

# Putting the Capital 'A' in CoCoRaHS: A Pilot Program to Measure Snow Albedo with the Community Collaborative Rain, [Albedo] Hail, and Snow Volunteer Network

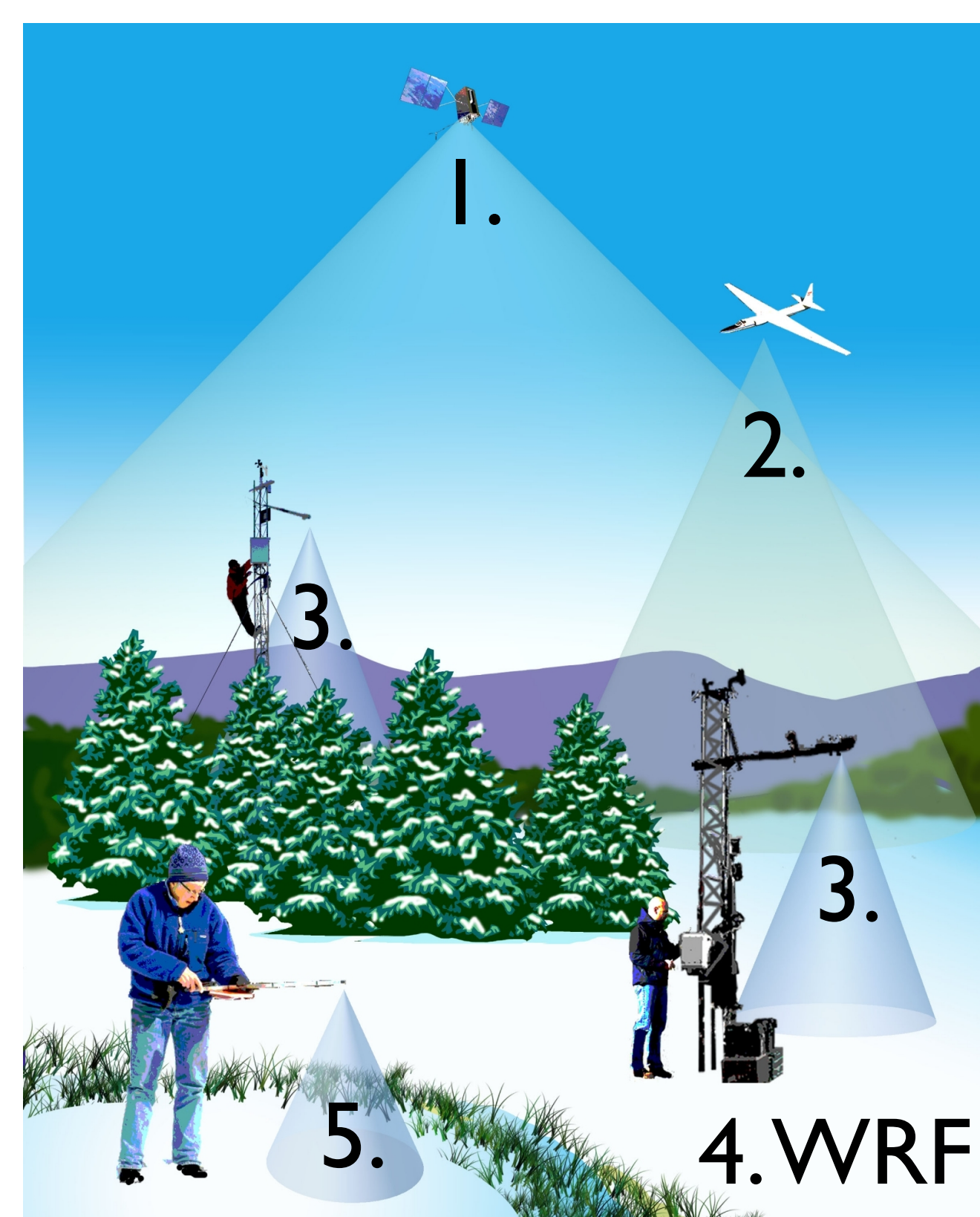
Elizabeth Burakowski, University of New Hampshire, Durham, NH

