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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sea surface wind speed estimation from space-based lidar measurements" *by* Y. Hu et al.

Anonymous Referee #1

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General comments:

This is a very nice paper. The authors applied a unique data set to an old problem, using a thorough analysis that led to a significant new result. As more data become available, I am sure that this paper will prove to be the beginning of a rapid increase in our understanding of the reflection of light from the ocean surface. I generally agree with the comments of Referees 2, 3, and 4, except that I think tan theta; is, in fact, the slope. I do have some additional minor comments, described below.

Specific comments:

P 2778, line 2: This paragraph describes different correlations between AMSR-E wind speed and lidar backscatter. (e.g., There is good correlation between the lidar

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backscatter and wind speed for wind speeds lower than 12 m/s.) I would like to see the actual correlation coefficients in addition to the qualitative descriptions.

P 2778, line 25: Like Referee 4, I would like to see more information on how the best fit was calculated. I would also like to see a quantitative comparison of the goodness of the three fits considered. An rms error is presented for the new fit, but not for the other two that are discussed.

P 2779, line 6: Here and in the summary and discussion, the authors claim that a linear relationship between wind speed and slope variance for a two-dimensional Gaussian slope density function implies that the slope variance for a one-dimensional Gaussian depends on the square root of the wind speed. I do not understand this. It seems to me that the variance of the 2-D Gaussian is the sum of the variances of the two orthogonal 1-D Gaussian variables, so the dependence of the 1-D and 2-D variances on wind speed would be the same. A little more discussion of why a variance proportional to the square root of wind speed implies a 1-D Gaussian process would be useful.

Technical corrections:

P 2774, line 4: The variance should be sigma squared.

P 2774, line 5: I do not think isotropic is the right word here. For an isotropic surface, we would have equal variances in the x- and y-directions.

P 2774, lines 7, 8: delete g

Figure 4 caption: Needs description of the lower panel.

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