Outline of the modelling paper on Arctic ozone

1. Introduction
2. Model descriptions
   2.1 Global chemical transport model (p-TOMCAT) and chemistry climate model (UM-UKCA)
   2.2 Photochemical schemes applied, particularly **bromine emissions from sea ice and open ocean sourced SSA.**

SSA production from blowing snow on sea ice (after Yang et al., 2008)
3. Results of data-model comparison

3.1 Monthly mean: with focus on seasonal variations

*Question:* Does bromine play a role in the spring ozone dips?

- Model experiments in p-TOMCAT (with/without SSA-bromine from both sea ice and open ocean) support it.
3. Results of data-model comparison

However, systematic biases between p-TOMCAT model and the data have been spotted. For example,
(1) modelled spring ozone minima occurred mainly in March, rather than April-May as shown in the data. → likely due to monthly sea ice coverage applied in the model(?)
(2) modelled surface ozone are generally lower than data by ~10 ppbv → likely due to the underestimated background ozone in free troposphere in both our models.
3. Results of data-model comparison

3.2 hrly data: with focus on ODEs

**Question: is ODE transported?** We may use combined coastal sites data (including O-buoy data?) and model simulation to identify some transported ODE cases

3.2.1 Coastal site data

need to select some ‘golden’ cases for point-to-point comparison. Which year? 2007-08?

3.2.2 O-buoy data (available? Which year data?)

need to identify cases with ODEs being caught by both O-buoy and coastal data.

Can each station (apart from Summit and Pallas) work out the partitioning of the ODEs that correspond to strong and calm winds? A threshold wind speed of 7m/s (or 12m/s) can be used.

We aim to answer an open question regarding polar ODEs. For example, ODEs have been observed at either calm or turbulent meteorology conditions [Jones et al. 2009]. Are they formed locally via photochemistry or simply transported? Do they correspond to different ozone depletion mechanisms, or simply one thing but being observed at different transported stage?

4. Conclusions