

## ***Interactive comment on “Effects of decimetre-scale surface roughness on L-band Brightness Temperature of Sea Ice” by Maciej Miernecki et al.***

**Maciej Miernecki et al.**

maciej.miernecki@cesbio.cnes.fr

Received and published: 31 October 2019

Dear Dr. Landy,

I am writing to you to supplement my initial response to your remarks. In the most recent version of the manuscript (2019/10/31) we used the measured, empirical CDFs instead of the fitted ones. Also, in the attachment you will find the figures with the exponential fits to the slopes PDFs for all of the roughness classes (Fig. 1 and Fig. 2 added below).

C1

Kind regards,

Maciej Miernecki

Remakes considered:

**4. Could you not just use the observed empirical CDF within each 70 m footprint, rather than the statistical model fit, to simulate  $T_b$ ? i.e. integrate over the  $N$  pairs of angles for each facet within the 70 m footprint. Is this just to speed up your simulations ( $70^2/0.5^2$  is only about a factor 2 larger number of facets than your  $10^4$  criteria), or so you can calculate average model results over 5 km sections? Using the observed CDF may produce a better model fit to the radiometer observations.**

»> In the current version of the manuscript we use the empirical CDF directly from the measurements (without fitting). This indeed improved the  $r^2$  performance matrix. However, the simple one-layer model setup that we used is inadequate to simulate the sea ice brightness temperature.

**P7 L10. Can you show the exponential function fit to each class of data in Fig 3, so we can see how well it performs?**

»> In the attached files and Fig. 1 and Fig. 2 shown below, we present the exponential fits to the slopes PDF for all of the roughness classes. Although in the manuscript (Figure 4) we have added only the fits for the selected ones.

C2

Please also note the supplement to this comment:  
<https://www.the-cryosphere-discuss.net/tc-2019-110/tc-2019-110-AC3-supplement.pdf>

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-110>, 2019.

C3

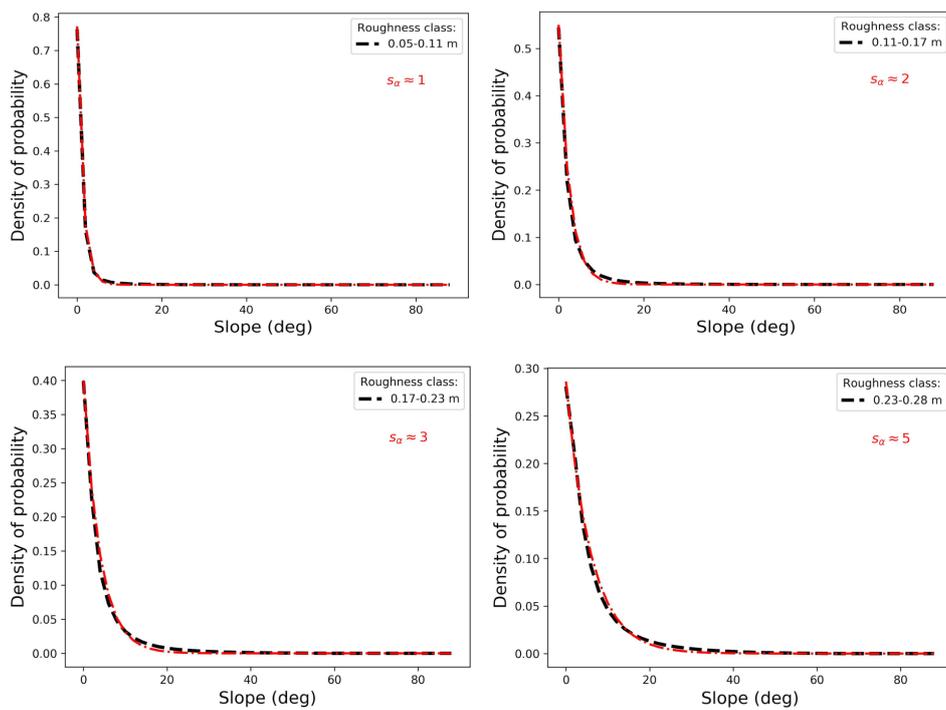


Fig. 1.

C4

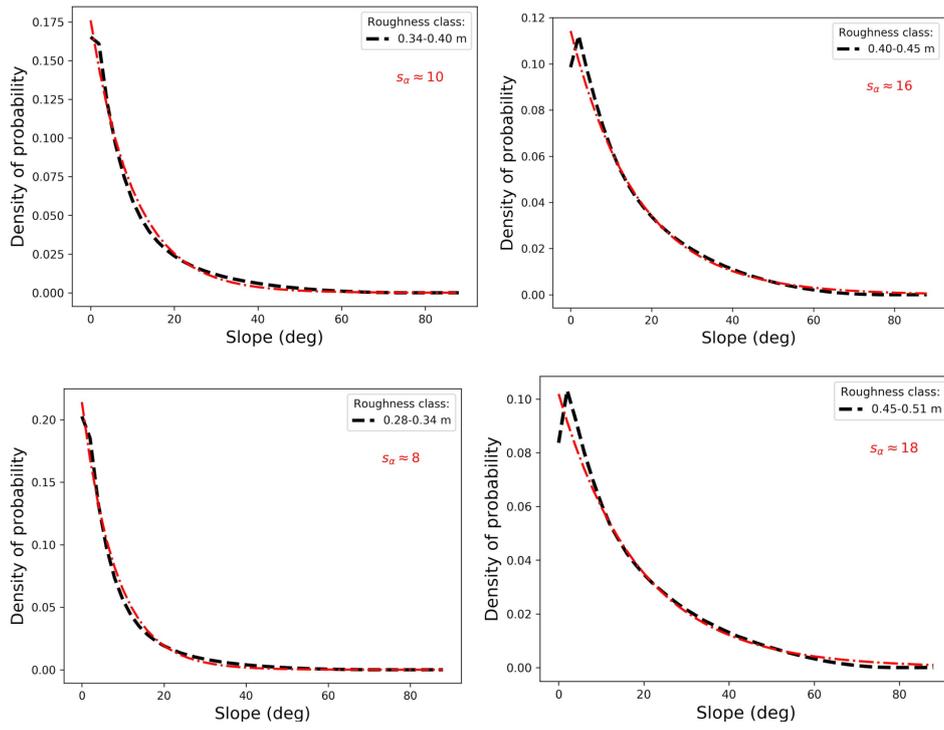


Fig. 2.