

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

C. Meyer et al.

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The reviewer suggests to reorganize the paper in a way that we add a section in the introduction about static ice caves in general instead of the description in section 2. This is a very good idea that we will include in the revised manuscript. Moreover he questions our formulation in p.5295 l19 “specific colder air”. Of course, we just meant colder air.

One question of the reviewer was about our statement in the paper that “inflowing air will gradually warm by contact with the ice”. Regarding this point we have to say that we do not have ice temperatures for Schellenberger Ice Cave to proof our claim, but from the specific energy and the relative masses of ice and air we would expect that

C3269

the air inside the cave cannot stay warmer than the surrounding ice/rock surface for a significant period of time. Cold air from the outside will only enter the cave if it is colder (and therefore heavier) than the air inside the cave. It follows that the inflowing air will be colder than the surrounding ice. When it reaches the temperature of the ice/air it will stop flowing into the cave. This of course is only true for static ice caves with no dynamic effects caused by other entrances at different elevations.

One other question was about the main purpose of this work. In the beginning of our work modeling airflow speed was the main focus of our work, but meanwhile we know that our results may be used for other purposes like e.g. modeling the energy exchange by air movement including attenuation of temperature variations. We will add some sentences about that in the Conclusions to make it clearer for the reader.

One side comment was, which kind of moving mean we do use. The moving mean is centered, not to introduce any artificial time shift. We will add this information to the revised manuscript.

We will improve the figures for the revised manuscript according to the corresponding comments. Figure 3 will be exchanged and for Figure 4 we will add a schematic side view of the ice cave part in order to make the extend of the ground ice clearer for the reader. In the ground view we will also make the extend of the ice clearer by using colours.

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

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