Reply

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We explicitly noted in paragraph 4, section 9 of our paper that we expected our results to be in error by some unknown amount if whitecaps were present at higher wind speeds. We considered including the statement that, in the presence of whitecaps, the albedo of the sea surface, r_-, would be given by

$$r_- = r_-(\text{water}) \cdot (1 - f) + r_-(\text{foam}) \cdot f,$$

where f is the fraction of the sea surface covered by whitecaps, $0 \leqslant f \leqslant 1$, r_- (water) is the albedo of the water, and r_- (foam) is the albedo of the foam in the whitecaps. However, we did not have available data of the quality shown in Fig. 1 of the comments, from which we could have determined f. Moreover, even if f is known, there is considerable uncertainty in the value of r_- (foam): values cited in the comments range from 0.22 to 0.6. Thus, we felt it beyond the scope of our paper to discuss the effects of whitecaps in any detail.

We reiterate that there are still other physical processes which can affect the albedos, but which are not considered in our surface study. In particular, the optical properties of the water body itself can alter the albedo r_- (water) by perhaps as much as 10%, as we noted in our section 10. In optically shallow water (e.g., nearshore coastal regions or lakes) bottom characteristics also influence this albedo. Both of these effects can be accounted for by using the irradiance model referenced in our paper together with the results of the surface study.

Our calculations of the contribution of the water surface to the total albedo stand complete and correct for the stated model. The work of Monahan and O'Muircheartaigh is a welcome extension of our study and complements our estimates of the sea surface albedos.

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