6th Annual Graduate Climate Conference, Pack Forest, WA 24th-26th October 2012

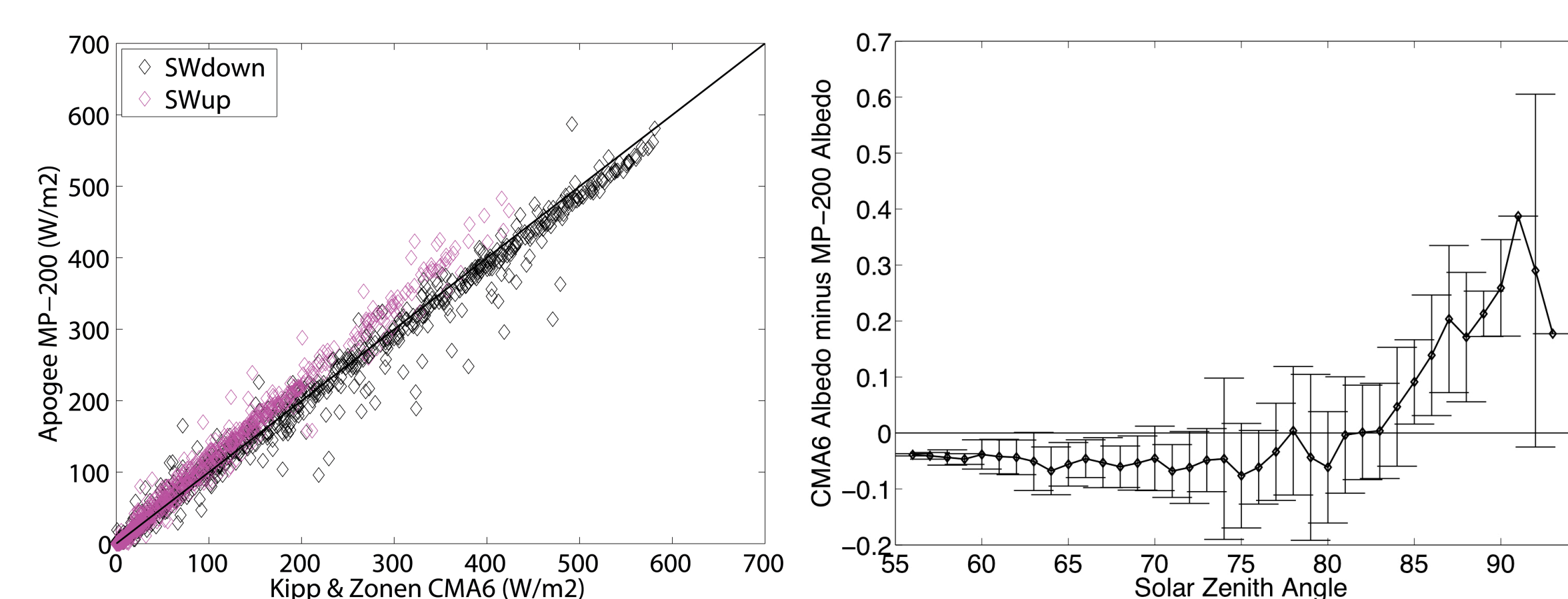
## The Big Picture:

Investigate the interactions amongst land cover, albedo, and winter climate using **five** approaches:

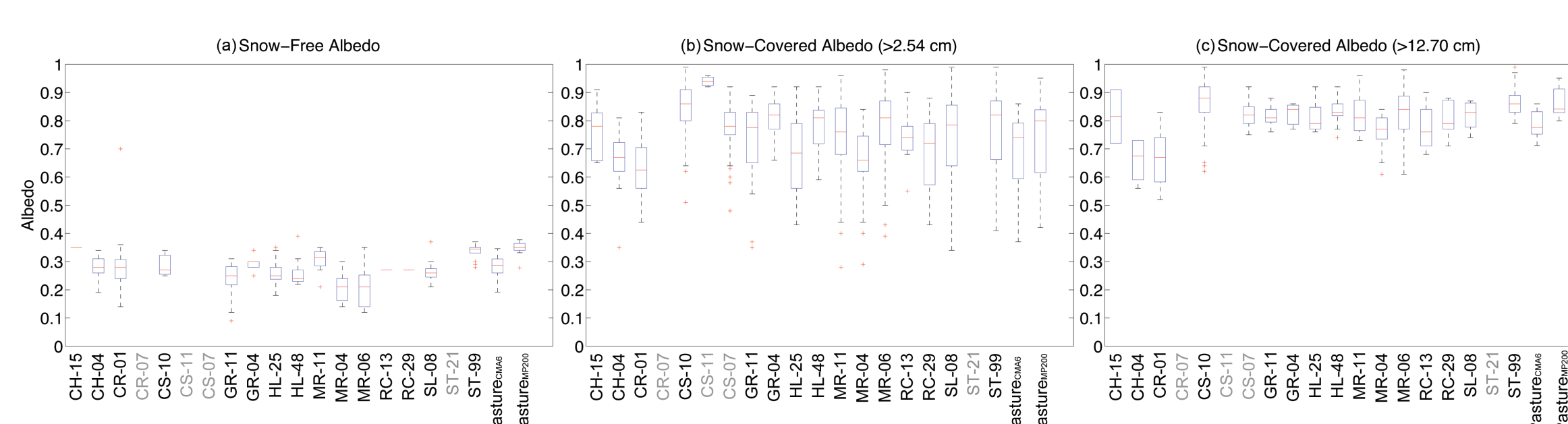
1. MODIS satellite imagery
2. Hyperspectral remote sensing
3. Tower-based observations over forested and deforested landscapes
4. Climate modeling
5. Volunteer scientist network observations



