

## ***Interactive comment on “Three years of sea ice freeboard, snow depth, and ice thickness of the Weddell Sea from Operation IceBridge and CryoSat-2” by Ron Kwok and Sahra Kacimi***

### **Anonymous Referee #2**

Received and published: 12 July 2018

The paper presents the variability of sea ice and snow parameters on two repeated OIB survey lines across the Weddell Sea and examines the potential synergism between OIB lidar and CS-2 radar. The paper is well written and can be published with some minor revisions.

The authors use data from three sensors: CS-2 radar, OIB LIDAR ATM and Snow Radar (SR), which have vastly different spatial resolutions and data collection date/time. In the “Data Description” section, the authors provide some background information about each sensor/dataset used but don’t include sufficient details on how these data sets are matched up and their associated mismatching uncertainties (spatial

C1

and temporal). In addition, the authors made many comparisons between the “derived estimates” and “retrieved quantities.” What is missing from those comparisons are consistencies between CS-2 and SR ice freeboard, as well as ATM and SR snow (total) freeboard, which is fundamental to the differences between the “derived estimates” and “retrieved quantities.”

Page 3, Ln 32: It is not clear “what “aspect of the algorithm” has been disabled.

Page 4, Ln 1-11: A detailed and quantitative description of the interface detection algorithm is necessary but missing. Also, please provide references if available.

Page 4, Ln 24: “described above” should be “described below.”

Page 6, Ln 14-15: The sea ice thickness are calculated in six different ways. Can the authors compare this calculated thickness against the ice thickness derived from the snow radar data only?

Page 7, Ln 22-23: It’s fine to compare total freeboard against snow depth, but comparisons of ATM and SR freeboards should be included in the discussion.

Page 9, Ln 10-11: When comparing monthly CS-2 data against individual OIB track data, one needs to understand the variability of sea ice at month scale. This discussion should be included in the paper.

---

Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2018-98, 2018.

C2