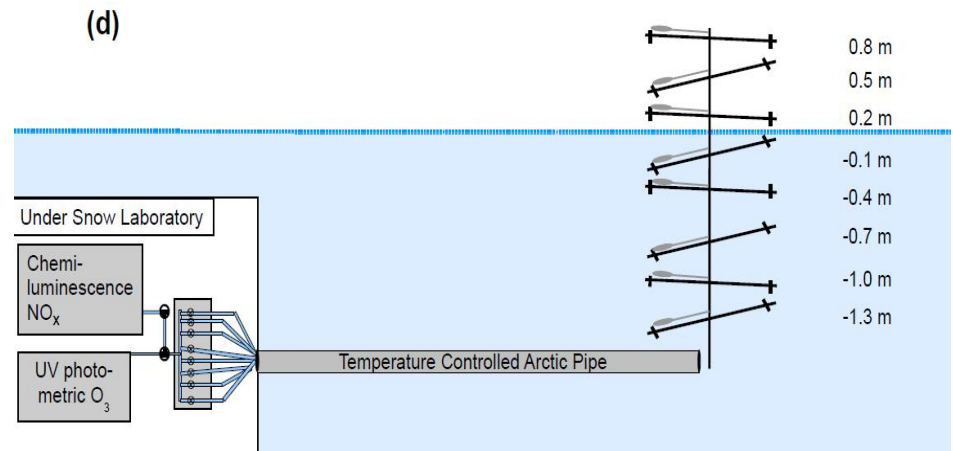
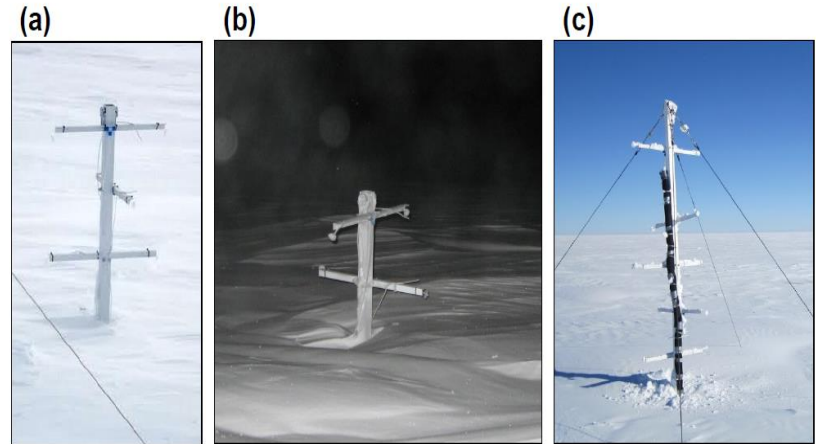
