



Vertical distribution of aerosol phase state over the Alaskan Arctic

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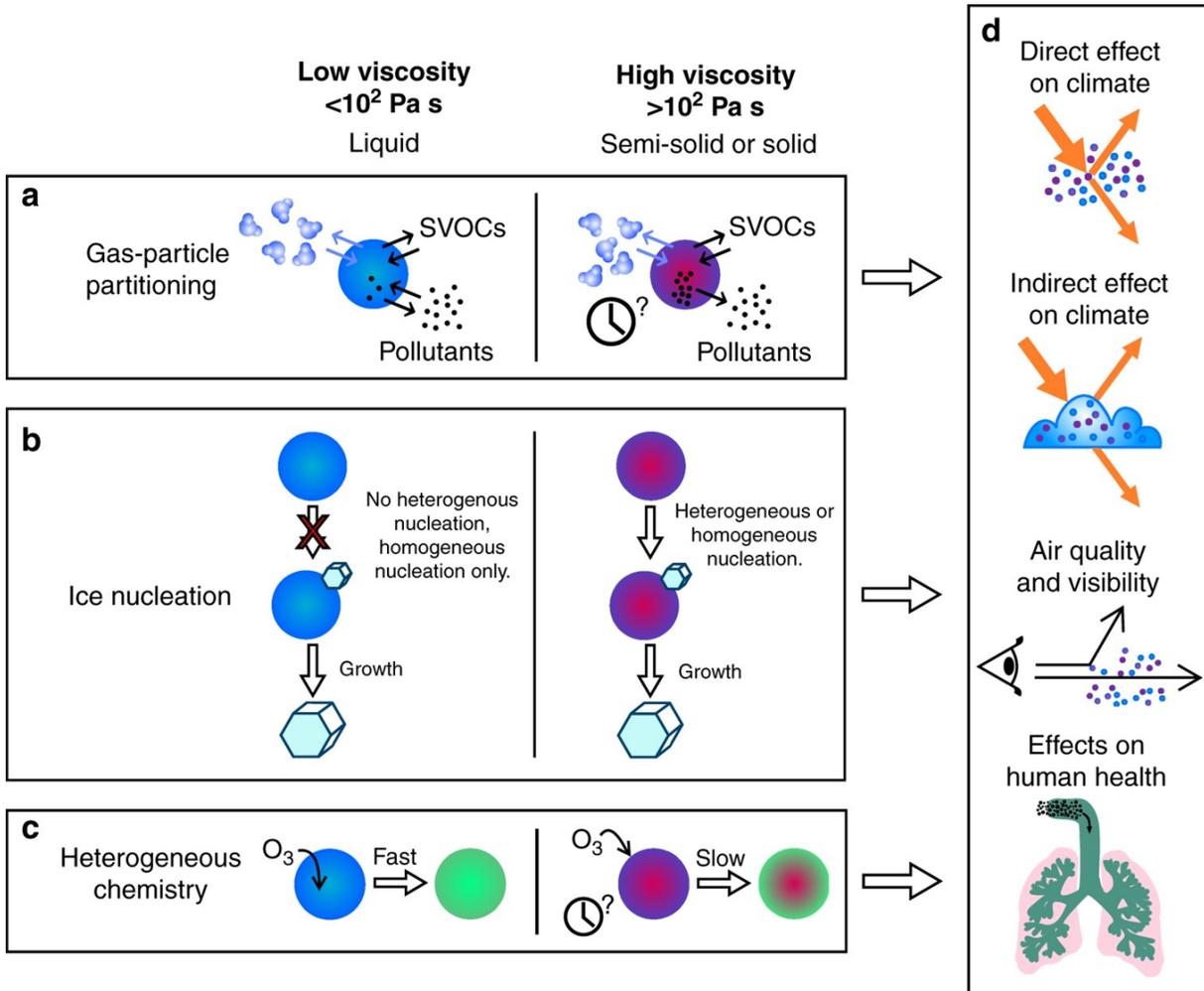
ARM/ASR PI Meeting 2022

