Contribution ID: **108** Type: **Talk**

Deliquescence and Ice Nucleation at near- and sub-Eutectic Temperatures

Tuesday, January 9, 2018 1:45 PM (20 minutes)

The phase state and role of aerosol particles in the radiative budget of the planet are important sources of uncertainty for climate modeling and prediction. The phase behavior of atmospheric particles depends on both environmental conditions and particle properties and can influence surface and bulk processes in both physical and chemical contexts. In the atmosphere soluble particulate is primarily considered to occur in one of two phase states. Either as dry particulate at low relative humidity (RH) conditions or as dissolved solution droplets at higher RH; and the limiting deliquescence RH (DRH) when the soluble material dissolves from one state to another is considered to have sudden discontinuous phase transition like character. A more realistic model of the meta-stable continuous deliquescence of particles has implications for liquid availability at RH smaller than DRH. Furthermore, it raises the question of soluble particles acting as ice nucleating particles in low temperature environments. Here we discuss theoretical developments and experimental observations related to sub-eutectic deliquescence and ice nucleation. Implications for atmospheric processes such as mixed-phase cloud longevity will be discussed.

ACKNOWLEDGEMENTS
This work was supported by the Swedish Research Council, the Swedish Foundation for International Cooperation in Research and Higher Education (IB2016-6612), and the US National Science Foundation (AGS-1461305, AGS-1461347).

Significance statement

Water adsorption and continuous deliquescence from low RH through saturation may have significance for cloud processes including hydrometeor formation, and mixed phase cloud formation and evolution. Furthermore, sub-eutectic metastable liquid may be a reservoir for atmospheric ice nucleation.

Primary author: Dr THOMSON, Erik S. (University of Gothenburg)

Co-authors: Prof. CZICZO, Daniel (Massachusetts Institute of Technology); Mr CASTARÈDE, Dimitri (University of Gothenburg); Mr WOLF, Martin (Massachusetts Institute of Technology); Dr KONG, Xiangrui (University of Gothenburg)

Presenter: Dr THOMSON, Erik S. (University of Gothenburg)

Track Classification: Nucleation