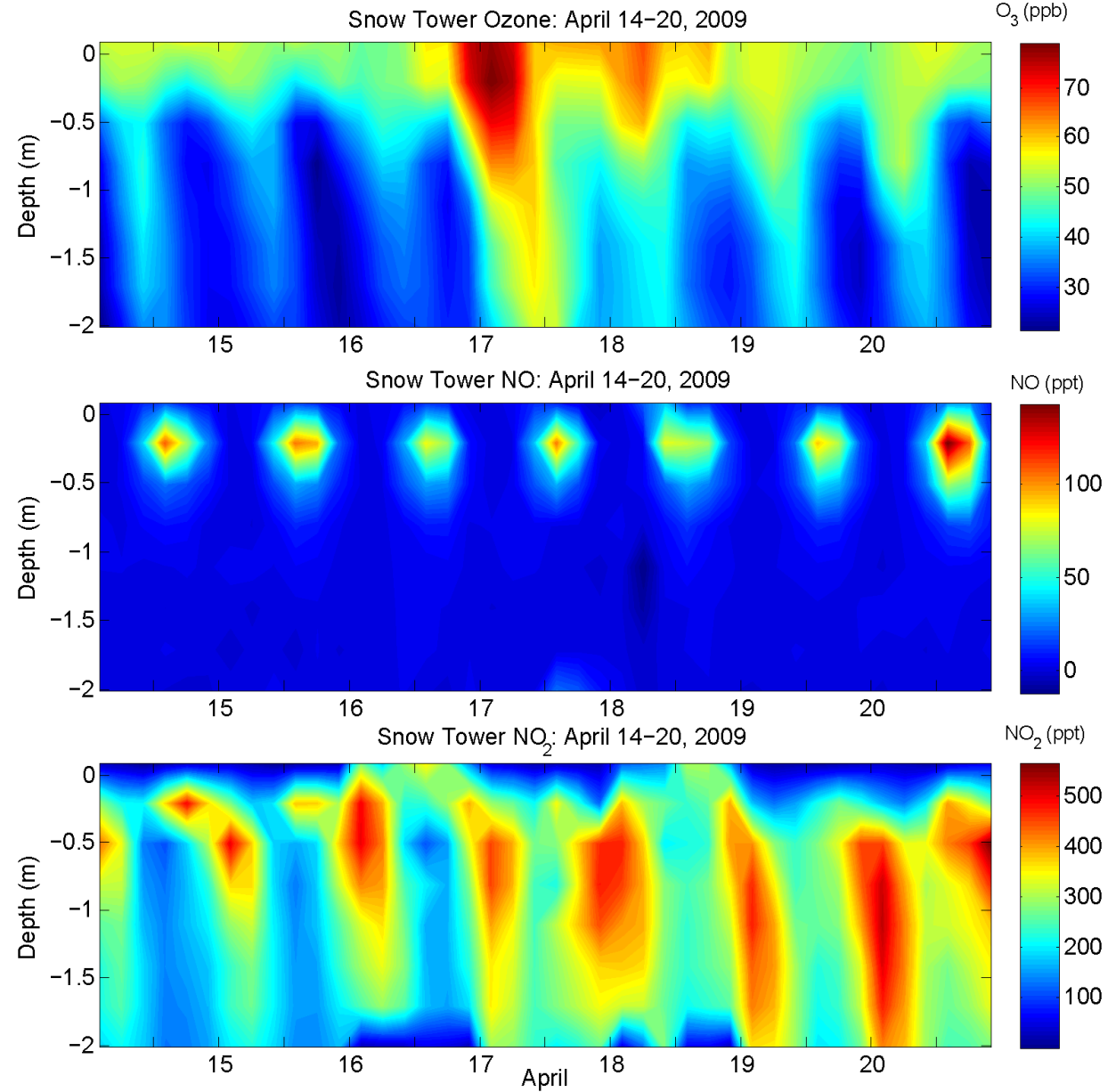


