Reply to Anne Van Loon

We would like to thank Anne Van Loon for her constructive comments and feedback on this manuscript. We think that the suggested revisions based on the Referee's comments will certainly improve the article. Please find our responses (in blue) to the main points raised (shown in black) below.

One comment is on the region you are looking at. You need to be clear from the start about the area you are studying. Now you mention 'Alpine Space', European Alpine region, mountain-foreland region, mountain-to-foothill transitions, etc. 'Alpine Space' is now defined in the Methods section, but it should be explained earlier in the Introduction.

- ➔ We agree that this needs to be more clear. See detailed answers below.

My second point is on the compilation of the database. You need to explain more on how the information from the different sources were collected. Have all these data sources been compiled before and are they publicly available? Or have you collected, translated and mined text-based reports yourself?

- ➔ A mix of both. We comment more on the availability of the original sources below. And we will make the specific classified collection that we used here available through a repository. We can only ask for the doi once we know that the paper will be accepted and will then include this in the final revision. We agree the source data and its compilation needs clarification. See details below.

Thirdly, please explain how you have dealt with overlap between EDIIeu and EDIIalps. Did you include EDIIeu impact reports for your region into EDIIalps? Or did you include your EDIIalps in the EDII database? It would be very interesting to compare your EDIIapls with the original EDII entries for your Alpine region to see the effect of differences in data collection.

- ➔ This comment follows the previous one and will be clarified as part of it.

Finally, I found it surprising that there is not many impacts reported in the Energy category. Please expand the discussion on this. Also in the Discussion, I expected you to say more about how perceptions of drought might have influenced the results, for example for the Energy category and for the impacts in the southern part of the Alpine region.

- ➔ We were surprised as well. There are some possible explanations that we will improve in the discussion. See details below.

Specific comments:

Abstract:

What is ‘Alpine Space’?

- ➔ The EU Interreg-Programm Alpine Space introduced the spatial extent ‘Alpine Space’ which “covers the Alps and their foothills, as well as different climatic zones”, as we defined in section 2.1. We see that this definition comes late in the text and will therefore refer to the study region as “Alpine region” in the abstract.

“The amount of more than 3200 compiled reports on negative drought impacts demonstrates the need to move from emergency actions to better preparedness” > not sure if the amount of impact reports demonstrates this need, maybe rephrase?

- ➔ We agree that the conclusion should incorporate more arguments than solely the amount of negative drought impacts. We will rephrase the sentence so that our study demonstrates drought as a hazard that requires attention in the Alpine region.

Introduction:

Socio-economic drought: It is a bit confusing how this is different from the impacts that you are investigating. For example the sentence: “These indirect impacts are the least tangible and often related to DSE.” (And in the Methods: “DSE is challenging to relate to specific impacts”) Please remove DSE as a drought type to avoid confusion between hazard and impacts?

- ➔ We see the confusion and will remove DSE.

P.3 l.58: maybe also mention DH impacts on hydropower production. A quite important sector in the Alpine region I thought. But from your results I see that the Energy and industry category is not often reported. Do you know why? Is it not an issue or does this just not end up in the newspapers?

- ➔ We also expected this category to be more often reported, as it is an important sector in the Alpine region. We will check some more sources but reasons (anecdotally suggested by stakeholders) include a stronger dependence on the energy market than on water. Also, most hydropower is produced from reservoir storage and most profitably sold for peak demand, whereas run-off-the-river hydropower sold for base demand financially plays less of a role for the (diversified) producers. We can elaborate a bit more on the issue.

Methods:

Fig. 1: can you indicate the countries and their borders in the map? This is important as later in Fig. 2 & 3 you report impacts by country.

- ➔ Yes, we will modify the map in order to show as well the countries, respectively part of the countries in the Alpine Space. We propose to show the borders in the additional overview map. Otherwise the overlapping lines of the countries, NUTS 2 and 3 regions, and subregions are not visible separately. See our proposed example (Figure R1):

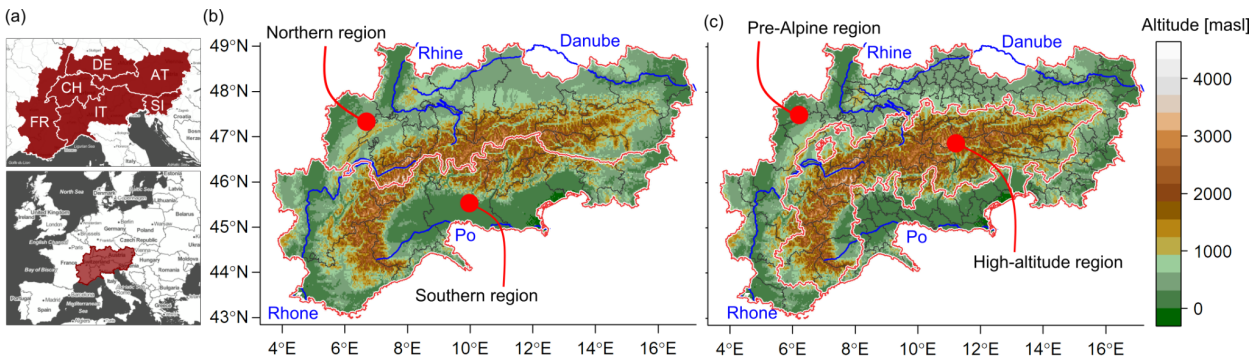

Figure R1: The “Alpine Space” study area within Europe (a) for which the Alpine Drought Impact Inventory ($EDII_{ALPS}$) was developed, showing the paired subregions for the analysis: (b) the Northern and Southern region divided by grouped NUTS 2 regions, and (c) the pre-Alpine and high-altitude region divided by grouped NUTS 3 regions.

