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Winter Arctic sea ice freeboard, snow depth and thickness variability from ICESat-2 and NESOSIM

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National Aeronautics and Space Administration's (NASA's) Ice, Cloud, and land Elevation Satellite-2 (ICESat-2) mission was launched in September 2018 and is now providing routine, very high-resolution estimates of surface height/type (the ATL07 product) and freeboard (the ATL10 product) across the Arctic and Southern Oceans. In recent work we used snow depth and density estimates from the NASA Eulerian Snow on Sea Ice Model (NESOSIM) together with ATL10 freeboard data to estimate sea ice thickness across the entire Arctic Ocean. Here we provide an overview of updates made to both the underlying ATL10 freeboard product and the NESOSIM model, and the subsequent impacts on our estimates of sea ice thickness including updated comparisons to the original ICESat mission and ESA's CryoSat-2. Finally we compare our Arctic ice thickness estimates from the 2018-2019 and 2019-2020 winters and discuss possible causes of these differences based on an analysis of atmospheric data (ERA5), ice drift (NSIDC) and ice type (OSI SAF).