

# Spatial and Temporal Variability of Surface Albedo and Light Absorbing Chemical Species in Greenland. *Courville, Polashenski, Dibb, Bergin, Schauer (NSF)*

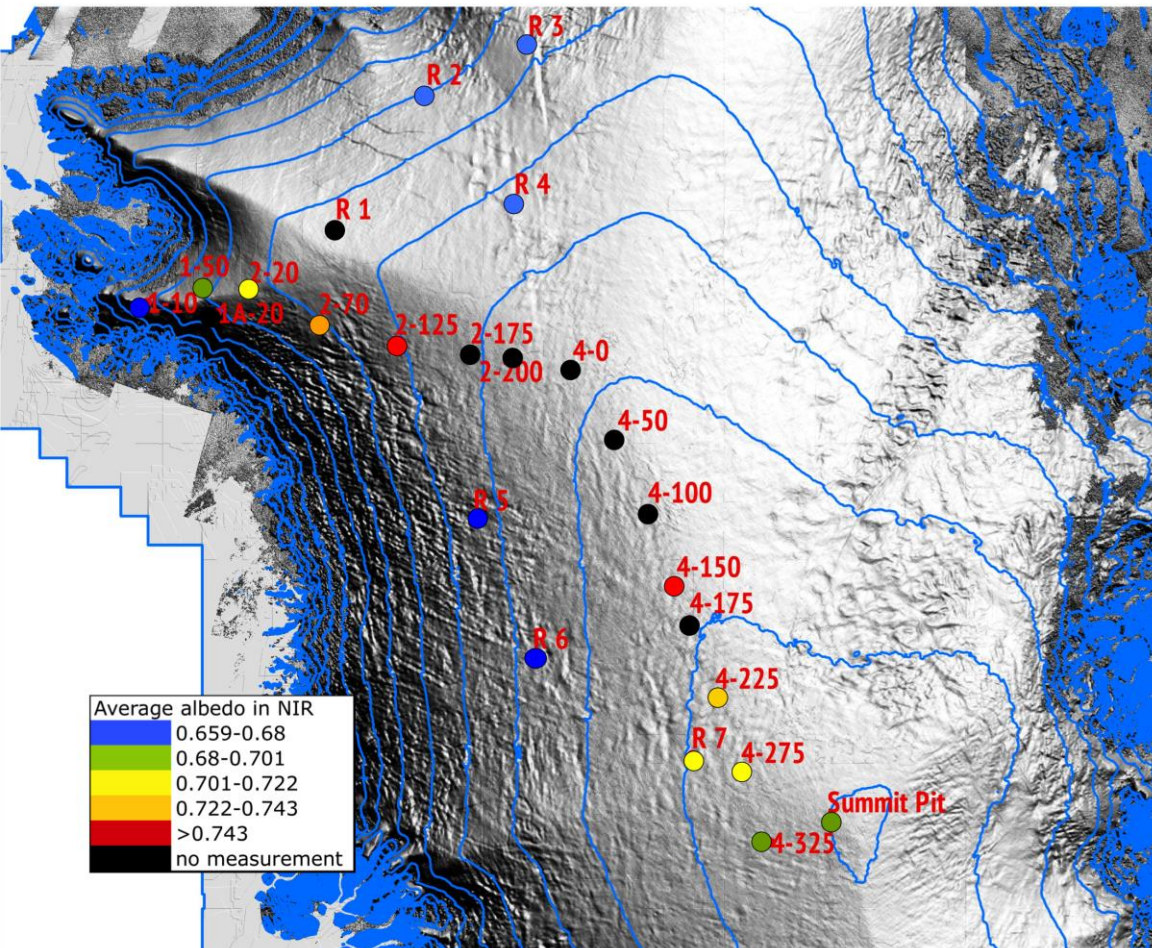
At each site sampled top 20 cm for BC, ions, trace element chemistry

Measured SSA with DUFISS and collected casts for stereology and micro-CT imaging

Also measured 10 m temperatures

At 5 stations set up AWS that include measurement of albedo

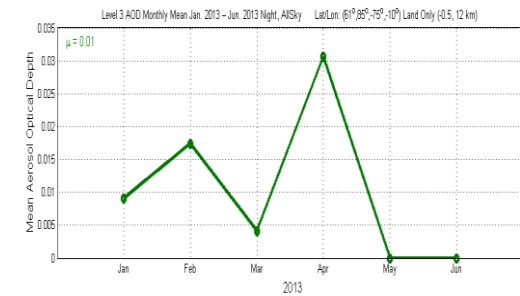
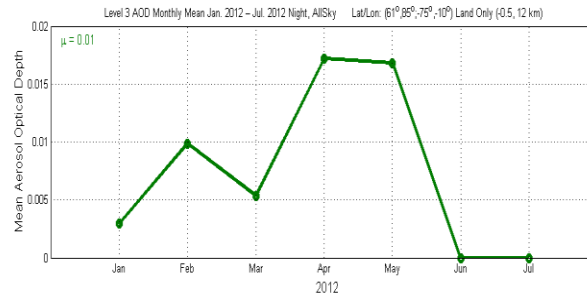
At all sites collected additional chemistry samples around the prominent 2012 melt layer, and in the refrozen percolation ice for a pending NASA proposal (now funded, see next slide)



