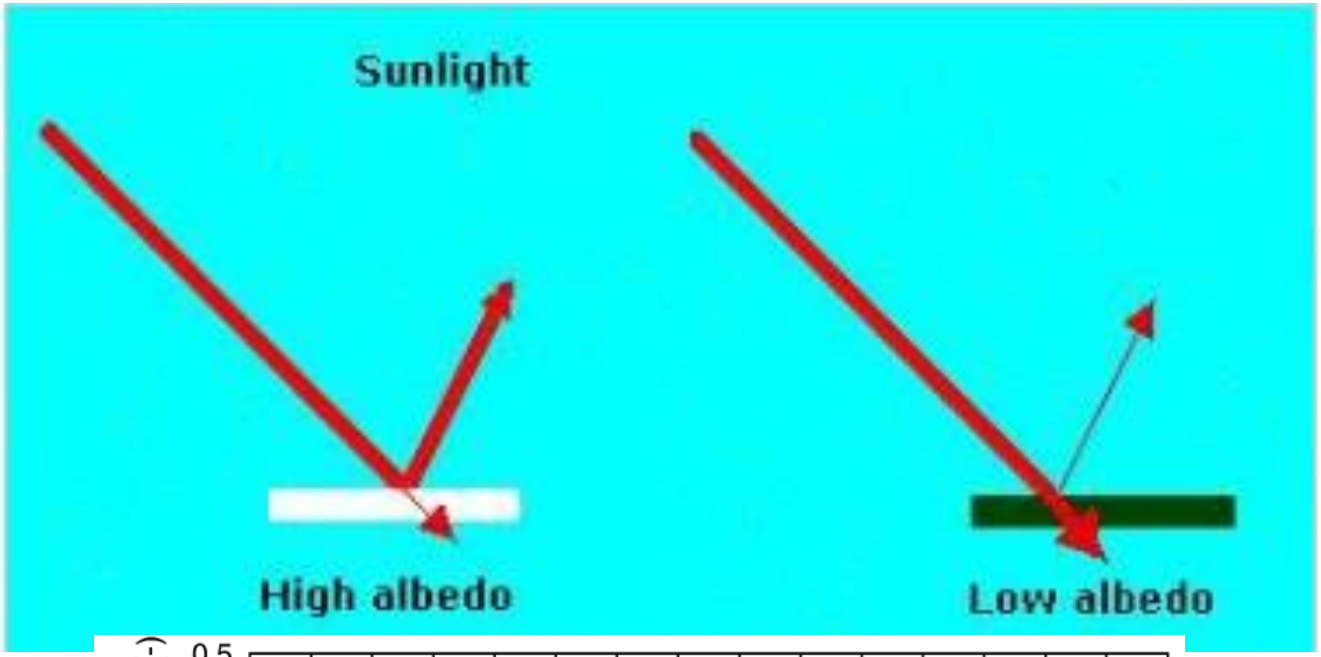
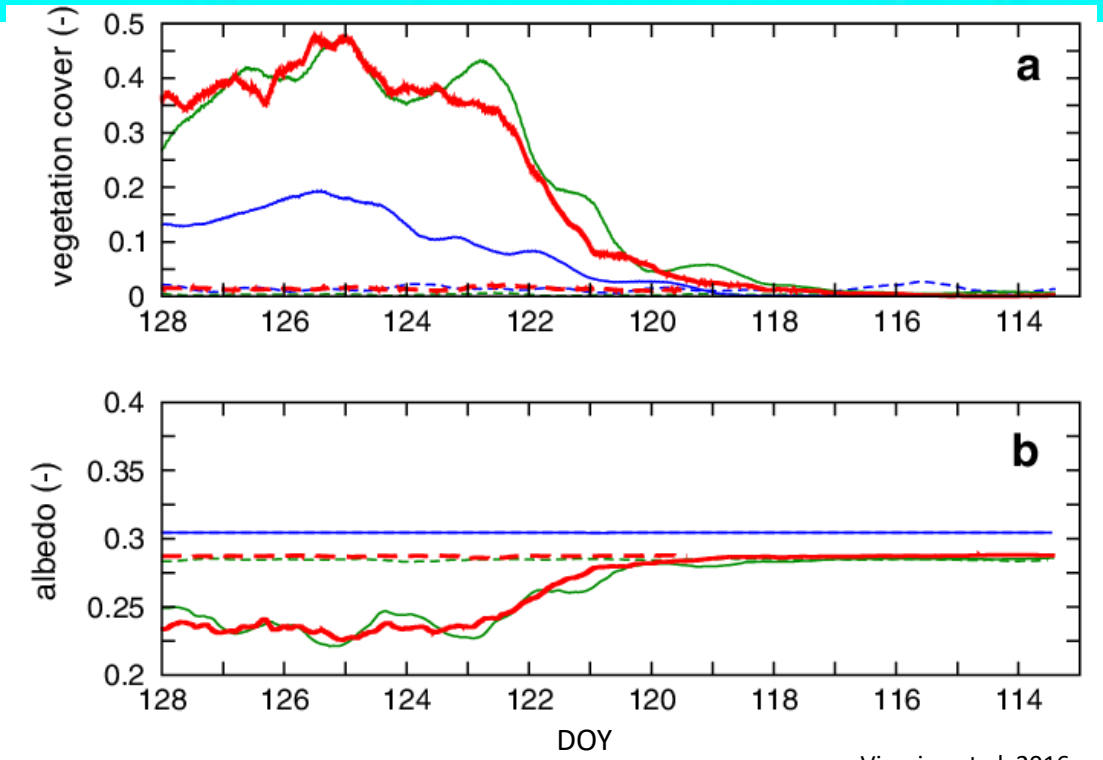
Role of tundra community cover in seasonal albedo values at four sites in northern Alaska

