

## ***Interactive comment on “Mapping radiation transfer through sea ice using a remotely operated vehicle (ROV)” by M. Nicolaus and C. Katlein***

**Anonymous Referee #2**

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### General comments:

This paper describes measurements of spectral irradiance and radiance that has been transmitted through Arctic sea ice and seawater to a depth of a remotely operated vehicle (ROV). The writing is clear, but very sloppy (see specific comments). The data set collected is very interesting and seemingly of high quality. I was excited to see what new scientific insights could be obtained from such an unique data set. However, I am very disappointed that I cannot identify any new insights. This paper reads as a data report, and in my opinion needs significantly more data analysis and better presentation of scientific results to be considered for publication.

### Specific comments:

C1607

p.3614, line 1: Solar short-wave radiation is not the definition for light.

p.3614, line 2: shortwave radiation is only a part of the "energy transferred through ice". The way it is written in the abstract is misleading. Further, shortwave radiation transmitted through openings, such as lead and cracks, also contribute to the melting of ice and heating of the water column. Formation of ice is of course also controlled by heat transfer through the ice, but this is heat conducted from the bottom and solar radiation has no direct role in this.

p.3614, line 20: albedo and transmittance are ratios and do not reflect the amount of solar radiation reflected or transmitted.

p.3614, line 3: "these" refer to amount and should thus be "this".

p.3615, line 1: This sentence is clumsy. "Their" refer to "fluxes through snow and ice, but then "their" importance is linked to light penetration through bare and ponded ice.

p.3615, line 11: Be consistent in the use of either "sea-ice" or "sea ice".

p.3615, line 20: The use of the term "classical spot measurements" is strange since it refers to studies where measurements were done along transects under ice (not as long as with the ROV) and vertical profiles.

p.3616, line 7, 13: "vertical transects" and "vertical distribution": no such data is shown in this paper.

p.3616, line 13: What are the "new insights"? I can find none. I am sure the data set can contain plenty of new insights, but its interpretation and presentation is way too poor.

p.3616, line 8: Figs. 2 and 3 should come before Fig. 4 (true for the order of other figures as well).

p.3620, line 5, 7:  $I_{\{d,u\}}$  and  $E_{\{d,u\}}$  are not defined clearly and not consistent with Table 2. Is "u" for upwelling radiation, or "under-ice"?

C1608

p.3620, line 9: What is "SAMIP" and what is "SAM"?

p.3621, line 7: No reference to find supplementary data set. Should it be called supplementary if it is not part of the submitted manuscript?

p.3621, section 2.6: Symbols are not consistent with those in Table 2.

p.3622, line 4: the term "transflectance" is typically used for something else than radiance normalized to incident irradiance.

p.3623, section 3.1: This section does not belong in the results section.

p.3625, lines 3-14: Why would the light field be expected to be isotropic especially at some depth below a highly variable ice cover?

p.3629, lines 1-18: Do the analysis suggested in this section, and resubmit this valuable data set.

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Interactive comment on The Cryosphere Discuss., 6, 3613, 2012.

C1609