# AM4. Title: Snowpack Chemistry and Surface Gas Exchange at Summit, Greenland

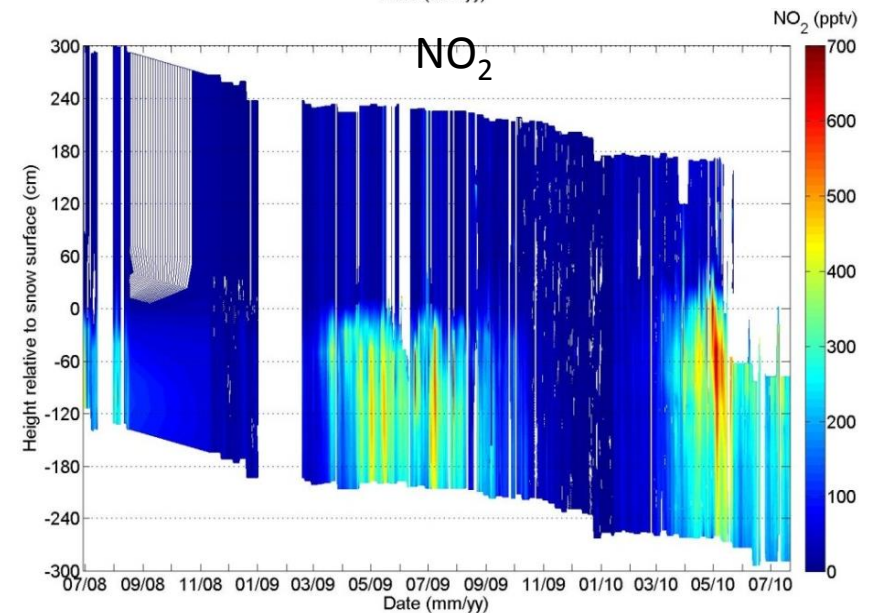
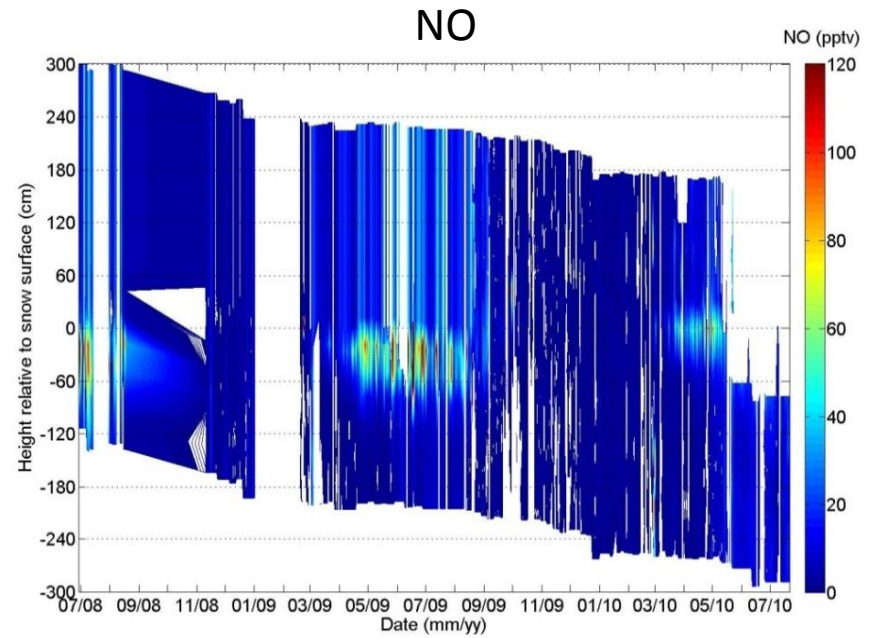
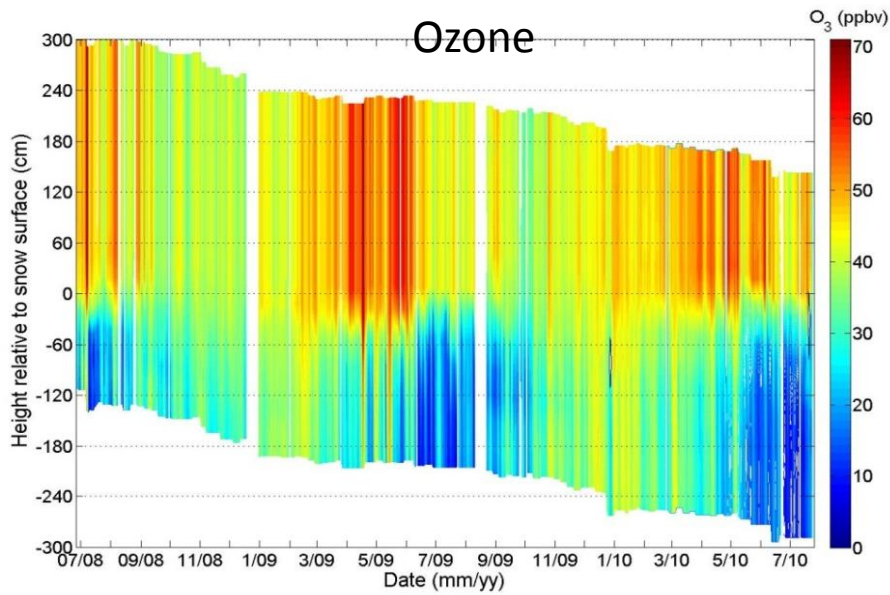
Detlev Helmig, B. Van Dam, C. Thompson, J. Caramore, L. Ganzeveld, B. Seok, P. Doskey, K. Murray, L. Kramer, X. Fain



Ozone, Nitric Oxide,  
Nitrogen Dioxide  
Within and Above  
the Snowpack  
During One Week  
in April