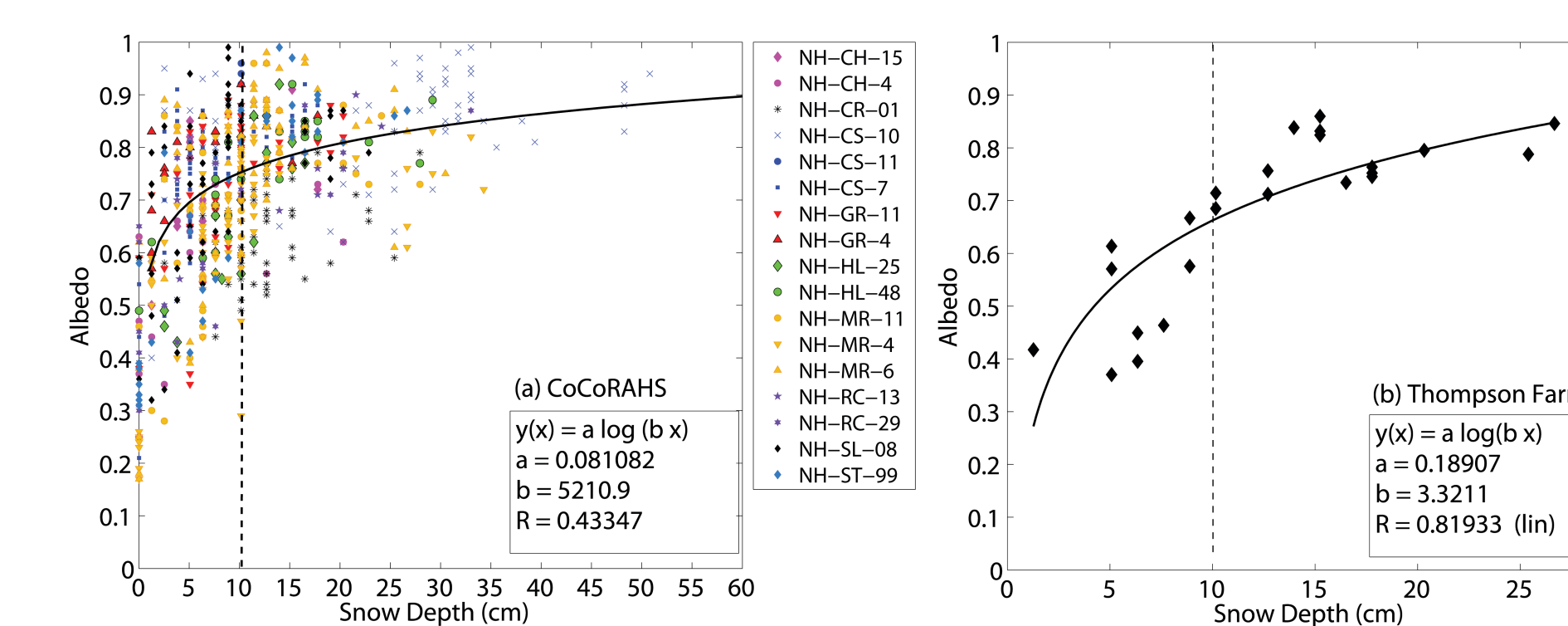
## Results:



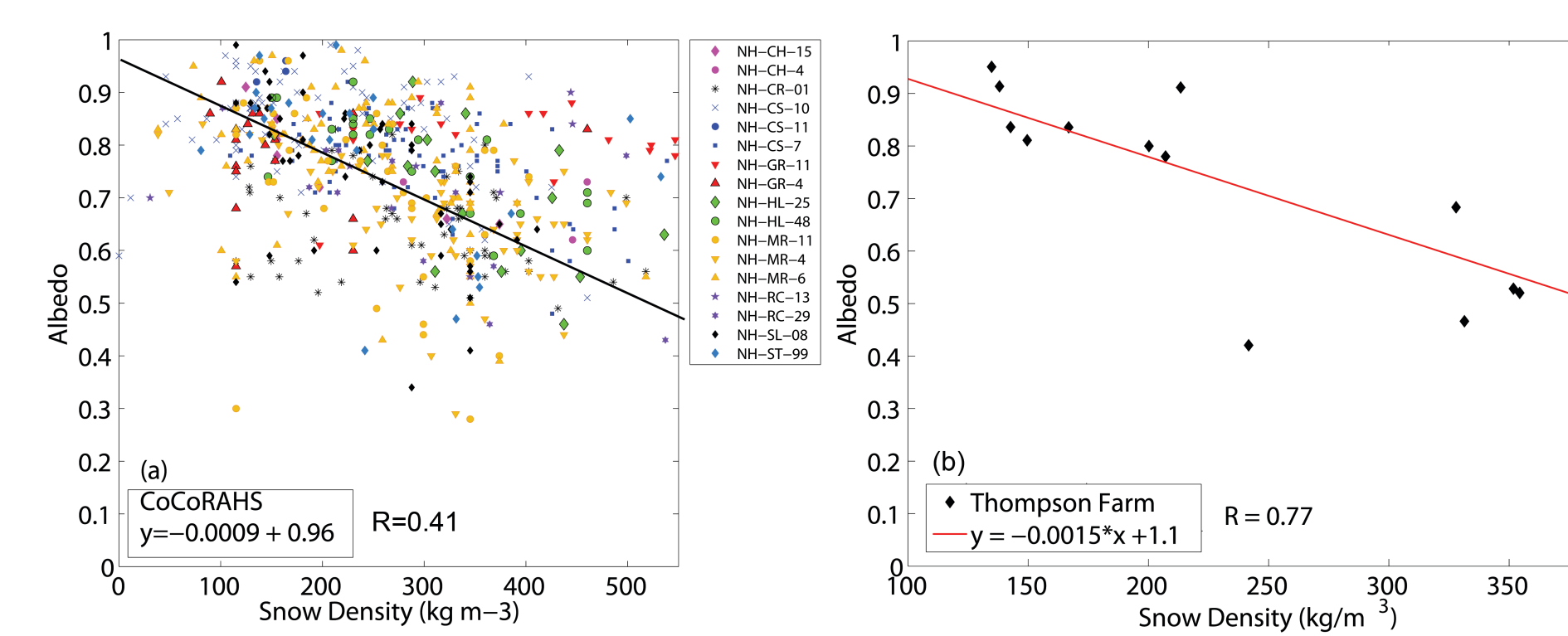
Comparison of Apogee MP-200 and Kipp and Zonen CMA6. Apogee MP-200 falls within +/-0.05 close to local solar noon.



