

Using Passive Air Samplers to Assess Persistent Organic Pollutants (POPs) in Alaska

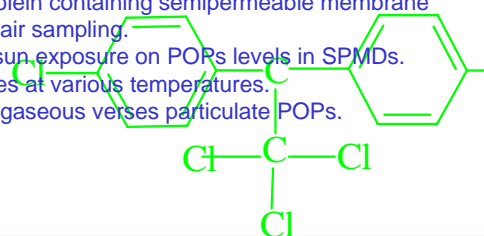
Environmental Issue

The Arctic is considered one of the most pristine and remote environments on Earth. However, increasing evidence has shown long range atmospheric migration of persistent organic pollutants (POPs) to the region. This has raised international concerns about potential adverse human and ecological effects due to POPs to the region. To better address these concerns efforts must be made to monitor POPs in the region. Traditional POPs air monitoring methods may not be feasible in isolated areas, since they require electricity and routine maintenance and are not portable. However, improvements in passive air sampling devices have overcome these problems and led to their potential usefulness in monitoring for POPs in the Arctic. Passive sampling devices are especially useful in remote areas like Alaska, since they require no electricity, are portable, require little maintenance, and are cost effective.

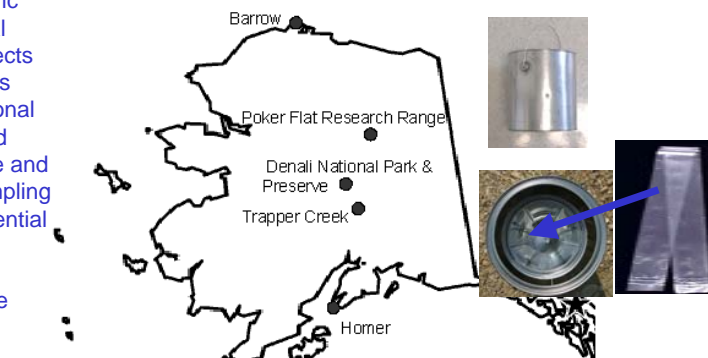
Research Highlights

Research Plan

- 1) To characterize triolein containing semipermeable membrane devices (SPMDs) for air sampling.
 - Examine effects of sun exposure on POPs levels in SPMDs.
 - Evaluate uptake rates at various temperatures.
 - Calculate uptake of gaseous versus particulate POPs.



- 2) To extrapolate POPs in SPMDs to atmospheric concentrations.
 - Use literature and characterization research.
 - Compare levels and types of POPs to an active sampler in Barrow, AK.
 - Assess POPs at five locations in Alaska.



Initial Results

Fig.1 Uptake study for SPMDs on three contaminants in the lab that will help extrapolate atmospheric concentrations in the field.

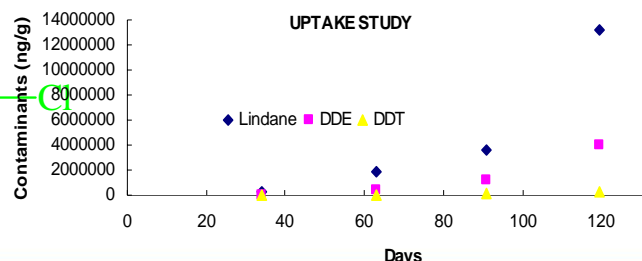
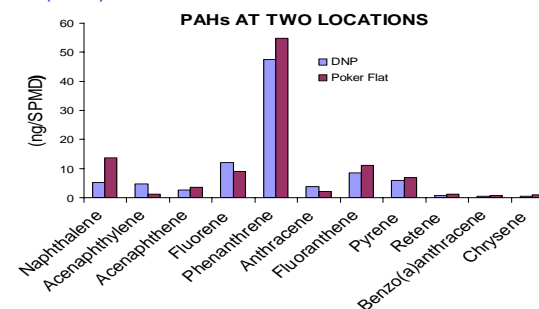


Fig.2 Initial concentrations of polyaromatic hydrocarbons (PAHs) in SPMDs at two locations Denali National Park (DNP) and Poker Flat.



Impact

POPs measurements in the Arctic air are continuing on a weekly bases. However, only a small fraction of the total geographical area is being measured. Research on passive air sampling techniques, such as this one, should help improve the geographical coverage of air measurements in the region. In addition, this study will provide baseline concentrations for an assortment of POPs for future studies in Alaska.

Partners

- Battelle National Laboratory
- Climate Monitoring and Diagnostics Laboratory (CMDL)
- Freshwater Institute of Canada
- National Park Service
- University of Alaska Fairbanks Department of Chemistry and Geophysical Institute