Jeremy L. May, Steven F. Oberbauer, Robert D. Hollister, Craig E. Tweedie, Jeffrey Welker



Higher reflective value=higher albedo

Snow has high albedo



Generally higher vegetation cover has lower albedo

Vizcaino et al. 2016

MISP Transects

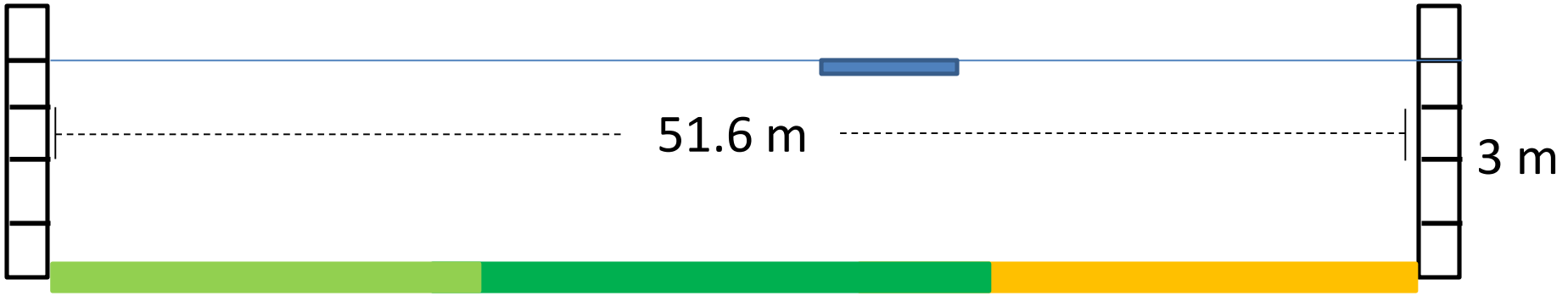
Atqasuk, Alaska

Barrow, Alaska

Imnaviat Creek, Alaska

Toolik Lake, Alaska

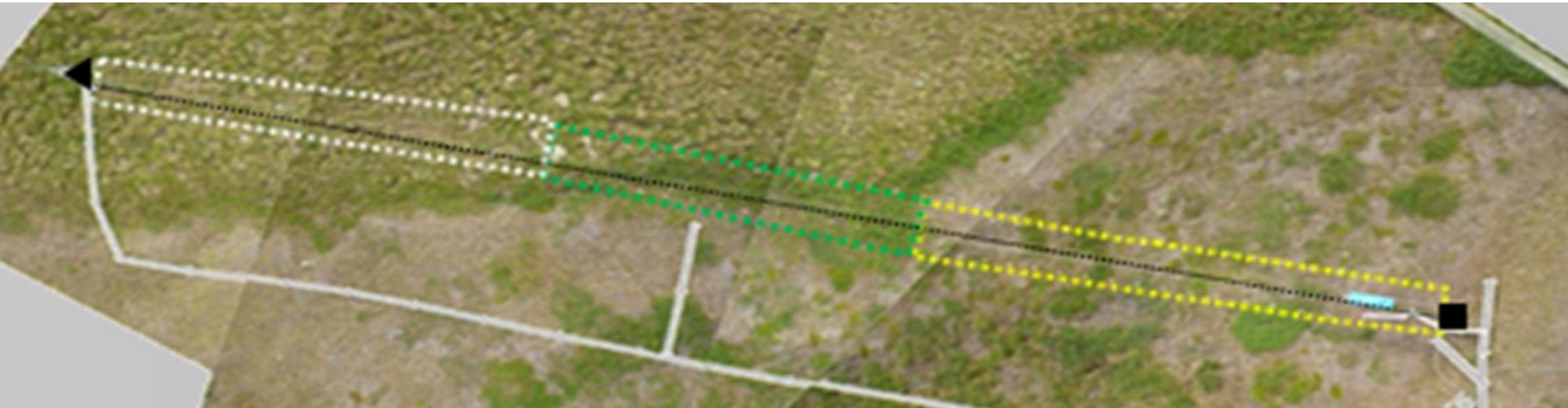
Toolik Lake Transect



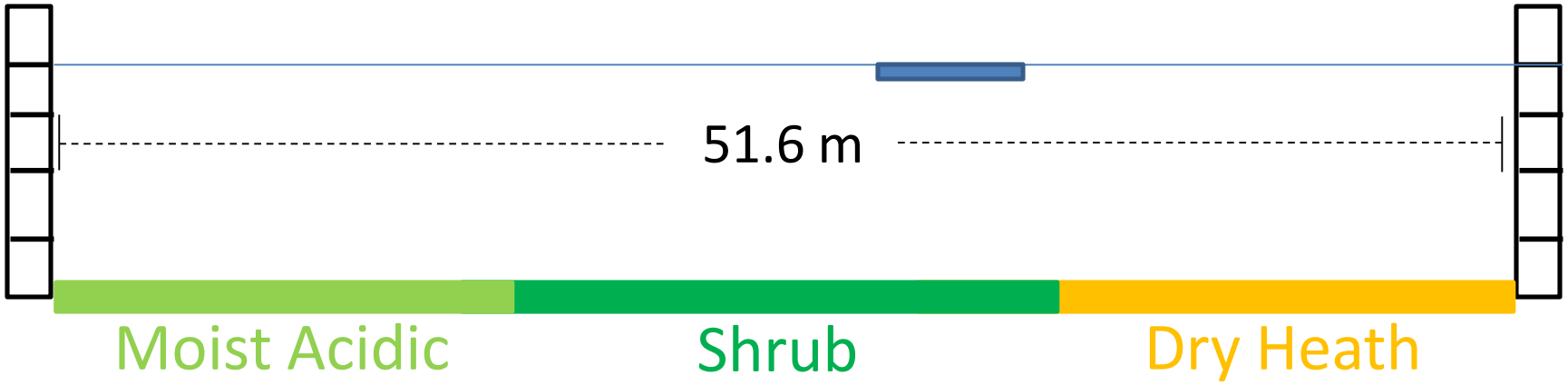