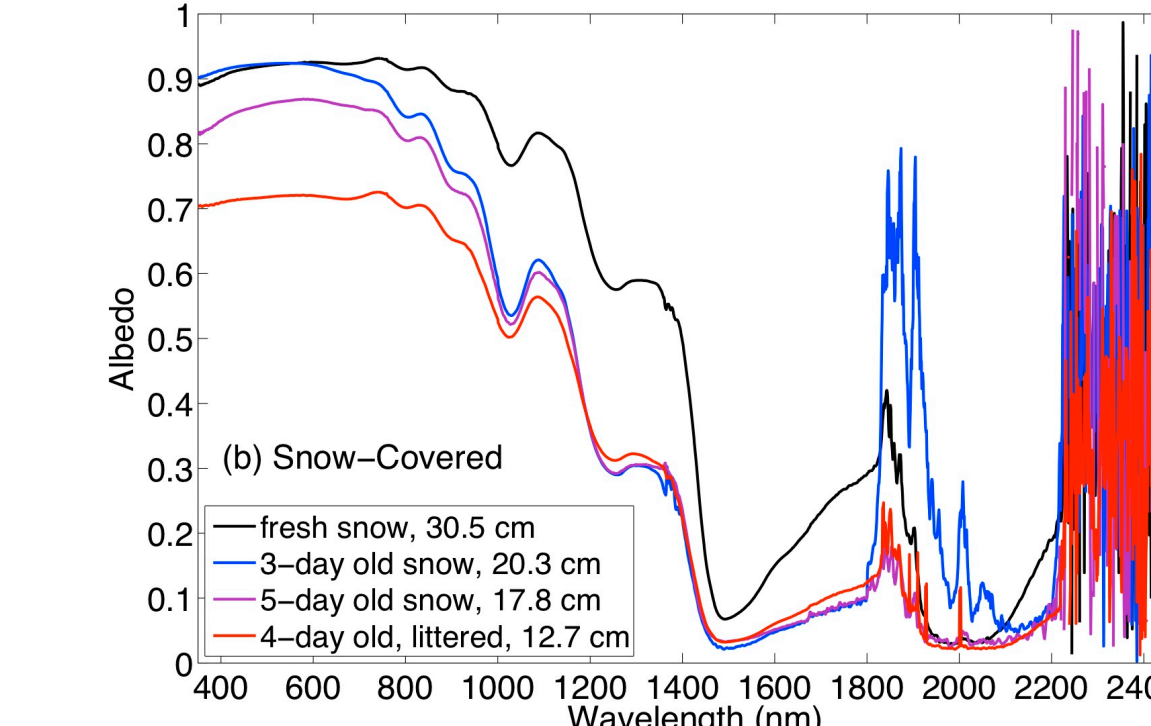
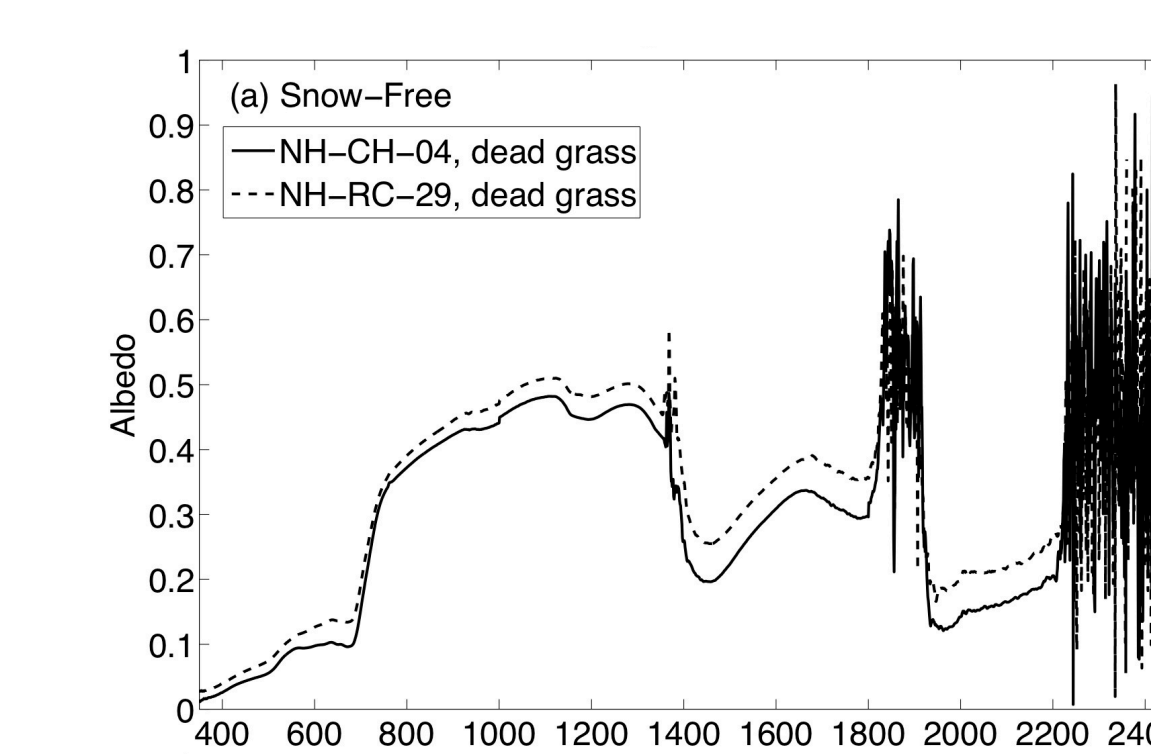
Box plots of (a) snow-free, (b) snow-covered (>2.54 cm) and (c) deep snow-covered (>12.70 cm) surface albedo, by station.



