

***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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This manuscript presents an interesting idea on a potential sensor for rapid snow-profile measurements. However the paper is far from being ready for publication. The overall concept of the measurements and the associated theories are missing. The geometry of the setup of each sensor should be presented in detail and discussed. Since it differs from plane-parallel, and since the incident radiation is far from being a plane wave there is a need for radiative-transfer simulations. Simulations are needed for the transmission concept, the reflection or scattering concept, the thermal IR sensor, and the acoustic sensor. The results of such computations should show that the instrument

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is able to derive snow-physical parameters, such as density, temperature, specific surface area, layer properties and possibly others. The associated physics should show how the different observables are related, how well the snow parameters can be retrieved, and how critical the disturbances are that are created by the instrument shaft, by the sensors and by the handling. The analysis will show if the instrument is optimal or if it can be improved by changing the critical parameters (like optical/acoustic wavelength ranges, size and material of support elements). At present none of these analyses have been shown to exist, and most details are missing.

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

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