

Interactive comment on “Basal crevasses in Larsen C Ice Shelf and implications for their global abundance” by A. Luckman et al.

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The paper by Luckman and others provides a detailed study of basal crevasses in an Antarctic ice shelf by means of GPR, optical satellite remote sensing, and a fracture mechanical modelling of the height of crevasses. The comprehensive case study on Larsen C Ice Shelf however would benefit considerably by including also radar satellite imagery in addition to the optical ones, because they reveal features below the surface, which are otherwise hidden under the snow cover.

Basal crevasses and coincident troughs in the layering at the surface of ice shelves were quite recently discussed by the paper Humbert & Steinhage, TC, 2011. The paper reports similar findings and we recommend an in depth comparison with those results and the explanation for their origin given therein. We would like to mention that

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Swithinbank (1977) does not deal with floating ice and is thus not a suitable reference. To our knowledge, the study on the evolution of the Fimbul ice shelf showed these structures for the first time.

Page 2042/2043: In particular the issue of surface crevasses linked with basal crevasses is of interest. Humbert & Steinhage found no prominent surface crevasses directly above the basal crevasses in high-resolution TerraSAR-X images: “The hyperbolae are clearly not located at the surface, nor is there any hint in TerraSAR-X images that surface crevasses in coincidence with the dark stripes exist (whereas few narrow, short cracks on the sides of the dark strips exist, possibly arising from bending stresses)”. Thus, the discussion (p. 2043, l.7) about its origin would benefit from a comparison with these statements, in particular as the spatial resolution of the optical satellite imagery and the radar imagery is considerably different, as well as the radar imagery penetrates the surface.

Interactive comment on The Cryosphere Discuss., 5, 2035, 2011.