

**A reduction of black carbon recorded from a shallow ice core during 1990–2016,  
East Greenland**

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Abstract: We reported the measurement of ions and ‘refractory BC’ (rBC) concentrations in a 10.96 m shallow ice core sample drilled from the East Greenland Ice Core Project (EGRIP) camp in July 2016. The results provide the recent record of BC deposition on Greenland snow and ice over the past 27 years. The annual variability of the oxygen ( $\delta^{18}\text{O}$ ) and hydrogen ( $\delta\text{D}$ ) isotopic compositions indicated that there were significantly warm events since 2008. The concentration peaks of rBC in this shallow ice core during the summer seasons may be attributed to biomass burning in boreal summer. Backward air trajectory analysis using the HYSPLIT model indicated that fossil fuel emissions from Russia, North America and Europe contributed

most of the BC deposition in the Greenland region, and the reduction of anthropogenic fossil fuel consumption in these areas played a dominant role in the decrease of BC concentration since 2000. Although the East Asia (China) emitted much more fossil fuel since 2000, this record suggested that contributed very little to the BC concentration in East Greenland ice core.