Breakout session: Vertical distribution of aerosol properties

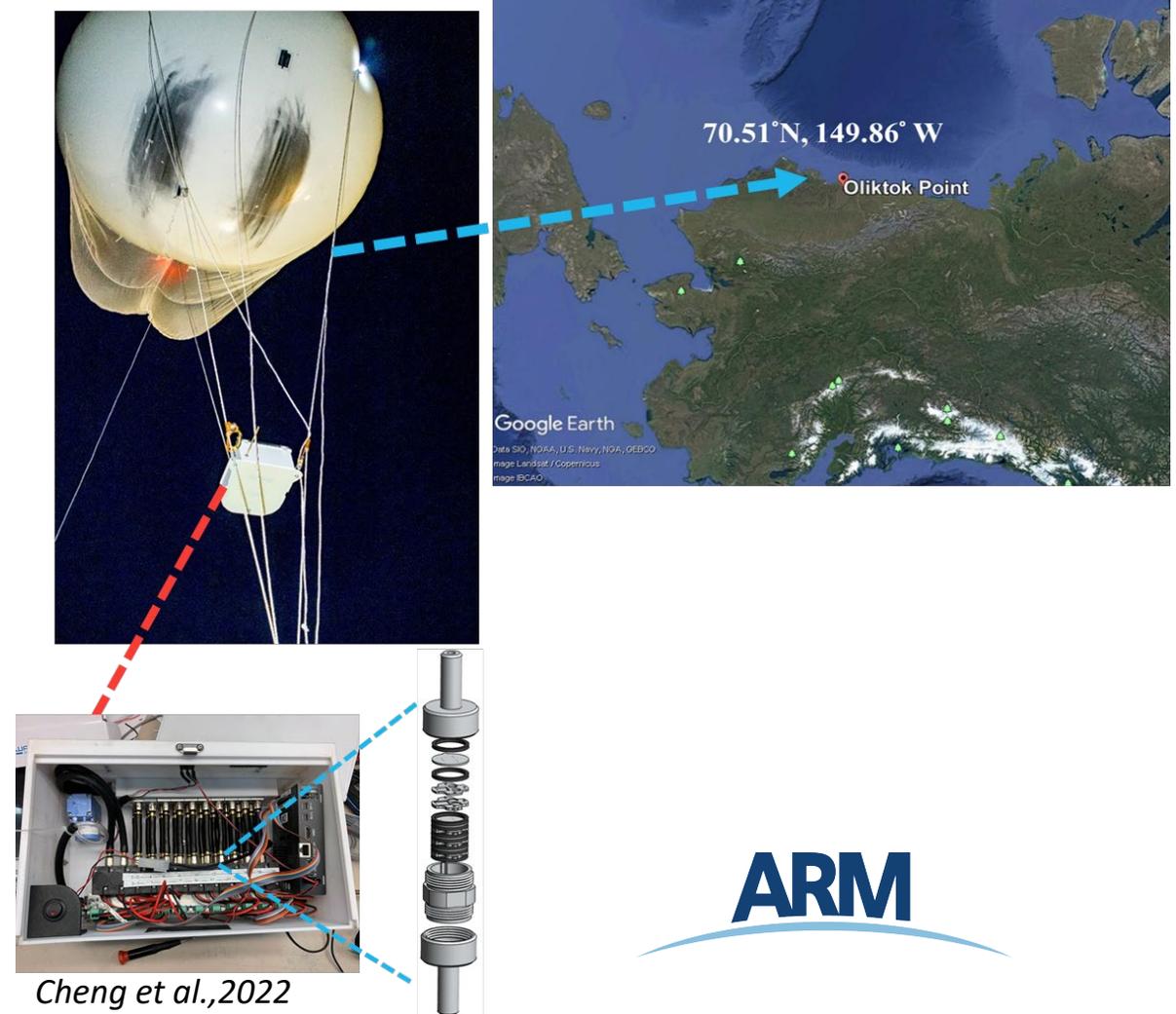
10/26/2022



Significance of Aerosol Phase State