Albedo versus snow depth for (a) all stations and (b) Thompson Farm in Durham, NH.



Albedo versus snow density for (a) all stations and (b) Thompson Farm in Durham, NH.

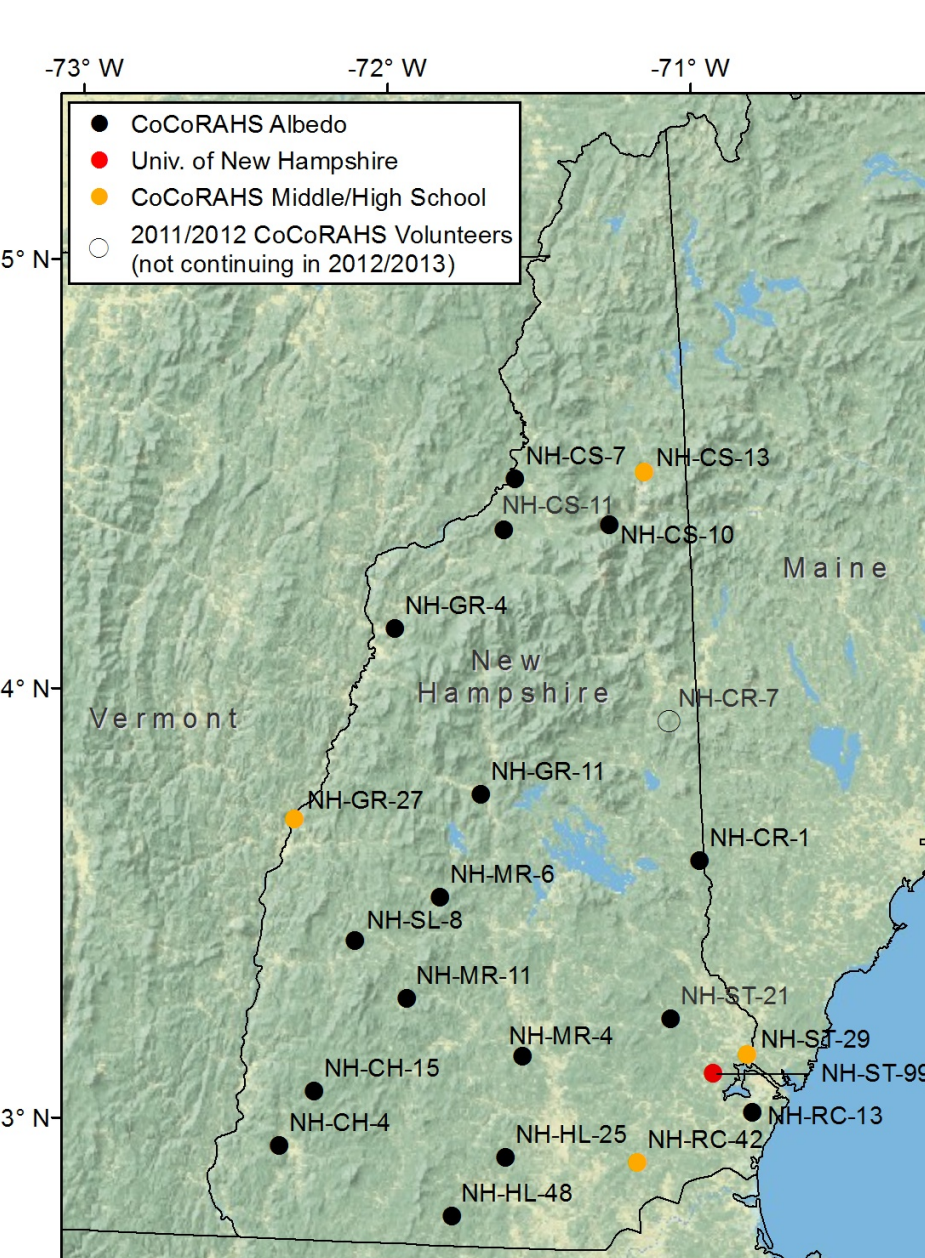
