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Interactive comment on "Boundary conditions of an active West Antarctic subglacial lake: implications for storage of water beneath the ice sheet" *by* M. J. Siegert et al.

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We are very grateful to the online review of our work by Michael Wolovick. As we have done for Sasha Carter's review, we offer our initial response to the comments below, prior to a formal description of changes made to the paper in light of all reviews once the interactive session is completed.

We are pleased that Michael found the paper interesting, and that be believes it has wide-reaching implications for the use of radar to locate subglacial water.

The first recommendation is to further promote the main findings of the paper – that RES may not be able to detect 'active' lakes, thus implying a larger volume of basal

water may exist in Antarctica than currently thought, and that 'active' lakes may not be contiguous bodies of freestanding water. Michael suggests an additional paragraph in the summary section, which we are happy to provide.

Michael has four specific comments, which we respond initially to as follows.

A. Alternative explanation for the ICESat surface uplift. A good point is made that ice surface elevation changes may not necessarily be caused by basal water movement. We agree with this general point. We also agree that for Institute E2 the most likely explanation is the discrete accumulation of basal water. As recommended we will detail what the alternative explanations might be, and how they can be eliminated.

B. Radar attenuation. A comment is made to justify the use of radar attenuation rates. We use attenuation rates commonly employed in WAIS by BAS geophysicists. We will also make it clearer why changing the absorption rate will not adversely affect the relative regional pattern of basal reflected power (though it will of course change the absolute values). The point being that the identifications of locations of relatively high reflectivity will be insensitive to the likely absorption rate.

C. Hydrological pathways. We will provide more detail on the hydrological routing model used, as we agree that the model has an impact on the predicted flow of water. Le Brocq et al. (2006) provided a nice assessment of the issue with respect to ice flow, which we can refer to.

D. As noted by Sasha Carter, the bed elevation data we present come from more RES data than we show in the figure of RES transects. This is easy to fix (with reference to Ross et al. 2012), and we will do so when we update the paper.

Michael also had some comments on the figures, which are relatively easy to fix and we will do so in our formal revision of the paper.

References

Le Brocq, A., Payne, A.J. and Siegert, M.J. West Antarctic balance calculation: impact

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Ross, N., Bingham, R.G., Corr, H., Ferraccioli, F., Jordan, T.A., Le Brocq, A., Rippin, D.M., Young, D., Blankenship, D.D. and Siegert, M.J. Steep reverse bed slope at the grounding line of the Weddell Sea sector in West Antarctica Nature Geoscience, 5, 393 - 396.doi: 10.1038/ngeo1468, (2012).

Interactive comment on The Cryosphere Discuss., 7, 2979, 2013.