

Studying Fog and the Chemistry of the Air in Iqaluit

Objectives and Rationale:

- The main objective of this project is to study the unique chemistry when emissions from human activities interact with ocean emissions in Iqaluit in the summer
- Air in the North is much cleaner than the south so we expect the chemistry to be very different than southerly locations that have been studied in the past, such as Halifax, that have greater background concentrations of pollutants
- Summer is interesting because ocean biology is the most active, human emissions from industrial activities such as shipping are also high and sun during the long days can drive unique chemical processes
- A secondary objective is to study the properties of fog, such as when it forms, how dense it is and how it dissipates
- Fog is a hazard because it lowers visibility and delays transport in and out of Iqaluit
- Predicting fog is still very difficult and these results would add to our understanding
- This project will allow us to better understand the unique processes that occurs in the air in Iqaluit, provide ground truth for air quality models, and better understand fog formation and visibility

Methods and Potential Environmental Impacts:

- Our equipment will be in or beside a trailer at the Environment and Climate Change Canada site next to the runway at the Iqaluit airport in July and August, 2021
- A suite of instruments will measure concentrations and properties of the particles and gases in the air and fog
- For all the instruments, sampled air passes through the instruments and is returned to the atmosphere, either unchanged or filtered and cleaner
- The environmental impacts of our study are noise from our equipment and the presence of a trailer on the site. Both of these are expected to be minimal compared to the nearby air traffic and existing infrastructure on site.



Figure 1 – Some of the instruments proposed for this study deployed in Halifax during a similar study. Highlighted are a trailer with our equipment and some outdoor particulate matter sampling instruments.

Sharing of Data, Results and Enthusiasm:

- During the study, data collected on computers will be backed up daily on two hard drives so that three copies always exist
- The finalized dataset will be published on the openly accessible Dataverse via Dalhousie University
- Communications have been initiated with the Environmental Protection division of Nunavut to coordinate sampling and share results
- Our team will engage with the community while on-site and explore opportunities to share knowledge with locals (e.g. through open question-and-answer sessions, collaboration with Arctic College). We will explore opportunities to incorporate Traditional Knowledge into our understanding of the measurements.

Who we are:



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