



## **Quantitative stratigraphy of snow resolved by high-resolution penetrometry**

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Precise measurements of snow structural parameters are essential to understand and model snow physical processes. Snow metamorphism, mass and energy balance of snow, radiative properties or the snowpack stability with respect to avalanche formation, all these processes depend on the snow structural parameters and the stratigraphy of the snowpack. However, most snow measurements are limited in spatial and temporal resolution and by extensive measurement times. For this reason, we developed a statistical model to derive three major snow structural parameters, density, correlation length and specific surface area (SSA) solely from a portable, high-resolution penetrometer. We demonstrate the potential of the method by a transect through Alpine snow in the Wannengrat study site, Davos, Switzerland. The two-dimensional plot of the transect reveals the depositional and metamorphic events. The results for the density are compared to independent density measurements from snow profiles. Based on these data, we are able to give a more complete interpretation of the snow stratigraphy and the underlying physical processes.