Ground-based aerosol optical measurements in biomass burning regions

Allison McComiskey

ASR/ARM PI Meeting
Tysons, VA, May 2-6 2016
Getting off the ground is critical in the Arctic

Scientific drivers:

• Arctic meteorology leads to stratification and marked aerosol vertical structure

• Vertical distribution of aerosol in Arctic is source dependent

• Vertical structure dictates heating rates and aerosol-cloud interactions

• Surface measurements do not adequately characterize the profiles of critical aerosol properties

Stone et al. 2014
ARC PAC: 2008
Vertical distribution of aerosol type, optical properties, and heating rates

Brock et al. 2011, Atmos. Chem. Phys., doi: 10.5194/acp-11-2423-2011
What are the major uncertainties in modeling BB aerosol radiative effects?
- Source
- Transport
- Vertical mixing
- Absorption
- Hygroscopic effect

Where do we stand now in observations and what key observations are needed?
- vertical profiles
  - composition
  - absorption
  - size/number
The NOAA micro-glider UAS ($\mu$gUAS)

- **Weather balloon based, <6 lbs. instrumented**
  - Equivalent to a balloon radiosonde
  - FAA regulation on small gliders might be less restrictive: *Ease of operation*

- **Light and inexpensive instruments**
  - ($Ks$ per instrument, “lose-able”)
  - *Low equipment cost*

- **Autonomously homing gliders or parafoils**
  - 5-km ceiling for easy recovery
  - Ground station and table for in-flight tracking
  - *Low operation cost ($350 per launch)*