Temporal and spatial variability of snow deposition at EGRIP, Greenland

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ABSTRACT

Temporal variability of snow depositions on the Greenland ice sheet provide information for assessing the relationship between the changes of climate and mass balance of the ice sheet. Also, investigation of spatial variability of snow deposition at ice core drilling sites help to interpret spatial representativeness of snow depositions data obtained from the single ice core in each site. In this study, to investigate the temporal and spatial variability of snow depositions during recent years in the EGRIP (East Greenland Ice Core Project) area located in the northeastern part of the Greenland ice sheet, we conducted pit observations at six sites in the summer of 2016-2018. In all pits, depth profiles of water isotope ratios showed clear seasonal variations. While the annual snow depositions obtained from each pit exhibited spatial variability, the averages for each year were very similar. The spatial differences of annual snow depositions for each year are probably due to post-depositional redistribution of snow caused by wind-erosion and snowdrift. The similar values of snow depositions averaged for each year in 2009-2017 indicate that annual snow depositions in the EGRIP area were almost constant in this period. The seasonal snow depositions in the EGRIP area tended to be larger in the summer-to-winter period than in the winter-to-summer period.