

Dear Editor,

The manuscript has been modified according to the comments of the reviewers and the scientific editor. Some additional changes have been made based on comments from colleagues. We have tried to keep up the track-and-change file, but changes were too many and it became a mess. So we have given up on this...sorry.

The major changes are:

(1) Definitions of variables and parameters have been made clearer with indication of dimension (REV. 1), e.g. lines 65-69 and at a few other places.

(2) We have added more discussion about the exposure factor and explain that it is hard to find something in the literature (REV. 1), lines 104-108.

(3) We have adjusted the calculation of absorbed solar radiation (REV. 2) with a correction factor f , dealing with the fact that an ice stupa intercepts more radiation than a horizontal ice surface. This factor depends on the shape factor s (lines 74-88). All the calculations have been done again with the correction factor included. The correction factor has been determined with a geometric model, but in our view it would go too far to describe the method.

(4) Two references have been added concerning the amount of diffuse solar radiation (REV. 2).

(5) We have commented on the fact that we do not make a real validation of the model against observations (REV. 3). We mention that the ice stupa height measured for the Val Roseg is in agreement with our calculations (lines 195-197).

(6) We agree with REV. 3 that a constant shape factor is a crude approximation. Therefore we have done a series of new calculations in which the radius is kept fixed and the shape factor thus increases (lines 53-56). The two cases (fixed shape factor and fixed radius) are compared in Fig. 3b. The differences are not very large.

(7) The number of figures has been reduced to three (EDITOR), according to journal guidelines. In Fig. 3 we use four panels, otherwise it is impossible to give a reasonable overview of the results.

(8) We have added some results with negative temperature perturbations, to show how much cooling is needed to make an ice stupa survive during the summer (Fig. 3d). Lines 159-164.

(9) 'Stupa' has been replaced by 'ice stupa' throughout the text.

(10) We experimented a bit concerning a location map as a panel in Fig. 1: this would take quite some space, or when it is made small, becomes messy. Personally I think the link to the Swiss interactive map is sufficient for those who want details..