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Comparison of high resolution density and optical records for the WAIS Divide ice core DANIEL BRETON, University of Maine, Department of Physics and Astronomy, GORDON HAMILTON, KARL KREUTZ, University of Maine, Climate Change Institute — Visual inspection and density profiling of firn (multi-year snow) and ice cores is a standard method of understanding and objectively characterizing polar glacier structure. Recent technological developments have transformed these measurements from low-resolution manual measurements to high-resolution automated scans of ice core sections. Here we compare data from two such systems: the Maine Automated Density Gauge Experiment (MADGE), an automated gamma-ray density gauge for firn and ice cores, and the National Ice Core Laboratory Optical Imaging System (NOIS), an automated high resolution line scan camera. Comparison between the MADGE and NOIS data on the West Antarctic Ice Sheet (WAIS) Divide deep core reveals a transition in firn structure with depth: anti-correlation between firn density and image brightness in shallow ($< 20\text{m}$) sections and strong correlation deeper ($> 50\text{m}$) in the core. We use Monte Carlo modeling of photon scattering and absorption in firn and ice of various bulk densities in an attempt to understand this transition and its impact on the paleoclimate record captured within the ice core.

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