Reply to Reviewer 2

General Comments

The manuscript is an interesting work on the great winter of 1739/1740 in Europe. It is well structured and raised. Text, figures and references are appropriate to the research objectives. The main conclusion is that this event was the result of natural variability, more than the consequence of radiative forcing (solar, volcanic, etc). The question here is what is the probability of this 'special sequence of events' (all of them related to atmospheric dynamics), that is, why this winter was singular, and it is very difficult to find other similar examples.

Specific comments

Table 1. I guess that 'p' is the measured pressure in each location (regardless its location above sea level), and 'mslp' is the pressure reduced to sea level. Correct?
Yes, not all series were digitized and reevaluated by us, but taken from others. These were usually taken as mslp. We add this remark to the Table caption.

Authors calculate indices for the NAO and EA patterns, but they affirm that 'during the cold spell in January a strong high pressure system established over Scandinavia and at the same time a rather strong low pressure system developed over the northern Mediterranean' (page 9, lines 245-246). This situation seems related to the positive phase of the SCAN pattern. In my opinion results would be more consistent if authors apply the same methodology used with NAO and EA to estimate the behaviour of this pattern during the studied period.
Thanks for the comment. In fact, we did that, and we will add the corresponding panel to the revised manuscript. It turns out that the blocking did not characterize the entire winter, so in a winter average the SCAN index is not prominent.

Figure 2 bottom. I don't find in the text comments on this figure.
It comes only very late at line 350. We will move the figure panel to an appendix.

Figures 3 and 4. October? According to the authors 'The fifth period noted in Fig. 2 is the month of October, which was persistently cold at most stations and which will be analysed in the following based on monthly charts' (Page 9, lines 265-267). Why have you excluded October from the analysis in Figs. 3 and 4?

The paper is already relatively long and we show a lot of material. For October we would have to show all 31 days, which would further blow up the manuscript. We therefore only analyse the monthly mean. In the revised manuscript, we add more information to the Appendix.

Role of ocean and land surface (pp. 18-19). Have you considered to study the possible role of the Atlantic Multi-decadal Oscillation (AMO)? The AMO is correlated to air temperatures and rainfall over much of the Northern Hemisphere, in particular in the summer climate in North America and Europe (Ghosh et al 2016; Zampieri et al., 2017). the AMO can also modulate spring snowfall over the Alps (Zampieri et al., 2013).

We will add a brief sentence with the references – we do not find a conclusive AMO signal, if anything, then the Atlantic SSTs show the classical tripole pattern, but we simply have not enough information.

Technical corrections

Abstract, page 1, line 15. ‘The 1737/40 cold season’ Erratum? Won’t it be 1739/40?

Thanks

References

Ghosh et a., l2016. Impact of observed North Atlantic multidecadal variations to European summer climate: a linear baroclinic response to surface heating". Climate Dynamics. **48** (11–12): 3547. doi:10.1007/s00382-016-3283-4.

Zampieri et al., 2017. Atlantic multi-decadal oscillation influence on weather regimes over Europe and the Mediterranean in spring and summer". Global and Planetary Change. **151**: 92-100. doi:10.1016/j.gloplacha.2016.08.014.

Zampieri et al., 2013. "Atlantic influence on spring snowfall over the Alps in the past 150 years". Environmental Research Letters. **8** (3): 034026. doi:10.1088/1748-9326/8/3/034026.