

Interactive comment on “Temperature and precipitation signal in two Alpine ice cores over the period 1961–2001” by I. Mariani et al.

I. Mariani et al.

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We thank the reviewer for the comments and the suggestions. We will consider most of them in the revised version of the manuscript as outlined below.

The manuscript of Brönnimann et al. has the different goal to test the skills of a simple forward model in replicating the preservation of the atmosphere signals by an ice core (Grenzgletscher). In our manuscript we investigated if ice cores from two different locations in the Northern and Southern Alps reflect the very local weather conditions through a direct comparison of $\delta^{18}\text{O}$ and accumulation with temperature and precipitation. We don't think that there is too much overlap, but we agree that a reference to the Brönnimann et al. manuscript should be included.

C3302

1) We are not aware that there is any modeling study capable of resolving the small spatial scale differences we are looking at. Nevertheless we will mention what has been done so far in the revised manuscript. We agree that we have not covered the problem of summer melt on the $\delta^{18}\text{O}$ (which is not significant) and we will add this in the revised version.

2) We chose the 20CR reanalysis dataset because of the higher spatial resolution with respect to the NCEP/NCAR R1, and ERA40 reanalyses. We did not use higher resolution products (MERRA, ERA-INTERIM, CFSR) because they go back to 1979 only, and we needed to cover the period 1961–2001. We will explain this in the revised version.

3) We agree with this comment and will describe the records in more detail in the revised manuscript.

4) We agree that we did not sufficiently explain how we established the age scale uncertainty. This was done empirically by identifying ambiguous annual layers between the reference horizons (Fiescherhorn 2000, 1977, 1963), (Grenzgletscher 1990, 1986, 1977, 1963). A comment will be added accordingly in the revised manuscript.

5) We will show temporal variations of the nearest weather stations in the revised version. We think that a more detailed study on subannual scale involving the difficult task of attributing seasons in the ice core record is out of scope of this manuscript.

6) We agree with the suggestion and will add this analysis in the revised version.

7) We agree with the referee and will implement this part.

8) and 9) We agree with the referee and will modify the figures accordingly.

10) We agree with the referee and will implement this part (see comment 5). The gap in Grenzgletscher, as explained in page 5871, L21–23, was due to a failure in the cooling system of the cold room and consequent melting of the corresponding ice core sections.

C3303

11) We partially agree with the comment. In this Figures we wanted to show the capability of the proxy data (delta18O and accumulation) to capture the regional weather parameters (regional temperature and local precipitation). The different panels in Figures 5 and 6 were meant to show the correlation within the dating uncertainty of 1 year. Nevertheless we will remove the redundant information in the revised version.

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