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The Cryosphere Discussions
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Interactive comment on "Brief Communication: Outburst floods triggered by periodic drainage of subglacial lakes, Isunguata Sermia, West Greenland" *by* Stephen J. Livingstone et al.

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General comments

The manuscript is well written and reports on some very interesting observations. The main shortcoming is a complete lack of the investigation and discussion of ice-dynamical effects. While a numerical study is clearly outside the scope of this paper, the DEM and satellite velocity data products could be easily investigated to answer some important questions.

A sublgacial lake of a lateral extent of twice the ice thickness will strongly affect the

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surface topography and the ice flow field. Is there any evidence of a flat surface over the lake (this should be readily visible form the DEM)? Is the surface structure changing after the drainage events, e.g. a downstream buldge, or crevasse zones?

The ice flow field would also be greatly affected by uncoupling from the bed of such a big area. Is there indication of increased lateral crevassing, or a compressional zone including a surface bulge at the downstream end of the lake? Are ice velocities higher over the area of the subglacial lake? Are velocities changing during drainage and refilling?

Minor comments

26 "channel melt rates" (it is important to distinguish this from surface melt).

33 "surface melt water"

41 This is somewhat problematic, as the lakes are at the ice bottom, which is not above the ELA. Their locations are at positions in the accumulation area, where the *surface* is above the ELA, or simply, above the EL.

62 Were these anomalies stable in space, or moving with the ice?

72 An indication of the ice thickness above these features is needed.

115 The change in surface elevation is only discussed in terms of subglacial water storage. Another cause could be ice compression by horizontally convergent ice flow. Can this be ruled out by the surface velocity field?

Figure 1: Years are barely readable. Better underlay the numbers by white background. Also describe in the caption that the "ice dammed lake (white background)" is visible on the surface.

Figure 2: The black line should be broken at 2011, as the anomaly might have been much lower than suggested by the line.

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