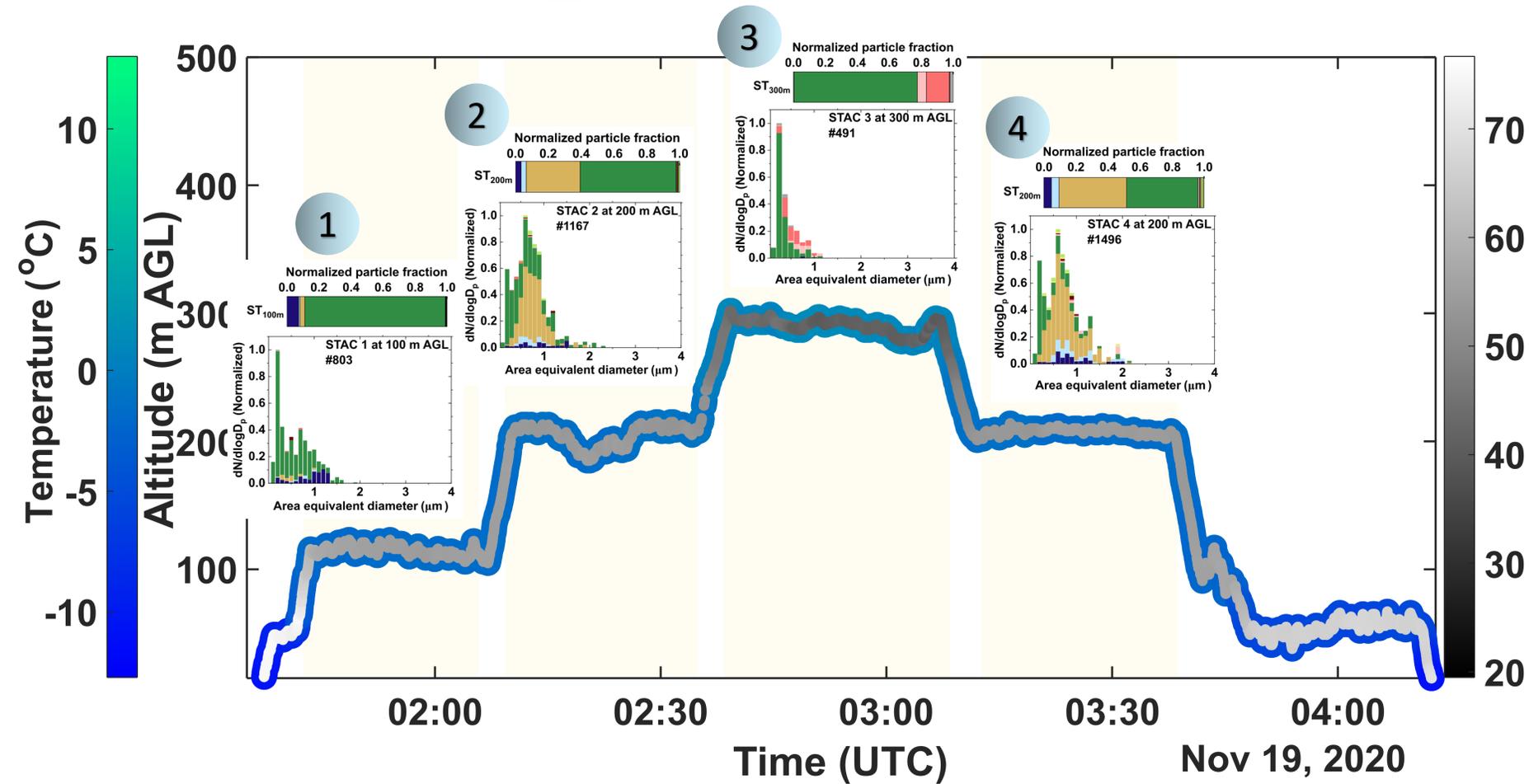


Deployment of TBS with STAC



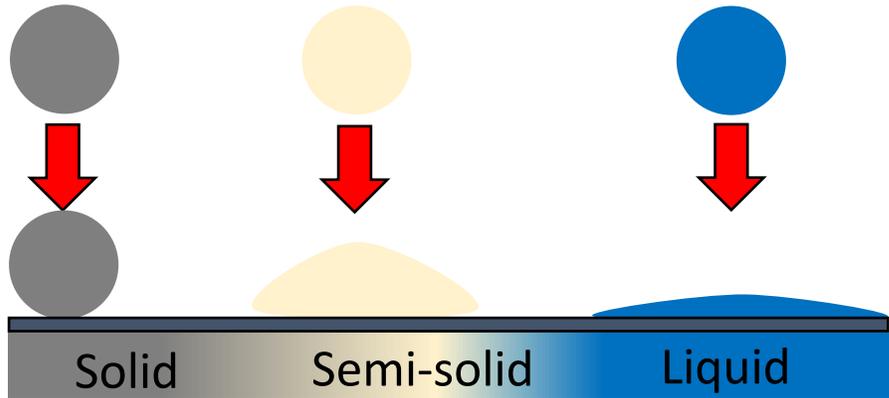
Size and Time resolved Aerosol Collector