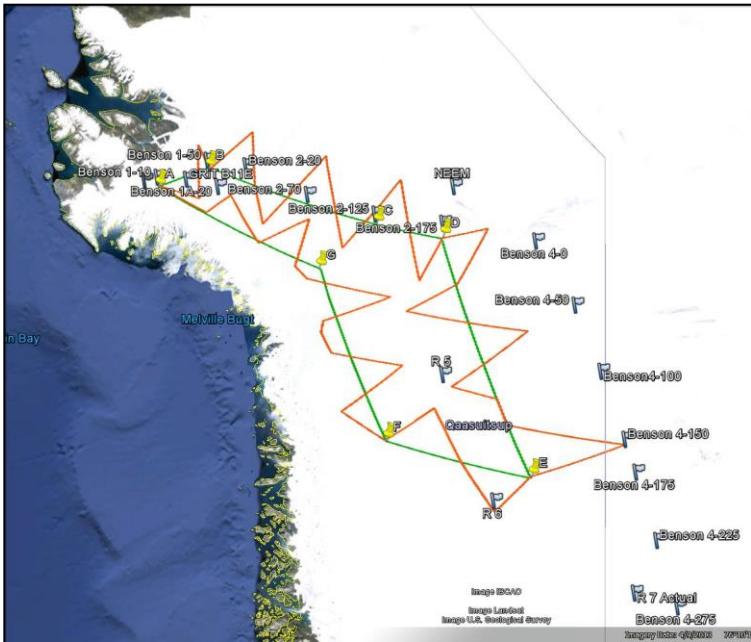
# Emission, Transport, Deposition and Impacts of Biomass Burning Derived Black Carbon on the Greenland Ice Sheet. *Polashenski, Courville, Dibb, Flanner, Soja, Winker, Fairlie, Trepte (NASA)*

Combine satellite remote sensing, detailed fire climatology and emissions, chemical transport modeling, and radiative modeling of the snowpack to track BC from source to Greenland ice sheet

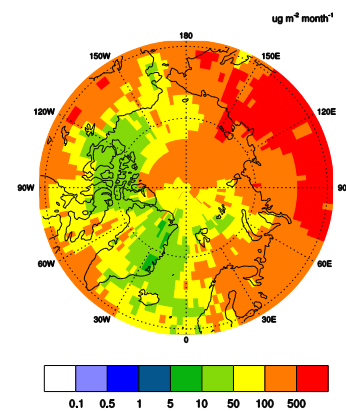
Assess skill of combined approach by comparison to spatial/temporal distribution of BC preserved in the snow



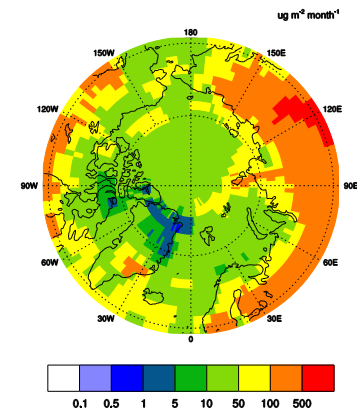
## CALIPSO AOD over Greenland above, CAM4 simulation of BC below



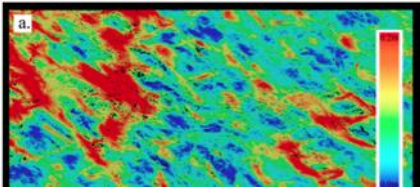
BC deposition, 2012-05



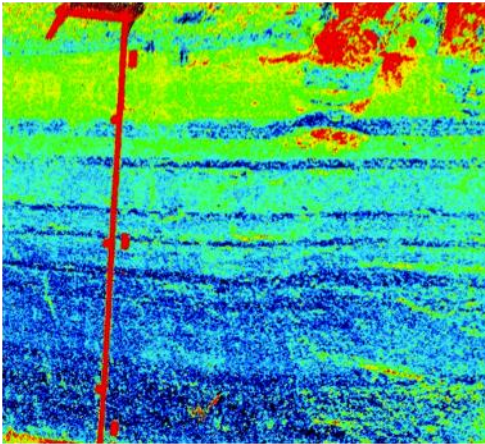
BC deposition, 2013-05



## Surface Roughness Variability in Central Greenland. Courville, Polashenski, Dibb (pending NSF)



Composite LiDAR scans of 100 m x 200 m area of snow-covered sea ice. The full range of the height measurements is 0.2m, with vertical resolution of 1-2cm.



Composite image of several LiDAR scans of snow pit wall (2 m total depth). In this image, blue shades correspond to coarse snow grains and hoar, yellow corresponds to fine snow grains. The red line (left) is the ruler placed in the pit for reference. Red sections (right) are sled tracks on the surface and melt features (in the pit).

Use LIDAR to make detailed assessment of surface roughness from cm to km scale at Summit

Measure albedo as a function of location within the characterized field of roughness elements

Sample snow at high spatial resolution, geolocated with albedo and map of roughness elements

Investigate the relationships between snow composition and microphysics in locations that differ by position relative to roughness elements

Attempt to partition the variability of small scale albedo between the impacts of aspect, impurity content, grain characteristics