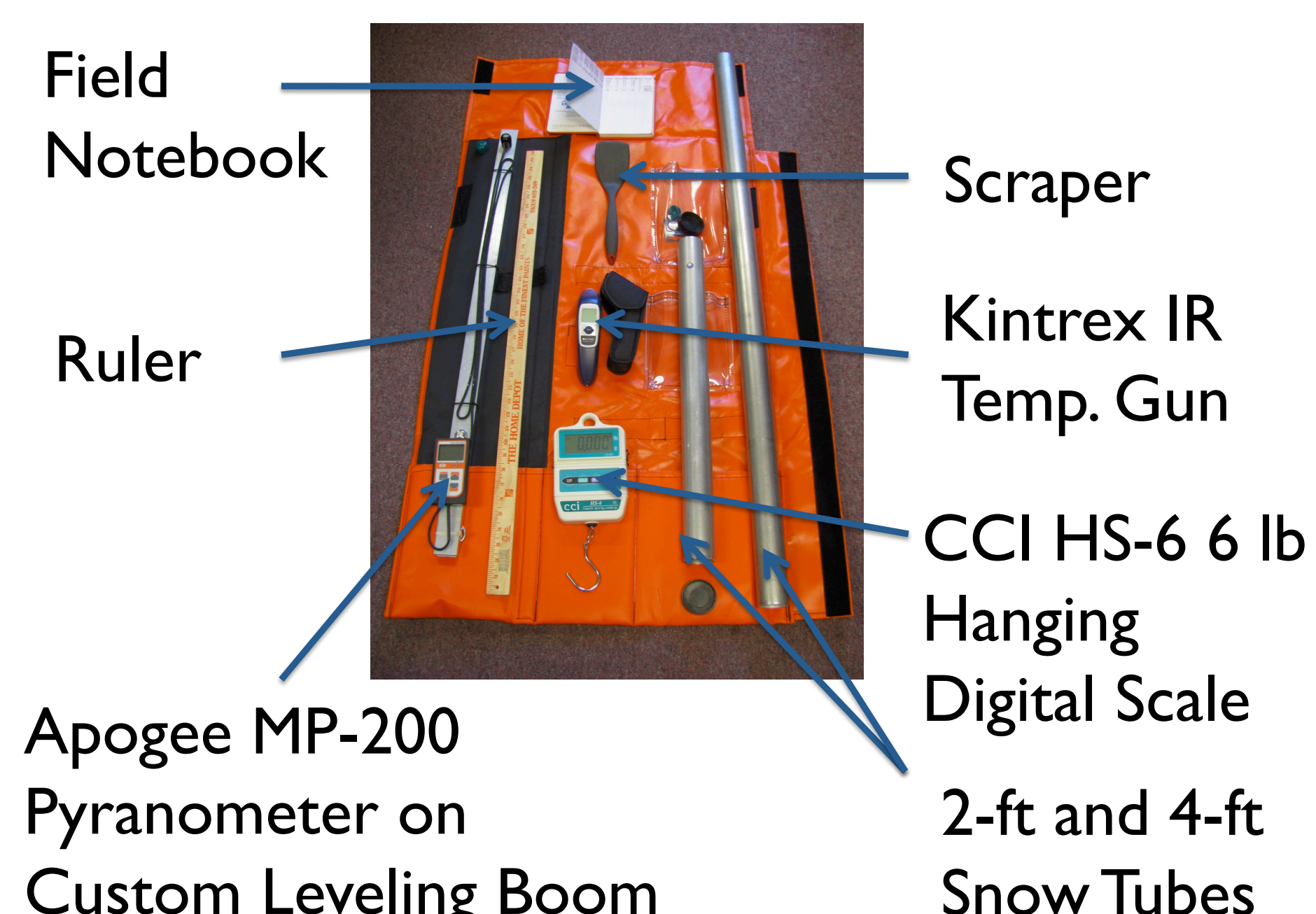


Spectral albedo data collected using the ASD FieldSpec4 over snow-free (a) and snow-covered (b) surfaces. NIR decrease indicative of grain size changes.

