Contribution ID: **37** Type: **Poster**

Probing the liquid-like surface of frozen salt solutions via infrared spectroscopy

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

While the surfaces of ice, snow, and sea ice are known to act as chemical processors that perturb the local atmosphere, the morphology, dynamics, and reactivity of the surface and near-surface regions are not well known. We present a method for studying the near-surface region of frozen aqueous films in the laboratory. Attenuated total reflection infrared spectroscopy (ATR-IR) enables study of the near-surface region of ice near its melting point without interference from water vapor. ATR-IR spectra of frozen NaCl solutions at -8℃ show that there is a liquid-like brine layer that increases in depth with NaCl concentration. Additionally, reflection spectra of ice with a liquid layer were modeled from the Fresnel equations. By modeling reflection spectra as well as analyzing the experimental spectra, the thickness of the brine layer as a function of NaCl concentration has been estimated. Furthermore, a method for determining the acidity of the liquid-like layer has been developed, since acidity plays a key role in many reaction mechanisms. Preliminary results for measuring changes in acidity upon freezing for solutions containing nitrate will be presented.

Please list some keywords

BL, brine layer, interface, depth, acidity, IR

Primary author: Dr MICHELSEN, Rebecca (Randolph-Macon College)

Co-authors: Mr SEARLES, Keith (Indiana University); Ms WALKER, Rachel (Randolph-Macon College)

Presenter: Dr MICHELSEN, Rebecca (Randolph-Macon College)

Session Classification: Lunch and Poster