Grouped into four domains: Northern, Southern, high-altitude and pre-Alpine. Please make it clear in the text that these are two different subdivisions. So you actually grouped two times into two domains. This comes back in the Results section (see below).

➔ Correct, we see that our phrasing is misleading and we need to clarify this grouping into different regions better in the revised version.

P.4 l. 98: explain how you defined Europe as comparison for the Alpine Space analysis.

➔ Please read our response to the following point for our answer.

How did you check for overlap with the existing EDII? Did you include your EDIIalps in the EDII database, or the other way around did you include original EDII entries in your EDIIalps database? Did you compare your EDIIalps with the EDII entries for your Alpine region to see the effect of differences in data collection?

➔ We agree that our explanation of how we defined the different regions was not clear enough and thus raised your questions. We will rephrase the parts describing how we updated EDII and subsetted respectively defined the different regions.
To clarify for further comments:

1. We considerably updated the original EDII database (a) with sources that had not been investigated before (Unwetterchronik in AT, Propluvia in FR), (b) with several other reports we compiled ourselves (especially German and Italian text-based reports), and with sources that had been used previously by EDII, but which did not receive an update for the more recent years (Drought.ch, DCMSEE). The updated version is called EDIIeu throughout the preprint.
2. We then subsetted the reports located in the Alpine Space from EDIIeu and called this EDIIalps, which is thus a part of EDIIeu.
3. We further split EDIIalps two times to compare different climatic and altitudinal conditions: Northern vs. Southern region and pre-Alpine vs. high-altitude region.

P. 5 l.106-110: Are all the sources listed publically available? Or did you also compile some of these yourself, for example the Italian and German text-based reports? What is the origin of these text-reports?

➔ The data we compiled were all publicly available. They stem from different sources meaning that some of them have been compiled before for other overviews or databases, such as the Unwetterchronik and the DMCSEE bulletins. We classified and transferred them into the EDII system. We collected the Italian and German text-based reports ourselves by searching News print and other media etc.and also classified and entered these into the EDII system. We specified the information sources to keep track of the origin of the text-reports. That means that we have the possibility to trace back, if the original source was a research article, newspaper article, governmental report, an entry in another database and so forth. This way we kept the standards the European Drought Impact Report Inventory (EDII) requires.

Results:

Fig. 2: I would suggest to add the distribution of reported impacts in the Alpine Space but based on the EDIIeu, so that you can compare with those in your EDIIalps. Also, maybe refer to the figure a bit more in the text to help the reader.

➔ The distribution of reported impacts in the Alpine Space is based on EDIIeu meaning that EDIIalps is a subset of EDIIeu (see our response in the Methods section). We will integrate the Figure more in the text.

Thank you for the other minor comments for the result section. We agree with the comments and suggestions and will address all minor points in the revised manuscript.

Discussion:

P.15 l.346: “30 % of all impact data across Europe is located in our study region” > Do you mean that within EDIIeu 30% of the impact report is located in your Alpine Space? Or that your EDIIalps has 30% of the impact reports of EDIIeu? The latter is not a conclusion you can draw because of the differences in data collection.

➔ We mean that 30 % of all impact data in EDIIeu is located in the Alpine Space, which we call EDIIalps (see our explanation to your question in the method part). We see the need to clarify the overlap between EDIIeu and EDIIalps and will add an explanation.

P.16 l.378: “ressort”? Do you mean report?

➔ We did not mean “report”, but the federal forest institutions in Germany that regularly publish assessments about the forest conditions. We will rephrase the sentence to mitigate misunderstandings with the word “ressort”.

Please discuss the relatively low amount of impacts in the category Energy (and Tourism).

➔ We also expected the categories Energy and tourism to be more reported. For the energy sector, please see our comments above about the dominating role of energy price and market. In general, drought is rarely associated with cold winter droughts, but Alpine tourism is mainly affected from winter droughts. This could be the reason for the relatively low amount of impacts. In fact, our project group also expected tourism to be more present in reports. There may be reasons such as an overlap low economic relevance nationally or in those places where reports are made, the language used to

refer e.g. to economic losses due to low snowpack for winter sports and a lack of a verbal link to “drought” (and related terms), which the EDII guidelines require to be made by a report used to create an impact entry. We will discuss this point in more detail in the revised manuscript.

P.17 l.413-414: Or maybe because dryness is more normalised in a Mediterranean climate and water shortages are not always reported as drought impacts?

- ➔ This might be an explanation for regions in the Southern parts of the Alpine Space. For other areas in the Alpine Space it could be that “cold winter droughts” are not associated with water shortages and therefore are not reported as drought impacts. We will further discuss this point in the revised manuscript.

P.19 l.453-455: Or water shortages because of a delayed or lower snow melt might not be reported as drought impacts?

- ➔ We think your raised point is especially important in the mountainous regions. Not only are some drought impacts delayed in the Alpine region, they also can occur in another region (upstream, downstream) and therefore might not be associated with drought. We will elaborate this point in the discussion of the revised manuscript.

Conclusions:

The first paragraph (l.475-487) fits better in the Discussion section than in the Conclusions.

- ➔ We also had this discussion beforehand and agree to rearrange this.