Statistical model for the correlation length of snow derived from Snow-Micro-Pen measurements.

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The Snow-Micro-Pen (SMP) allows to retrieve various mechanical parameters from the snowpack. However, remote sensing applications rely on structural parameters of snow such as the correlation length. In the absence of a sound physical connection between structural and mechanical parameters we derive a statistical model for the correlation length from SMP measurements. To this end we have analyzed 22 snow samples of various snow types by computer tomography (CT) and SMP. We correlate the SMP-derived structural element length with the CT-derived correlation length. For validation we employ the statistical model to estimate the specific surface area from combined SMP and density measurement from natural snow profiles. We compare this SSA estimate to independent SSA measurements by Near-Infrared-Photography and discuss potentials and limitations of the method.