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## ***Interactive comment on “Constraining the recent mass balance of Pine Island and Thwaites glaciers, West Antarctica with airborne observations of snow accumulation” by B. Medley et al.***

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Medley et al. (2014) provide a comprehensive and valuable assessment of mass balance on some of the most important outlet glaciers of WAIS. The combination of methods and data are an advance over previous efforts and represent what are current best practices. Below are several comments for further clarification in this well written and important paper.

957-20: The hypsometry is quite different for TG and PIG in Figure 2. This is worth

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a brief mention here or in the paragraph below, but also in the discussion section in terms of impact on temporal mass balance response observed to date if any.

961-3: Is the isochronal dating reported here from the density-depth time model or from the horizon counting using hydrogen peroxide summer maximum and other annual markers? Given the reported values below I would assume the latter. It is critical to contrast dates derived for at least Horizons H1 and H3 from the firn cores analysis using the direct observations of hydrogen-peroxide concentration, water-isotope ratios, and non-sea-salt sulfur to sodium ratio versus dates and from the density- time model in a table this is the validation we need.

961-10: The comparison referred to here without the suggested table above is not sufficient evidence for the statement made.

962-22: Why not refer to H2 and H3 dates and depths found in the cores here? The values if reported in the table comparing model versus chemical dating would naturally be discussed here.

966-10: I agree with the assessment of almost all surface velocity resulting from basal sliding; however, is there a reference or data you can provide to make this assertion. Nick et al (2007) provide a good means of assessing depth average velocity, which is not required here if previous referencing is available.

975-18-25: Does the numeric data reported here need to be restated, since it is in the tables, figures and text? It takes away from the larger points that follow.

Table 4: Provides critical flux gate discharge data that should be depicted in a figure to better illustrate the temporal variations and the difference between the glaciers in this progression. This is more important than the sea level rise contribution axis in Figure 10, and could replace that or as a separate figure. The SLR contribution could easily be placed in Table 5 or text.

Nick, F. M., van der Veen, C. J., and Oerlemans, J.: Controls on advance of tidewater

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glaciers: Results from numerical modeling applied to Columbia Glacier, J. Geophys. Res., 112, F03S24, doi:10.1029/2006JF000551, 2007.

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Interactive comment on The Cryosphere Discuss., 8, 953, 2014.

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8, C94–C96, 2014

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