

## Response to comment by referee J Woodward (original comments in gray box)

We thank Dr. Woodward for his generous and helpful comments.

This is a well structured, important paper providing insight into basal crevasse formation on Antarctic ice shelves. The paper neatly highlights the importance of basal crevasses and provides a novel method for recognising them from remote sensing imagery. The remote sensing imagery is tied to ground-penetrating radar profiles from the Larsen C Ice Shelf. The GPR profiles are thoroughly convincing and well displayed. Numerical modelling is then applied to predict crevasse penetration heights. I am not best placed to review numerical modelling papers, so refrain from commenting, suffice to say a more complete modelling assessment of crevasse formation for the Ice Shelf would be an obvious next step in developing this work.

I have only limited questions regarding this paper, as it is well written, well presented and well researched.

Minor points are:

1. I was interested in the comments in lines 9-17 on page 2038, referring to the temporal pattern of crevasse formation. S1 crevasses seem to form every 5 years, with S2 crevasses forming every 14 years. Why is this? What controls the timing of crevasse formation? This could be revisited and commented upon in the discussion.

We assume that crevasses are generated at different time intervals in response to the different stress regimes. A crevasses will propagate when the stress exceeds a critical value, and the time it takes to reach this critical value will depend on factors such as ice thickness and speed. Although it is of great interest, it is sadly beyond the scope of this paper to include a discussion of this aspect.

2. Line 12 of page 2046 indicates other remote sensing images are not shown because of 'considerations of space'. Please produce this figure and include it for completeness. Space should not be an issue in an interactive online journal.

We agree, and have included the said figure.

Thanks.