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## 1D multiphase modeling of NO<sub>x</sub> and halogen photochemistry at Summit, Greenland using MISTRA-SNOW

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Motivated by observations of reactive halogens and NO<sub>x</sub> at Summit, Greenland in the center of the Greenland ice sheet we have developed a 1D model for snow physics and chemistry. This model has been coupled to the boundary layer model MISTRA, which includes detailed multiphase chemistry in the atmosphere and snow. We have developed the model with the goal of understanding how chemical species evolve with time in the interstitial air and to study the interplay between the chemistry in and above the snow.

Measurements of gas phase bromine species were undertaken as part of the GSHOX field campaign, conducted during summer 2007 and 2008 at Summit Research Station on the Greenland ice sheet. We compare model results with data collected from the field including meteorology, as well as observed NO and BrO mixing ratios. We have found that both ambient NO and BrO mixing ratios can be explained by fluxes out of the snow pack.

The methodology for modeling the multiphase in-snow chemistry will be presented along with results from the model, including vertical profiles of halogens in the snow pack and in the atmosphere along with their evolution in time.

### Please list some keywords

Halogen, chemistry, Greenland, Summit, model, snow

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