## Our Volunteer Network:

### The Snow Sampling Kit

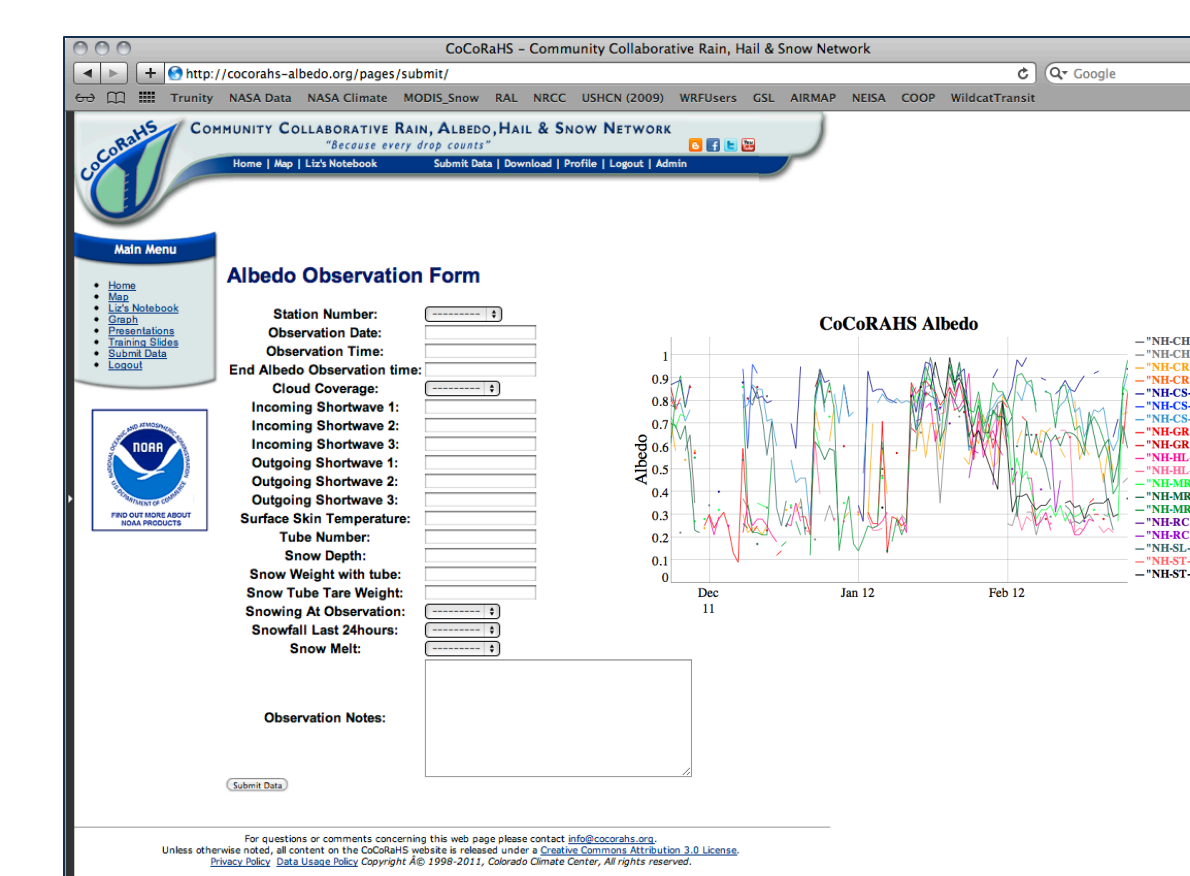
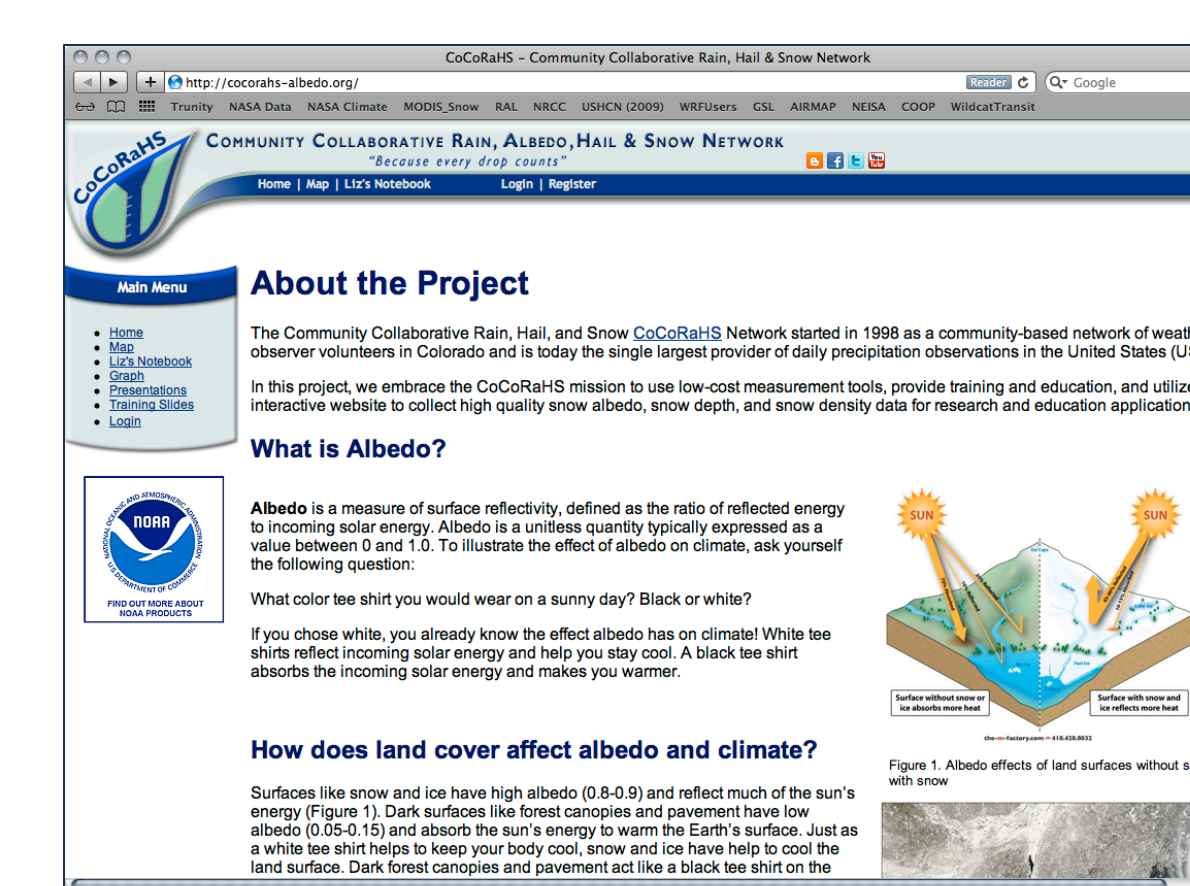
### Station Map



