Surface melt from the Greenland Ice Sheet (GrIS) is currently the dominant contributor to sea-level rise. After the summer melt season, remaining snow, known as firn, continues a metamorphic process that affects its density and crystal morphology. Because processes in firn affect the behavior of melt water, e.g., whether it refreezes or runs off, calculating surface mass balance (SMB, a boundary condition for ice sheet models) requires a complex snowpack model deep enough to simulate firn densification. To prepare E3SM for coupling to its ice sheet component (MALI), ongoing developments within its land component’s (ELM) snowpack model, including an expanded vertical grid and added compaction terms, have been tested in 5 century-scale, stand-alone ELM experiments. Here, we present firn density profiles simulated with ELM that include combined snow compaction and firn densification parameterizations. Our modifications reduce biases in GrIS near surface densities by 11% at 0.5 m and 18% at 11.5 m when evaluated against a comprehensive collection of available measurements. Simulated densities are too low deeper than 12 m, but estimates from a steady-state empirical model indicate that our compaction rates there are 60% less biased than those in CESM2/CLM5. With this new ELM capability, we are working on initializing the GrIS snowpack and firn conditions in coupled ELM-MALI configurations with the specific goal of improving simulated SMB. Such a spin-up, applied globally, will also position E3SM to be used for studying snow cover and albedo feedbacks in a changing climate.