Vertical Variation of Aerosol Composition, RH and Temperature

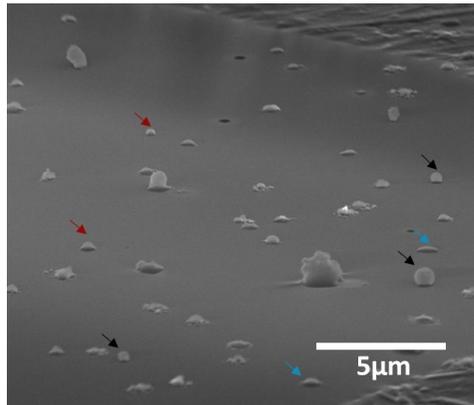
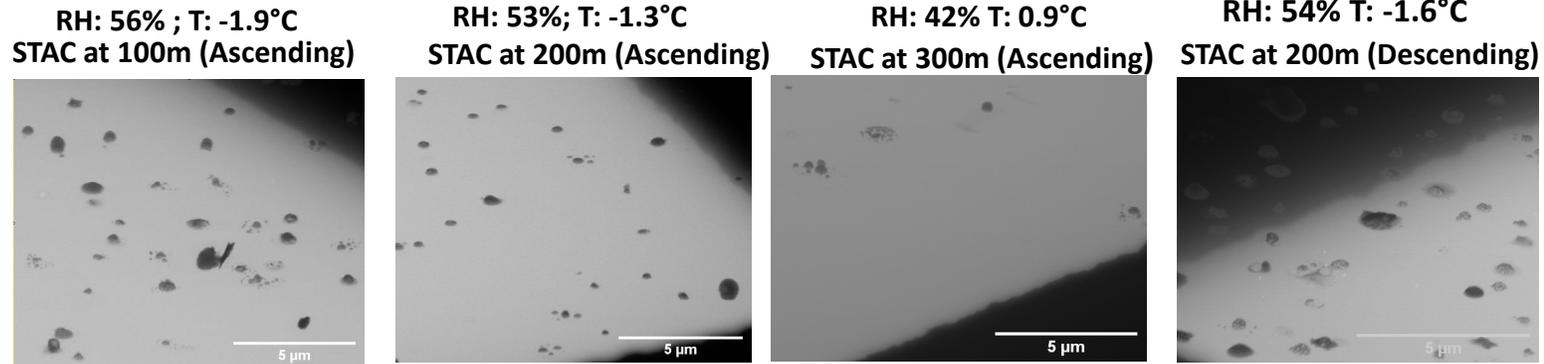


