

General comment. I was delighted to see this compilation and analysis of snow records from the whole span of the European alps. Previous country-based studies have used different methods that prevented aggregate conclusions, and the efforts the authors have undertaken to compile this comprehensive dataset represents an important breakthrough that paves the way for a much improved understanding of the consequences of warming for snow in the European alps. Having assembled three datasets (with more similarities than those here) from different jurisdictions for some of my work, I can appreciate the magnitude of the task.

Thank you for this positive assessment which we highly appreciate. Please find below a detailed account of our changes to the manuscript as well as responses to your remaining comments.

Two referees have provided some technical corrections, to which I add the following.

Abstract - lines 49-51 are an attempt to represent much of the information in table 3 in a line of text, but the result is insufficiently specified and confusing. I suggest reducing the amount of detail and focusing on the key numerical message, and delivering it clearly. Perhaps one number for the DJF all-station average and one for the MAM all-station average. The next level of detail would be to list the average trends by elevation bands, but it's less confusing to put the elevation band first: "for 0-1000m, -1.1cm/decade; for 1000-200m, ..." Including the ranges is too much detail for an abstract, and places undue emphasis on outliers.

We adopted your suggestion to give all-station averages without ranges.

Regarding the elevational detail, we agree that we tried to condense too much information in too little space. We therefore remove numeric results from the abstract and now we only provide indicative remarks.

IPCC 2019 - follow the citation convention specified at the beginning of the report

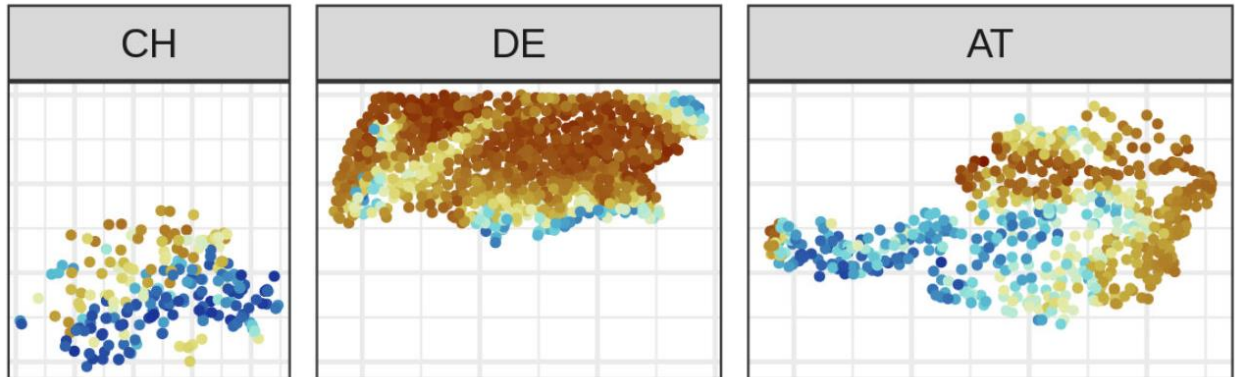
Actually, we already took the citation as specified in the report. The IPCC 2019 citation refers to the SPM (summary for policymakers) part, and the citation has only been adapted to journal rules.

There almost seems to be a straight line through the loadings of PC2-5 (Fig 3) at about 47.5°N, straighter than the topography would suggest. It's suspiciously close to the Germany-Austria border. Can you convince me that it's not a data artefact?

Yes, this impression can arise. And it is possibly also strengthened by our choice of the color scale. But our analysis indicates that this is not a data artefact. The issue is rather that the border between Germany and Austria is tightly linked to a strong topographic divide. It is also the case e.g. for France-Italy, where also PC3-5 can give such an impression. We added country borders in the topography map Fig 1(a), to make it easier to see that the change is linked to topography rather than national borders.

Also, we created the PC figure splitted by country, in order to provide a clearer overview on the different data sources, and to better highlight the fact that the gradient is not a border effect (here only the subset for Switzerland, Germany and Austria for PC2):

# PC2



We shall add the full figure with all PCs and countries in the supplement, and discuss this issue in the manuscript as well.

Fig B1 is very important for the interpretation of the loadings; I strongly suggest moving it to the main paper

Done.

Line 401: state the p-value of significance

Done.

Section 3.3 - I see no real reason to shorten the record and present 30-year trends, except to calibrate the variability of shorter trends. I see another reviewer provided extensive comments on this.

We remove this section from the analysis (see also the detailed information on the response to Ross D. Brown review comments).