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Measurement of atmospheric and snow-phase carbonaceous particulates and gases on the Greenland Ice Sheet

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In order to determine the current levels and post-depositional chemical stability of organic (OC) and elemental carbon (EC) on the Greenland Ice Sheet, a 10-week field mission took place in the summer of 2006 at Summit Camp, a research station located at the highest elevation of the ice cap. Atmospheric measurements include time-integrated filters (particulate OC and EC), real-time particle size and number concentration, real-time aerosol absorption coefficient (b_{ap}), and real-time particulate and gas-phase water-soluble organic carbon (WSOC). Snow sampling included surface snow measurements of WSOC, snow-phase particulate OC (SPOC), and EC (SPEC). A series of snow pits were measured both near camp and at distances up to 20 kilometers to study the temporal and spatial variation of carbonaceous species. Comparing the 2006 summer surface snow measurements to a 3 meter snow pit, previous summers have archived WSOC at levels half of the 2006 surface snow average. In addition, temporal variability was observed in surface-snow WSOC and SPOC, with levels frequently dropping off after deposition events. Finally, atmospheric measurements captured a significant pollution episode that occurred in mid-June.