

Abstract Submitted
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Development of an optical system to determine impurity content composition in a snowpack KAVYA DEVGUN, ALDEN ADOLPH, St. Olaf College — Snow influences global temperatures due to its high reflectivity. This reflective property is called albedo, the fraction of solar radiation reflected off of a surface. Among other factors, light-absorbing particles (LAPs) such as black carbon, organic carbon, and dust can decrease snow albedo, subsequently accelerating snowmelt. Referencing previous studies, we built an optical system to measure LAP concentration in a snow sample following filtration through a Nuclepore filter. To do this, we used a light source ranging from 230 nm to 2500 nm, two integrating spheres, and a spectrometer to record light transmitted through a filter to measure LAP concentration. Following design and development, we have continued to characterize and quantitatively calibrate the system. Preliminary analysis of varying concentrations of black carbon show that this is a promising measurement technique for use on snow from the St. Olaf Natural Lands in Northfield, MN. These local measurements will be helpful in understanding the role of LAP concentration in Midwestern snow albedo and the implications for the timing of seasonal snowmelt as global temperatures continue to increase.

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