Variation of recent annual snow depositions estimated on the 2016 pit observation at the East Greenland Ice Core Project (EGRIP) camp

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East Greenland Ice Core Project (EGRIP), which is an international ice coring project led by University of Copenhagen in Denmark, commenced in 2015 to clarify the variations of climate and ice sheet in Greenland. We are participating in the project under the Arctic Challenge for Sustainability project (ArCS), and cooperative research is underway with various countries. We dug two pits with depths of 4.02 and 3.18 m at the EGRIP camp (75°37′N, 35°59′W) to estimate recent annual and seasonal snow depositions and concentrations of chemical species and dust particles in the snow samples. Snow sampling and snow density measurement were carried out at 0.03 m interval in those pits. Currently, measurements of the water stable isotope (δ^{18}O and δD) for the 4.02-m deep pit have been completed. Clear seasonal variations in the stable isotopes of water were observed in the depth profiles, which suggested that snow had accumulated regularly every year. Also, the seasonal cycles of δ^{18}O and δD showed the pit included snow deposition corresponding to nine years covering 2008–2016. The annual snow depositions ranged from 99 to 247 mm water equivalent (w.e.), showing the mean value of 167 mm w.e. The pit observation of 2 m deep conducted at North Greenland Eemian Ice Drilling (NEEM) camp in northern Greenland reported that the mean annual snow deposition was 176 mm w.e. during the years 2006–2008, and the value was on the same level with that at the EGRIP. The profile of snow density in the pit indicated a seasonal variation, in which the density increased in the winter layers and decreased in the summer layers. The same trends were also found at NEEM and Summit in Greenland in the previous studies (Albert and Shultz, 2002; Kuramoto et al., 2011). A wind-pack effect in winter may cause the higher density observed at EGRIP, as discussed in the previous studies. We will also show analyses of the chemical species and dust particles for the 4.02-m deep pit and results of the 3.18-m deep pit on the presentation.

Keywords: Greenland, ice core, mass balance, snowpack, stable isotope ratio

