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The Cryosphere Discussions

Interactive comment on "Brief communication "Snow profile associated measurements (SPAM) – a new instrument for quick snow profile measurements"" *by* P. Lahtinen

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As the reviewer suggests, the introduction should state more clearly what has been presented, studied and achieved. The main achievements are that the instrument concept proved to be easy to use and that the extinction measurement provides results which are in line with the existing literature, ie. exponential decay below the topmost snow layer (e.g. Warren, 1982).

The irradiance sensor was compared side-by-side with Analytical Spectral Device (ASD) FieldSpec Pro. ASD measures the irradiance from 350 to 2500 nm with 1 nm step. As the TSL230R sensor of SPAM is sensitive in the range from 300 to 1100 nm,

the ASD data were integrated from 350 to 1100 nm to yield a comparison value. Fifteen irradiance spectra were averaged before the integration. The simultaneous SPAM data consists of 9365 measurements. The averaged irradiance values differed by 2.5 %, small part of which comes from the missing 50 nm band. The peak-to-peak jitter in the SPAM irradiance data was 1.2 % of the mean value. These results were not originally seen relevant, but based on the reviewer comments the author now sees they should have been shown.

In the case of light extinction measurement, the absolute accuracy of the sensor is not critical as the measurement is relative to the irradiance at the surface. The datasheet of the TSL230R sensor states that the non-linearity is less than +- 0.2 % off the full-scale frequency range used in the instrument (0 to 100 kHz). As the relation between the frequency produced by the sensor to irradiance is linear, the irradiance values have the same very low non-linearity.

In light of this review, the proposed modifications are to add "The following chapters discuss some potential uses of the measurement concept." to the beginning of Chapter 2.2, and modify Chapter 2.2.3 towards more discussion-like text. Chapter 3 would present only the gained results on light extinction, and also Chapter 4 would be adjusted accordingly.

Interactive comment on The Cryosphere Discuss., 5, 1737, 2011.