

Interactive comment on “Analyzing airflow in static ice caves by using the calcFLOW method” by C. Meyer et al.

Anonymous Referee #2

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General comments

This is an excellent paper highlighting the importance of ice cave studies. The theme of ice caves has received a lot of attention in recent years and it has become apparent that these features can be as important, if not more important, than “normal” ice bodies for understanding the response of the cryosphere to climate change and for assessing the permafrost distribution and widespread/local thawing permafrost event in high mountains environment in the past. To understand dynamics of air flows and to possibly quantify their speeds are quite challenging procedure owing the severity of the environment, the logistic problems mainly related to the difficult access of such features and to environmental problems affecting the functionality of the instruments. Generally air flows are measured by using sonic anemometers which present various problemat-

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ics, and the idea of developing a method which use “only” a set of thermistors properly located in the underground environment, allows to project broad-spectrum research campaigns limiting the economical effort generally necessary to face such studies. The methods seem robust, the results are realistic and feasible and the overall discussion is excellent. This is a paper that could have good impact in research studies on this topic with the potential to become highly cited by the community of ice-cave researchers. I have a few minor points that need attention, especially in regards of figures that, on the contrary, do not reflect the quality of this work, but apart from these small issues I think that the paper is near to being ready for publication. Although the manuscript would benefit of some (minor) editing by a native English speaker it is very well written and easily readable.

Specific comments:

In the introduction (pages 5293-5294) I would add more details about what a static ice cave, maybe moving what is stated when you are talking about the model in the section 2. This would fix the problem from the beginning helping the reader to better understand the issue. p.5295 l19 I don't understand “specific colder air”... could you please explain? At line 25 you stated that the inflowing air will gradually warm by contact with the ice... I'm not sure this is always true, especially during late Winter / beginning of Spring when both air and ice reaches the lowest temperature. Could you please better explain this issue? P5300 l26 I would write “. The cave is situated at. . .” P5301 l 9-14 Here you write that the main purpose of this work was not to determine air speed, but while reading the abstract the idea that the readers have is rather different, and actually you are doing so in this work. So I suggest to rephrase here P5303 l14 which kind of moving mean is this? Centered? p.5308 l 21 to BETTER characterize the processes inside the cave. . .

Comments to Figures

Figure 1 Please correct the symbols on y-axis in order to have the same number of

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digits (-5.5; -5.0, -4.5, -4.0) The legend in each panel is not necessary even because fonts are too small. As far as I understood the same legend is valid for each panel on the left, and on the right. Therefore, I suggest to move at the bottom of the figure (outside panels) the 2 legends. Another option could be use the panel e) and the panel f) for the legends, but enlarging the font –size

Figure 2 Same as figure 1

Figure 3 This figure is poorly useful as presented. My suggestion is to delete the names of all the German showcaves from the map, possibly better highlighting their presence with a more intensive colour so that each showcave is more highlighted from the background (black dots?!). The name and location of Schellenberger ice cave should instead be better highlight by using a different colour for the location and a larger font for the text.

Figure 4 The legend is poorly presented and many items are missing. If measuring points are clearly highlight, a “bar scale” and the “North arrow” need to be added. Next, I personally do not understand what the two different light blue polygons represent in the picture, as well as the brown polygon on the left. Moreover from this picture it is not clear the extent of the ice deposits. This figure has to be redrawn in order to better highlight each and every symbol and updated to clearly state what is ice and what is rock or debris

Figure 5 Please correct the symbols on y-axis in order to have the same number of digits

Figure 6 Please correct the symbols on y-axis in order to have the same number of digits Figure 8

Figure 8 This figure is confusing. . . the legend in each panel (from a to f) is not necessary even because fonts are too small. As far as I understood the same legend is valid for each panel therefore I suggest to use the panel b) which have a lot of space

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to better highlight the legend with larger fonts. Another option could be to present the legend apart in a different panel. I personally don't like that graphs are cut at the value 0.9 (panels a, c, e) but I understand that you did this in order to maintain the same yaxis-scale for each panel. Maybe some words about this choice should be add in the capture

Figure 9 Same as figure 8. . . move the legend in one panel or put it apart

Figure 10 Same as figure 8 and 9. Please also correct the symbols on y-axis in order to have the same number of digits

Figure 11 and Figure 12 could be maybe combined together

Interactive comment on The Cryosphere Discuss., 9, 5291, 2015.

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