



Contribution ID: 32

Type: Poster

## Nitrate and Protons at the Air-Ice Interface

*Monday, 6 June 2011 12:05 (1h 10m)*

We used surface-sensitive spectroscopic methods to study the air-ice interface, with a focus on two species: nitrate ( $\text{NO}_3^-$ ) and protons ( $\text{H}^+$ ). Nitrate ions at the surface of frozen  $\text{Mg}(\text{NO}_3)_2(\text{aq})$  samples were directly measured using glancing-angle Raman spectroscopy. Protons at the surface of frozen water samples, whose pH was adjusted using  $\text{HNO}_3$ ,  $\text{HCl}$ ,  $\text{NaOH}$  or  $\text{NH}_4\text{OH}$ , were indirectly measured using glancing-angle laser-induced fluorescence and the pH-sensitive fluorescent molecule, acridine. Results suggest that although nitrate is excluded to the ice surface, its surface concentration is much lower than that predicted using the bulk phase diagram. The amount of nitrate excluded to the air-ice interface was not temperature dependent over the range 263 - 273 K. Preliminary results also suggest that protons, while present at the air-ice interface, are not excluded there from the bulk: the pH obtained at the air-ice interface of frozen solutions is the same as that of the solution prior to freezing. This study has important implications for understanding a) snowpack nitrate photolysis which leads to fluxes of  $\text{NO}_x$  and  $\text{HONO}$  to the overlying boundary layer and b) pH-sensitive heterogeneous processes occurring on ice, such as bromide activation.

### Please list some keywords

ice, snow, surface, nitrate, pH, Raman, laser-induced fluorescence, phase equilibrium

**Primary author:** Ms WREN, Sumi (University of Toronto)

**Co-author:** Dr DONALDSON, D. James (University of Toronto)

**Presenter:** Ms WREN, Sumi (University of Toronto)

**Session Classification:** Lunch and Poster