

# ***Interactive comment on “Bipolar long-term high temporal resolution broadband measurement system for incoming and outgoing solar UV radiation, and snow UV albedo, at Sodankylä (67°N) and Marambio (64°S)” by O. Meinander et al.***

**Anonymous Referee #1**

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## **A) General comments**

The manuscript is divided into two parts. First it presents the bipolar UV albedo monitoring station at Sodankylä and Marambio. It explains in full details the setup and the challenges operating these polar stations. The second part tries to give an extensive overview over albedo measurements, analysis and modeling of these kinds of data. The later chapters are defined as literature review by the authors.

The first part is a fundamental manuscript which could be used a master reference not only for further work related to the two measurements station but also to similar

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projects.

The second part summarizes resent albedo studies. It references to already published work. Although the reader gets a nice overview over these works this section is strongly questionable. Does this literature review fit to the more technical section in the beginning of the paper? These summaries of many publication do not enhance the readability of the manuscript. Thus, on the one hand the reader gets a nice overview of the past studies but on the other hand – without reading the actual papers – it is difficult to grab the paragraphs of this literature review.

## B) Specific scientific comments

The following comments should be taken into consideration to improve the quality of the manuscript:

- 1.) The setup in Marambio is fixed to a container which affects the snow deposition around it depending on the wind direction. How is this effect handled?
- 2.) Measuring height of 2m: If the snow accumulation around the setup is more than 1m than the distance between the snow surface and the instrument is below the recommended standard height. Does this never occur at both stations?
- 3.) It is unclear what the cleaning frequency of the entrance domes actually is.
- 4.) Is there any kind of ventilation and heating systems (VHS) around the devices? If not, how many measurements are affected by snow accumulated on the sensors?
- 5.) In line 191 the life time of sensors is discussed. Do the author mean the lifetime of the calibration or the device itself? Sensitivity changes of this sensor type are mostly affected by the lack of maintenance (old desiccant). This is independent on the light exposure and sensitivity changes happen most frequently in the storage rooms.
- 6.) The sensors of Marambio are calibrated in Finland which includes long distance transportation. Sensitivity changes are thus detected after the arrival in Finland. Air

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travel can strongly affect the sensitivity of the sensor by the lower pressure present during the transport (humidity can enter the device). This can be tested during the calibration period at the calibration facility. Could the authors comment on this point?

#### C.) Presentation

First of all it should be considered to either move section 3 and 4 to a separate manuscript. Alternatively these two sections could be shortened to one section "Albedo literature review" with a few paragraphs listing the literature references. The emphasis of the paper as indicated by the title should be on the "measurement system" of the two stations. Currently the paper is divided approx. 60/40. Otherwise the manuscript is clearly structured. Minor modifications are recommended to improve the quality of the paper:

- 1.) Throughout the paper abbreviations are used either without declaration or they are multiple times declared. In addition, no common declaration style is used or late declarations are used. Consider using the standard style: "first use, first declaration". Examples without claiming to be complete: line 53 "RT", line 107 "SMN", line 217 "SZA", line 285 "VIS", ..., line 31 and 94 "IPY", line 44 and 59 "UV", line 29 and 77 WMO and (WMO), line 290 – first late declaration of "BC"
- 2.) The statement "first time" is used in line 24, 57, 69 and 332. As this is intrinsic for a novel manuscript it is not needed.
- 3.) Line 110: "The measurements" change to "The measurement devices" (or similar)
- 4.) Typo line 136:  $2\pi \rightarrow 2\pi$
- 5.) Paragraph line 154 to 160 is essentially a copy of the former (146-153). Both paragraphs could be merged together.
- 6.) Equation 2 (if the paragraph remains in the paper) should be written as:  $A=c*SZA$ , with A being the albedo decline, c the fit constant and the solar zenith angle SZA (if not previously defined!). In the Neumeyer data c found out to be -0.024 or -0.0024 (line

266 and 268)?

Figure 3: The location of the radiometers at the container is not visible.

Figure 5: Copy of Meinander, 2013. This meaning is only understandable in the context of the original publication.

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