

Variation of recent annual snow depositions and seasonality of snow chemistry at the East Greenland Ice Core Project (EGRIP) camp, Greenland

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ABSTRACT

We collected snow samples from two pits with depths of 4.02 and 3.18 m at the EGRIP camp (75° 37' N, 35° 59' W), Greenland in 2016 summer season in order to estimate recent annual snow depositions and examine seasonal variations of major ion species, stable isotopes of water and microparticles (dust). Dating using clear seasonal variations of some chemical components indicated that the 4.02 and 3.18 m deep pits included snow depositions corresponding to ten years from 2006 to 2016 and seven years covering 2009–2016, respectively. The mean value of annual snow depositions for the 4.02 m deep pit showed 138 and 146 mm yr⁻¹ in water equivalent (mm w.e. yr⁻¹) in the periods of 2006–2016 and in 2009–2016, respectively. On the other hand, the deposition value for the 3.18 m deep pit averaged 149 mm w.e. yr⁻¹ between 2009 and 2016. Seasonal variations of concentrations in the major ion species and dust were similar to those previously reported for Greenland. The values of the summer peaks of Cl⁻/Na⁺ concentration ratios in the pits were much higher than those on other sites in Greenland.