Introduction

- Volatile materials in exhaust condense onto soot particles and nucleate new particles.
- Useful metrics: SMF (Soluble Mass Fraction) and VMF (Volatile Mass Fraction)
- For deliquescence measurements to quantify SMF.
- Use volatility measurements to quantify VMF.
- Explore SMF & VMF variation with distance in plume.

Conclusions

- SMF can be measured via deliquescence.
- VMF can be measured via thermal desorption.
- SMF is found to
  - Increase with fuel sulfur content and engine power.
  - Decrease with particle diameter.
- VMF increases with decreasing engine power and hence longer residence time in plume.
- The FT+THT fuel has the highest propensity for collecting volatile material in the plume, with HRJ coming next. The ordering of the other fuels changes with engine power.
- For low sulfur fuels
  - VMF > SMF
  - Not all volatile material is water soluble.
- For high sulfur fuels
  - SMF > VMF
  - SMF and VMF are highly correlated.