



- Home
 - Search
 - Conferences and Symposia
 - Meeting Calendar
 - People
 - Main Exhibit Hall
 - Career Resource and Graduate School Fair
 - Participating Program Committees
 - Officers of the 106th Annual Meeting
 - Program Highlights ✔
 - General Information ✔
 - Attendee Resources ✔
 - Floor Plans
 - Sponsor Index
 - Sign out
 - Technical Support
- Indicates there are Recordings
- Click to add an item to 'My Schedule'.
- Click to add/remove an item to 'My Favorites'.
- Click to add/remove a person to 'My Contacts'.
- Click in the menu to access your Schedule

961 - Importance of Size and Composition in CCN Activation of Natural Aerosols in the Arctic

Thursday, January 29, 2026

3:00 PM - 4:30 PM

Hall B3 (George R. Brown Convention Center)

Abstract

The ability of aerosols to act as cloud condensation nuclei (CCN) for a given cloud supersaturation depends on their size and chemical composition. In this study, we estimate the impact of both size and composition on CCN. Measurements of submicron aerosol particle number size distributions (PNSD), organic and inorganic aerosol composition and CCN from Utqiagvik (71° 17' N and 156° 47' W) in 2023 for the Sustaining the Utqiagvik Aerosol Record of Decades (STUARD) campaign show the two most frequent PNSD clusters in all seasons were accumulation-mode (20-80%) and high-Aitken (~20%) mode types. Organic components make up the largest fraction of aerosol submicron mass (46-61%). The organic fraction can explain a significant (57-79%) variability in the smallest activated aerosol diameter, also known as critical diameter, based on an assumption of constant chemical composition for submicron particles. The difference between the calculated critical diameter from a linear fit to the organic fraction is negatively correlated with organic acid and alcohol group mass fraction, as well as with sulfate and seasalt mass fraction. A comparison of composition-based CCN calculations with the measured CCN, (at 1% supersaturation), shows that calculated CCN are within 20% for most of time with the constant-submicron composition assumption. Varying the hygroscopicity used for the organic components showed the sensitivity of the calculated CCN to this value. CCN sensitivity have also been observed to be higher for high-Aitken mode type, in which the number of particles below the critical diameter is higher than the accumulation mode. This analysis provides insights into the important factors of CCN calculation from size and composition measurements.

Co-Authors

- sourita saha (Presenter)**
University of California, San Diego
La Jolla, CA
India
- Lynn M Russell
SIO
La Jolla, CA
USA
- Patricia K Quinn
Pacific Marine Environmental Laboratory (PMEL)
Seattle, WA
USA
- Lucia Upchurch
Pacific Marine Environmental Laboratory (PMEL)
Seattle, WA
USA
- Richard Leitch
EC
xx Canada