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Interactive comment on "Reflective properties of white and snow-covered sea ice" *by* Aleksey Malinka et al.

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First of all, we are grateful to our reviewers for their skilled and professional comments.

Below we will try to answer carefully to every note.

Anonymous Referee #1 Received and published: 21 July 2016 This paper is aimed at theoretical and experimental studies of reflective properties of white and snow-covered sea ice. I suggest the publication of this paper after minor corrections.

Thank you.

The authors may address the following points: 1. I do not think that the mean photon path length (MPPL) coincides with the value of a_ef. Please, establish the link.

Yes, you are right. This coincidence exists only for the pure random mixture, i.e., in the

case in point. Except for the constant factor of 3/2 or 3/4 used by the different authors in the definition of aÂ■eff (depending on either radius or diameter of the equivalent sphere is used), the effective size coincides with the mean chord. On the other hand, the mean chord coincides with is the MPPL in a particle of random shape. However, for any other shape, when the angles of refraction and photon path lengths are not strictly independent (e.g. for spheres), the mean photon path length for sure does not coincide with the mean chord, which by definition assumes the random straight line field. The appropriate corrections are made in lines 25-26 on page 3.

2. Eq. (11) has been derived assuming that k=0. Please, say in this in the paper (and also for other similar equations).

In Eq. (11), as in the whole theory (Malinka, 2014), k is assumed to be small but not necessarily equal zero. In Eq.(11) you can see ω0, which can be <1, and α, which can be of any value.

3. Please, derive Eq. (11).

Eq. (11) is derived in Malinka, 2014. To avoid misunderstandings, we put a phrase that all the Eqs. from (6) to (16) are derived there (P. 4, Ls. 5-6).

4. Do not you think that the value of g=0.67 (p.10) is too small for large scatterers like ice grains?

Note that these results are derived in the framework of the geometrical optics. The value of g with diffraction will be approximately (1+g)/2, i.e. about 0.84. The appropriate comment is added (P. 10, l. 6).

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