Volunteers collect **daily** measurements of surface albedo, surface skin temperature, snow depth, and snow density.

## Our Website: [www.cocorahs-albedo.org](http://www.cocorahs-albedo.org)

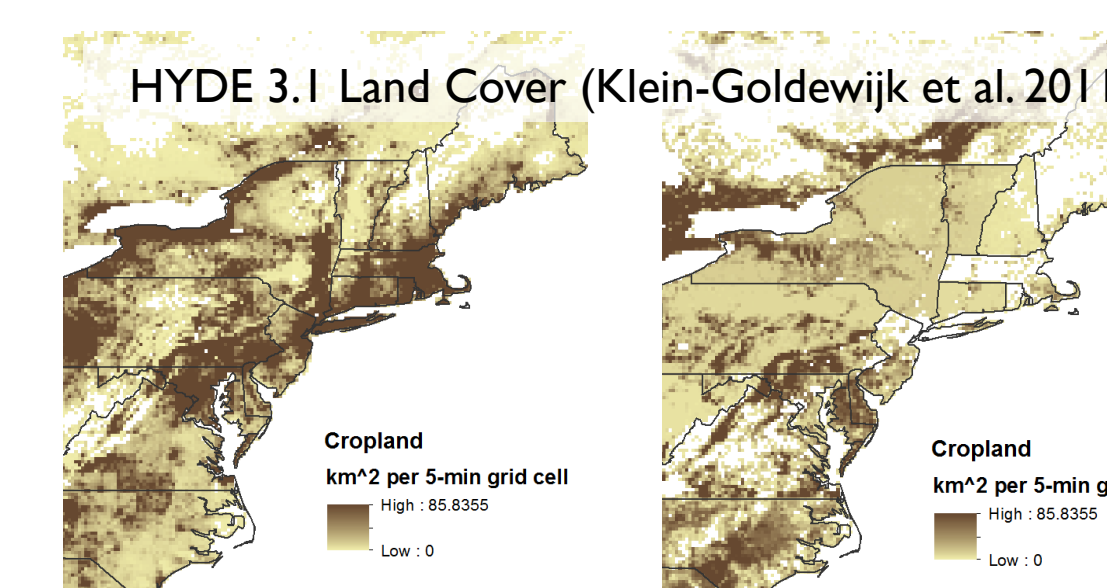
- About the project
- Training Slides
- Presentations
- Data entry
- Mapping & Graphing modules
- Liz's Lab Notebook: a blog for discussing science, CoCoRaHS
- Lesson Plans: Coming Soon!



## Conclusions:

1. Low-cost pyranometers compare well with research grade equipment.
2. Albedo is positively correlated with snow depth; negatively correlated with snow density.
3. The snow density relationship is inferred to be proxy for grain size metamorphism.

## Future Work:



Climate model simulations using the Weather Research, and Forecasting Model: Historical deforested (1850) and present-day reforested (2005), under high snowfall and low snowfall lateral boundary conditions.