



Sources of reactive bromine in polar regions and its implications for ozone in the troposphere

Paul Griffiths (1), Alex Archibald (1), Xin Yang (1,2), and John Pyle (1)

(1) University of Cambridge, Chemistry, Cambridge, United Kingdom (ptg21@cam.ac.uk), (2) British Antarctic Survey, Cambridge, United Kingdom

In the last two decades, significant depletion of boundary layer ozone (ozone depletion events, ODEs) has been observed in both Arctic and Antarctic spring. ODEs are attributed to catalytic destruction by bromine radicals (Br plus BrO), especially during bromine explosion events, when high concentrations of BrO periodically occur.

The source of bromine and the mechanism that sustains the high BrO levels are still the subject of study, and there remains scope for improving our understanding of reactive bromine budgets in polar regions. Yang et al. (2008) suggested snow could provide a source of (depleted) sea-salt aerosol if blown from the surface of ice, while recent work by Pratt et al. (2013) posits Br₂ production within saline snow and sea ice.

In this poster, we consider the production of sea-salt aerosol from a mixture of snow and sea ice during periods of strong wind. We use a combination of box models and the United Kingdom Chemistry and Aerosols scheme, run as a component of the UK Met Office Unified Model, to quantify the effect of bromine release in the boundary layer and its effect on ozone at the regional scale. The importance of heterogeneous reactions is quantified and new data from the recent Polarstern cruise by members of the British Antarctic Survey as part of the NERC-funded BLOWSEA project will be considered.