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Measuring and modeling temperatures within the uppermost snowpack layers

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Both the surface temperature and the temperature within the uppermost layers of the snowpack to a large extent determine snowpack evolution within these layers and hence weak layer formation. However, it is not straightforward to get reliable and continuous recordings of those temperatures. Continuous recording of snow temperatures at daytime in loose new snow and under clear sky conditions is known to be difficult as sensors pick up short wave solar radiation and thermal contact to the ice matrix is very often insufficient. Various trials lead to the design of a probe which is inserted vertically into the snowpack and allows to measure snow temperature within ± 0.1 K with a spatial resolution of 1 cm. Temperature profiles measured at regular time intervals over a 24 hours period including quite fair sky conditions in daytime are compared to model outputs of the Swiss snow-cover model SNOWPACK. The dependence of model performance on boundary conditions as well as input data quality can thus be tested. The resulting influence on modelled layer evolution will then be discussed.