

## Review: An Alpine Drought Impact Inventory to explore past droughts in a mountain region. Stephan et al. NHESS-2021-24

This was a really nice paper describing the development of a new drought impact inventory for the Alpine region. The graphs and analysis used were novel compared to other papers which describe and analyse the EDII. I suggest only minor revisions to the paper before publication, these are discussed below and some more specific comments on the figures, text and written English are listed below.

Did you consider splitting (or aggregating the NUTS regions, perhaps NUTS3) by basin – this could be interesting in Section 3.1 where you look at the spatial differences in impacts, as well as Section 3.4 where you consider the different drought types.

Section 2.2 – further information on the specific sources of impact data for the Alps EDII would be useful. It's not clear for example, whether the Italian and German text reports were from newspapers, government reports etc. and it would be useful to have more information on the Propluvia French data as it is not clear what it is. Please include URLs to the sources where appropriate.

Section 2.2 - I suggest that you could put the example impact reports in a table – this would be easier to read and for readers to see the differences between the impact data from the different sources.

L149 – the choice of the case study years has not been explained – it would be good to introduce these years in the introduction perhaps with appropriate references in the introduction e.g. Lahaa et al. 2017 (<https://doi.org/10.5194/hess-21-3001-2017>)

L193 – The percentages here do not match up with those in the previous sentence – please check these figures

L387-389 – Here you say that 2003, 2015 and 2018 depicted are more comparable picture, but in the following state there was a remarkable difference in 2003. These points seem to contradict each other – unless the comparable picture refers only to the Agriculture and Forestry categories. Please clarify.

Section 4.3 – it would be interesting to consider the temporal trends and drought occurrence in the context of other known drought events (aside from the case study events used in the paper). For example, comparing the results to papers that consider the timing, propagation and characteristics of drought events (e.g. Laaha and Van Loon 2015 (<https://doi.org/10.1016/j.jhydrol.2014.10.059>), Haslinger & Blöschl 2017 (<https://doi.org/10.1002/2017WR020797>) such as Spinoni et al 2015 (<https://doi.org/10.1016/j.ejrh.2015.01.001>), Sheffield et al. 2009 (<https://doi.org/10.1175/2008jcli2722.1>) and others)

You make an interesting comment in the final line of the paper on the application of the EDII ALPS data; it would be interesting to explore this further in the discussion.

The written in English in places could be improved as in some cases it was difficult to really understand what was meant. Some points on this are listed below.

### Figures and tables

**Figure 1** – adding the country boundaries would be helpful here especially as you use the countries in the analysis later on. In the right hand figure there seems to be a small region inside the high

altitude region that isn't labelled. It is also quite hard to see the NUTS boundaries (which are also not labelled – you could consider adding them to the key) it might help to make the maps bigger and the boundaries thicker so they stand out against the elevation.

**Table 1** – foot note 1 should be moved to the caption for clarity (and could be mentioned in the text). You could consider showing these results in a heat map of all the pairs, highlighting these significant pairs (same for Table 2).

**Figure 2a** – please add a legend for the grey shading of the NUTS regions and make the country borders clearer

**Figure 2b** – in the caption please explain that data are shown for each sub-category so it is clear why for example the southern region has two labels for the agriculture impacts and why there are faint grey lines within each impact category block

**Figure 3** – it could be the resolution of the figure in this draft version, but the red text is quite hard to read – it is also not explained what the p value is in the caption.

**Figure 3** – I guess that the dotted plot is the 'counts of all reports per country and year' - please add a legend to indicate what size of the circles mean. I also suggest you label this figure 3b and the current figure 3b, to 3c

**Table 2** – I assume the dashes in the rows for the high altitude and southern regions indicate that there were no significant pairs for these regions, please clarify this in the caption.

**Figure 4** – the dates for the seasonal summaries start in March for spring, you could consider doing the same for the time series plots so that the values for the winter are all together.

**Figure 5** – the caption uses the acronyms DSM and DM but in the plot these are labelled as SMD and HD, please make these consistent here (and throughout the paper – sometimes you use the acronym and sometimes not).

**Figures 4 & 5** – In the captions for these two figures the sentence “Monthly values are related to frequency of the month with most impacts.” isn't very clear - does this mean that for each impact category the monthly data points for each month are from the year with the most impacts in that category? Please clarify this.

## Minor points

L72 – you could introduce the acronym EDII<sub>ALPS</sub> here

You introduce the abbreviations DSM and DH ~L40-45 but don't always use them, for example in the figures and in the discussion section.

L90 – should the Eurostat reference be a full reference with a date?

L142 & Data availability – doi to be updated if possible

L146 – it's not clear what total numbers you are referring to

L165 – it would be useful to refer to Table S1 here - you don't directly refer to it until much later

L169/170 – and throughout, you are not so consistent with the use of your acronyms, so here for example you could use EDII ALPS and EDII EU instead of the Alpine Space and the entire European region (you also don't define what the European region is – could you show on the inset map in Fig 1?)

L178 it's not clear what you are referring to by 'groups' here and L180 the end of this sentence is not clear – what do you mean 'if we tested more than two'?

L235 – it is not clear which three years you are referring to here

L256 – do you mean that the summer was always significantly different to winter?

L257 – you mention that summer and autumn were not significantly different in terms of the impacts, how does autumn compare to the other seasons?

L377-381 – it could be useful to link to Stahl et al. 2016 (<https://doi.org/10.5194/nhess-16-801-2016>) here which discusses the biases of the EDII and the text based impact report approach

L433 – you say you presented the least winter impacts, do you mean to say that there were fewer impacts in winter? The word presented here implies that there were impacts but you didn't show them

L442 – “as the problem is real and should not be ignored in management” this is quite informal and the wording could be improved

L454 – is there a word missing at the end of this sentence? What is the glacier melt used to fill? (presumably lakes?)

### English/grammar/spelling

Some points on spelling/the written English are given here:

Check tenses throughout – you mix between present and past tense, particularly in the discussion

L5 – is this missing 'report' from “Alpine Drought Impact Inventory” i.e. to be consistent with the EDII (European Drought Impact report Inventory)?

L8 – suggestion to change 'to entire Europe' (and similar phrasings throughout, e.g. L10) to 'the whole of Europe' to improve the grammar

L36 – 's' missing from end of Alps

L60 – add a comma after “In mountainous regions” to improve the readability of the sentence

L64 – should 'report' in European Drought Impact Report Inventory be lower case?

L65 – when talking about the 'Tourism and recreation' impact category throughout the paper, Tourism is spelt wrong ('Tourims')

L70 – needs either 'data' (or similar) at the end of the sentence or change to 'the EDII' so that it makes sense

L97 - suggested change: we chose the spatially higher resolved NUTS 3 regions because → we chose NUTS3 regions with a higher spatial resolution because

L102 – missing 'The' at the start of the sentence which currently starts “EDII itself”

L117 – I think here exemplary should read exemplar

L150 – should the colon should be a full stop?

L218 – where you have used the word 'relevance', do you mean 'occurrence' (applies to some later occasions where the word relevance is used e.g. L427)

L421 - the word 'especially' is not clear – do you mean that there is an expectation that drought impacts tend to occur in the summer?

L425 – suggested change: Summer and often early autumn impact dominance most clearly shown for the impact categories → Summer and often early autumn impact occurrences were dominated by the Agriculture and livestock farming and Public water supply

Some sentences were hard to follow and could be improved for example: L97-99, L453-454