**Formation of glacier tables caused by differential ice melting**

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*Referee's report*

Glacier tables are surficial features of glaciers in which a rock is supported above the ice surface by a column of ice protruding above the ambient surface. Their mechanism of formation is due to the shielding effect of the rock, which prevents melting of the underlying ice by radiative heat flux. On the other hand, the same heat flux warms the rock, which provides a conductive heat flux to the underlying ice, which offsets the shielding effect. This offset is reduced if the rock is large, in which case the glacier table can form.

The paper describes measurements of a field of glacier tables on the Mer de Glace, and then provides a simple one-dimensional theory to explain the measurements. The measurements show an interesting relation between boulder size and height of the supporting ice column. I suppose that the spread in the data is at least partly due to the fact that the height $H$ will grow with time, and its maximum represents the height when the boulder topples; if that is the case, it is worth pointing out, presumably in the caption to figure 3.

The theory is simple as it is one-dimensional, but well presented and justified for all that. Obviously a one-dimensional theory misses the lateral melting of the ice column and thus the cause of rock collapse, and it might be interesting in future work to add a lateral melt component (which can be done in the same fashion as here). Although the model is validated with reference to the four principal rocks, the statement at 199 that there is 'excellent agreement' of the theory with the measurements for the sample of 80 tables is disingenuous: it is obviously not. What can be said is that the agreement is good for small ice columns, but it is quite inadequate for large ice columns and for holes ($H < 0$). Indeed one of the features of figure 3 is that the data follows a fairly well-defined curve (with spread perhaps due to the comment above (?)) where on the face of it $H$ asymptotes to $\sim -0.5$ m for small $d$ or $h$ (use $h$ not $e$), and appears to become infinite (well, large) for $h \sim 1$ m or $d \sim 5$ m. It seems to me that this latter behaviour is associated with a lack of lateral melt of the column (and thus $H$ can become very large as toppling will not occur). For a large boulder, radiative melting will disappear due to complete shading. Using the numbers in the paper, I find the short wave radiation to be $\sim 220$ W m$^{-2}$ and the effective (LW and turbulent) heat flux to range from 35–126 W m$^{-2}$, depending on wind speed. Under a large boulder, only the turbulent heat transfer will provide much melting, and I suppose the column narrows more slowly, allowing growth to greater heights. Similarly for holes, for example the left most data point in figure 3a, a 1 cm pebble in a 5 cm hole will be effectively shielded both from wind and incident radiation. So in my view the correct statement is to highlight the agreement at small $H$, but also highlight the disagreement at large or negative $H$, and then comment accordingly, perhaps as above.

Some smaller points:

I found the second half of the abstract rather confusing and the authors might want to clarify the text.

Figure 1 is far too small. Also figures 2, 3, 5. Figure 6 should be a bit bigger.

Lines 18, 34: other rock forms are *tafoni*, and on ice surfaces, ice sails (or pyramids).

42: narrow and deep holes.

46: a role in.

49: Mer de glace glacier → Mer de Glace; and delete the second comma. Also in figure 2 caption, and at 58. Also in that caption (and later in the model, e. g., 61, 63, etc.) $e$ is a very poor choice of symbol; use $h$.

64: noted → denoted.

136: felt → fell.

138: than → as. I'd just say 'the supplementary material'. Also at 146, 150 and 152, and figure 7 caption.

141: cap → cap rocks? Or caps.

152: remove indentation.

184: must be W $m^{-2}$.

186: thickness.

195, and elsewhere: I prefer the units without the dot (which serves no purpose), that is m $s^{-1}$ (with a space) rather than m·$s^{-1}$.

206: sinks . . . forms.

223: leads.

230: raises.