

## Boundary Layer Depth Effects on Surface Chemistry: Insights from Comparing South Pole Antarctic and Summit Greenland

W. Neff, B. van Dam, D. Helmig, D. Davis

A series of atmospheric chemistry experiments (ANTCI, ISCAT) at the South Pole implicated that shallow boundary layers (e.g. <20m in depth) play a determining role in the occurrence of high levels of nitric oxide (NO) observed in the summers of 1998, 2000, 2003, and 2005 at the South Pole and the occurrence of “super-events”, where rapid increases in NO were encountered over very short times (Davis et al, Atmos. Env. 2008). Observations using a sodar and surface chemical measurements have now been used to examine whether similar processes are at work at Summit Station Greenland (Van Dam et al. 2013, J. Clim. Appl. Met.): The result is that similar concentrations and “super-events” do not occur there despite the frequent occurrence of shallow boundary layers. In this presentation, we examine differences and similarities in the meteorology (including snow accumulation rates – following Davis et al. 2008), terrain (the dome topography at Summit versus long fetches along subtle drainage basins surrounding the South Pole), and the diurnal cycle in meteorology at sites removed from the Poles. We also suggest some simple experimental ideas using AWS stations that might address the origin of “super-events” at the South Pole.