# Continuous Record of Ozone, Nitric Oxide, Nitrogen Dioxide Within and Above the Snowpack



# Ozone Surface Fluxes During Spring and Summer

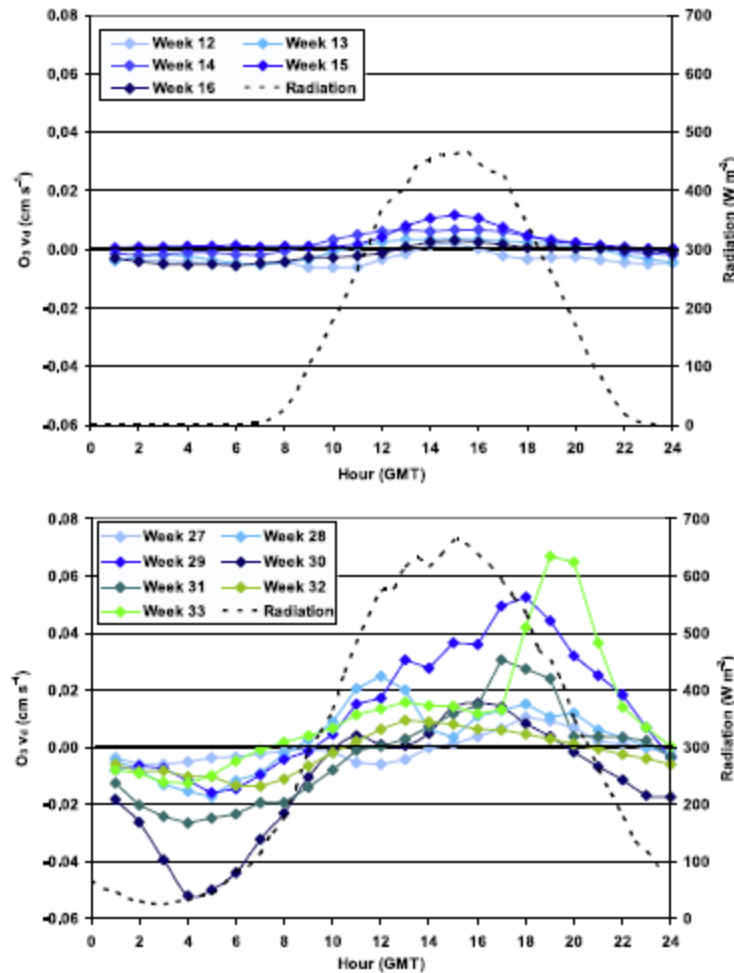


Figure 1. Weekly median, smoothed, hourly values of the ozone exchange velocity (expressed as ozone deposition velocity values,  $v_d$ ) (top) for the spring period, March 21–April 28, 2005, and (bottom) for the summer experiment, June 29–August 14, 2004. The graphs also show the median diurnal incoming solar radiation, derived from the actual measurements during the summer 2004 experiment. For spring 2005, radiation data for DOY 89-104 in the prior year are shown as a surrogate (reflecting the middle portion of the spring period).

## Most Recent Summit Publications

- Van Dam B., Toro C., Helmig D., Doskey P., Kramer L., Murray K., Ganzeveld L., Seok B. (2014) Multi-year observations of O<sub>3</sub> and NO<sub>x</sub> dynamics in the Summit, Greenland snowpack, Manuscript in preparation.
- Helmig D., Stephens C.R., Caramore J., and Hueber J. (2013) Seasonal behavior of non-methane hydrocarbons in the firn air at Summit, Greenland. *Atmos. Environ.*, 85, 234-246.
- Van Dam B.A., Helmig D., Neff W., Kramer L. (2013) Evaluation of boundary layer depth estimates at Summit Station, Greenland. *J. Applied Meteorology and Climatology* 52, 2356-2362.
- Helmig D., Petrenko V., Martinerie P., Witrant E., Röckmann T., Zuiderweg A., Holzinger R., Hueber J., Stephens C., White J., Sturges W., Baker A., Blunier T., Etheridge D., Rubino M., and Tans P. (2013) Reconstruction of Northern Hemisphere 1950 – 2010 atmospheric non-methane hydrocarbons. *Atmos. Chem. Phys. Discuss.*, 13, 1–53, doi:10.5194/acpd-13-1-2013.
- Van Dam B. and Helmig D. (2012) Comments on 'Possible contribution of triboelectricity to snow-air interactions'. *Environ. Chem.* 9, 116-118.
- Bocquet F., Helmig D., Van Dam B.A., and Fairall C.W. (2011) Evaluation of the flux gradient technique for measurement of ozone fluxes over snowpack at Summit, Greenland. *Atmos. Meas. Tech.* 4, 2305-2321.
- Helmig D., Cohen L.D., Bocquet F., Oltmans S., Grachev A., and Neff W. (2009) Spring and summertime diurnal ozone fluxes over the polar snow at Summit, Greenland. *Geophys. Res. Lett.* 38, L08809, doi:10.1029/2008GL036549.