- Carbonaceous particles dominates at 100m and 300m
- Sulfate particles dominates at 200m (ascending & descending)

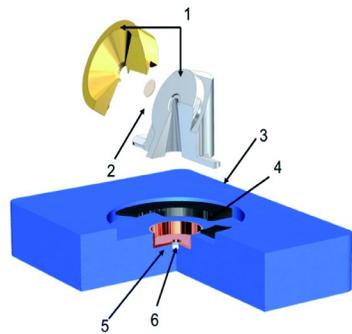
Probing Vertical Gradient of Aerosol Phase State



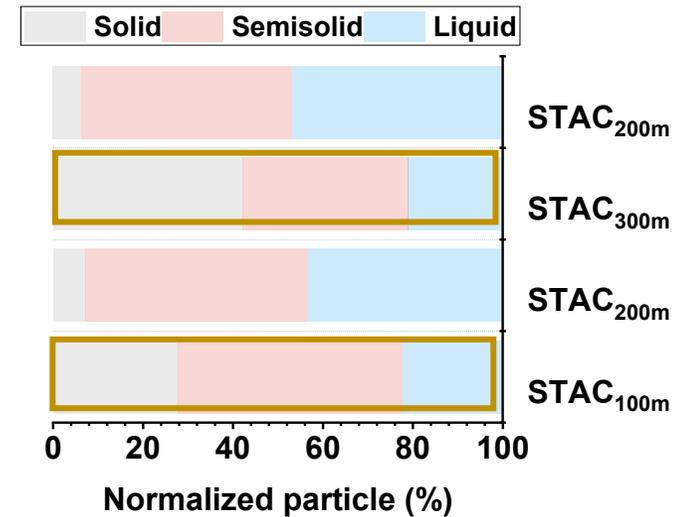
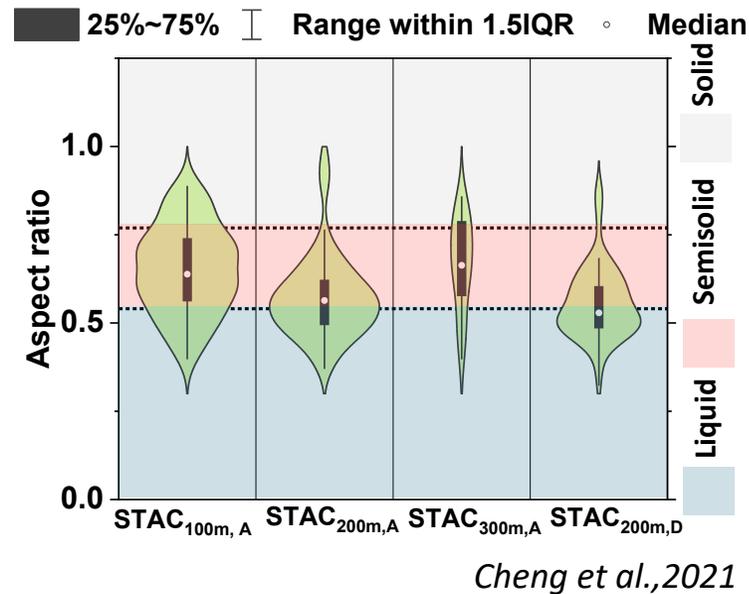
Deformation of particle shape upon impaction



Tilted Peltier Stage



Cheng et al.,2021



- Ambient condition (RH~41 to 55%, Temperature~0.9 to -1.9°C)

- Carbonaceous dominant sample contains more solid-like particle
- Sulfate dominated sample contains more semi-solid and liquid-like particles

Key findings & atmospheric implications

- Variability of aerosol phase over scale is probed
- Aerosol phase variability stems from multiple factors
- Improve understanding of aerosol-climate interaction

Acknowledgements

