalies with respect to 1961-90). The Lötschental time series experiences much more low frequency variability than the Beaune and Pyrenees records. However, it is hard to argue that one of them should be the correct one. All have uncertainties with regard to their low frequency behaviour. In the tree-ring series many studies discuss these issues that stem from age detrending, temporally inconsistent tree-age distributions, etc. On the other hand documentary data for GHD are also not free from issues concerning low frequency variability. In the case of vine there may be adaptation, breeding, gene (de)activation processes over the decades that may dampen low frequency variability. There may also be changes in taste altering harvest dates in both directions.

Another point worth mentioning in comparison with tree-ring reconstructions is that the Beaune temperature reconstruction rather underestimates interannual variability (SD=0.58 K, period 1659-2007) compared to the Paris observations (SD=0.87 K) whereas both tree-ring reconstructions overestimate it (both SD=1.10 K)."

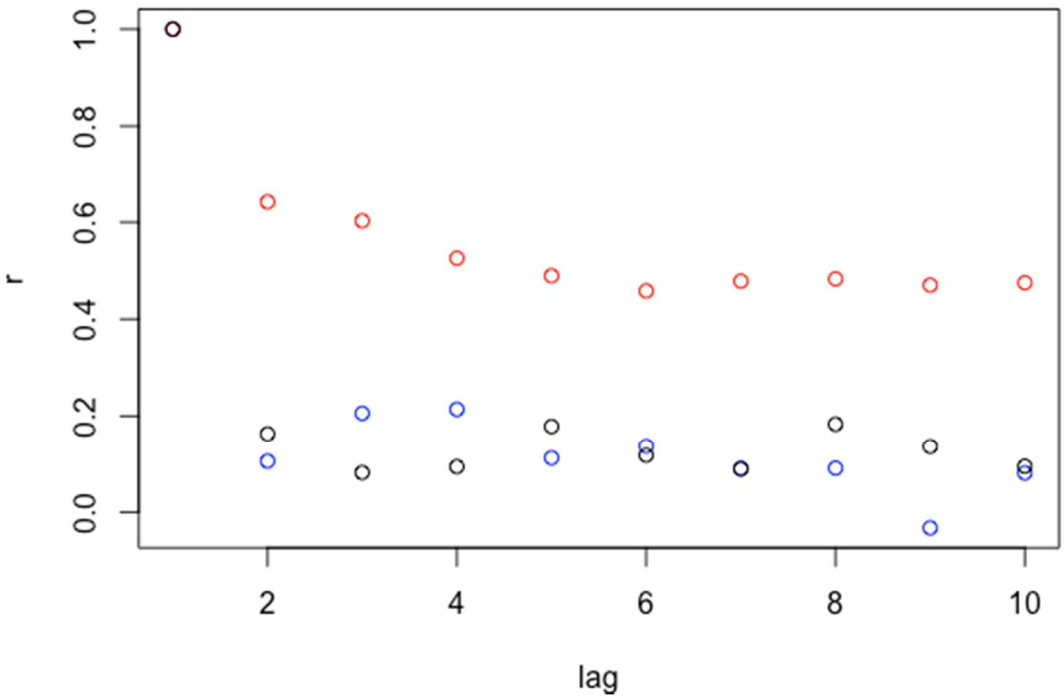

Figure 1 : Autocorrelation structure of Beaune GHD-based temperature reconstruction (in black), Löchtental tree-ring-based temperature reconstruction (in red) and Pyrénées tree ring-based temperature reconstruction (in blue)

3. **"I kindly ask the authors to consider the spatially explicit European summer temperature reconstruction by Luterbacher et al. (2016) for comparison**

In the article we have compared the Beaune record with the two closest proxy records, which actually are the basis for the Luterbacher reconstruction, too (i.e. the Alps and Pyrenees, east and south-west of Beaune respectively). Luterbacher et al. do not have any additional proxy information to north or west. Hence, the interpolation to a coarse grid, even with a sophisticated method, could hardly add significant information at our site.

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