

## ***Interactive comment on “Variability Scaling and Consistency of Airborne and Satellite Altimetry Measurements of Arctic Sea Ice” by Shiming Xu et al.***

**Anonymous Referee #3**

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This is an interesting study which analyzes variability between CryoSat-2 and airborne data sets of freeboard from Operation IceBridge and CryoVEx. The analysis provides a useful look at scales of variability between the data sets which considers instrument noise, retrieval errors, and random error sources.

I found this to be a well-written manuscript which provides valuable information useful for comparisons between the satellite and airborne data sets, as well as interpretation of results from the data sets on an independent basis. I just have a few minor comments listed below:

P2 L30: I think it's a misconception to state that the radar penetrates a certain percent-

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age of the way through the snow cover, rather what happens is that the return contains energy from the snow surface, snow volume, and ice surface and depending on the local conditions and tracker used this can lead to a bias in the retrieval of ice freeboard. P3 L27: I believe the bandwidth-limited range resolution of CS-2 also greatly contributes to the low correlation on a shot-to-shot basis. P14 L 7: There was actually temporally coincident data between OIB and ICESat in 2009, however the laser energy of ICESat had degraded substantially by this point to make data potentially problematic for a comparison such as this.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-220>, 2019.