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Volatile organic compounds in snow and air during snow melt at Alert, Nunavut in spring 2006

G. Kos, P. A. Ariya

McGill University, Departments of Atmospheric and Oceanic Sciences & Chemistry, 805 Sherbrooke Street West, Montreal, QC, H3A 2K6, Canada, T: +1 (514) 398-3615, F: +1 (514) 398-6115, E: parisa.ariya@mcgill.ca

The investigation of exchange processes of volatile organic compounds (VOC) at the snow-air interface is of great importance to understand their transfer, deposition and degradation. Only a few compounds have been investigated so far and numerous anthropogenic and biogenic compounds need to be determined in order to assess their contribution to snowpack and air chemistry. During the period of snow melt a large number of processes influence VOC chemistry (photochemistry, microbiological activity, increased snow water content).

Snow and air samples were collected in the High Arctic in Alert, Nunavut during snow melt in May and June 2006. Solid-phase micro extraction with gas chromatography and flame ionisation detection (SPME-GC/FID) was used on-site for VOC analysis of snow and air. Additional samples were collected in SUMMA canisters (air) and pre-cleaned glass containers (snow) for further analysis in Montreal.

Twenty different VOC or semi-VOC (aromatic, halogenated and acetone) were identified and quantified in both matrices. Detected concentrations were in the lower ng/L (air) and μg/L (snow) ranges and varied significantly during the observation period. Coastal and inland sites were compared. Interpretation with collected ancillary data will provide an improved description of atmospheric boundary layer and climate change processes.