Moist Acidic

Shrub

Dry Heath



Tram power and sampling speed

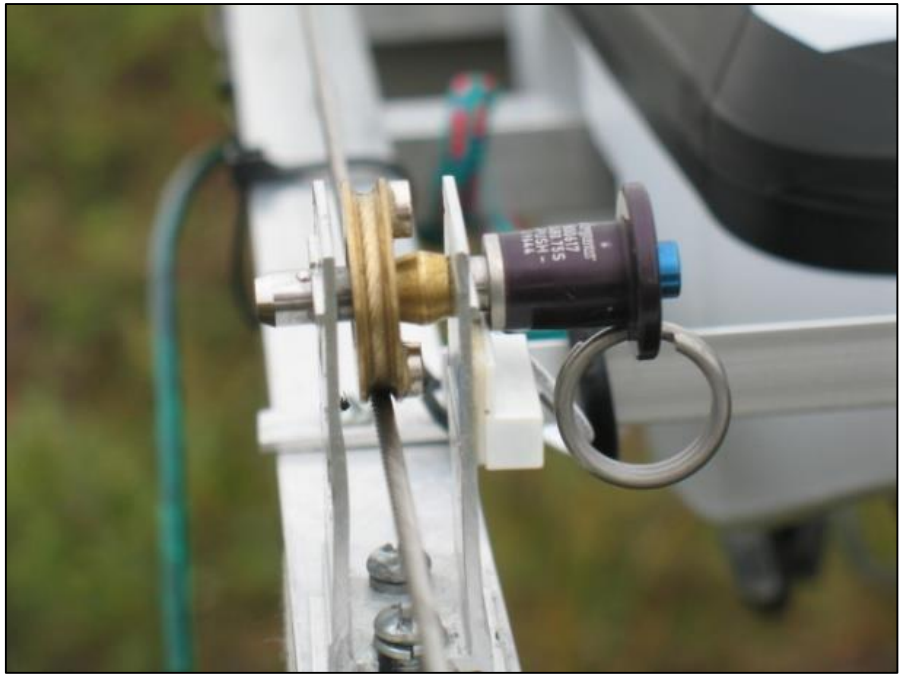


Daily measurements

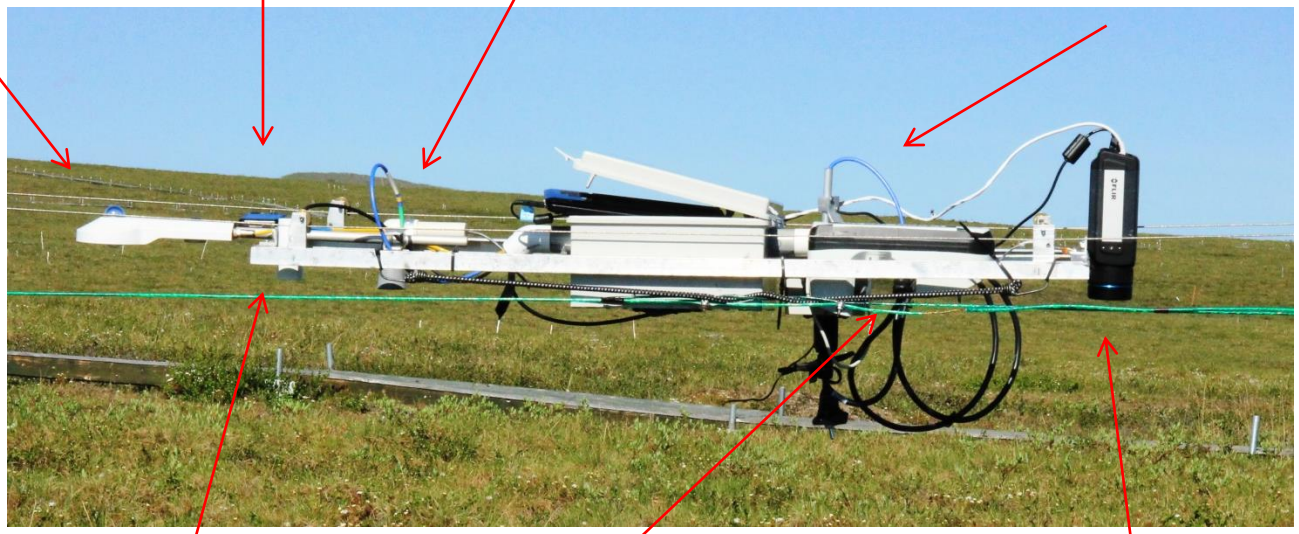
Solar powered pulley system

3 cm/sec speed

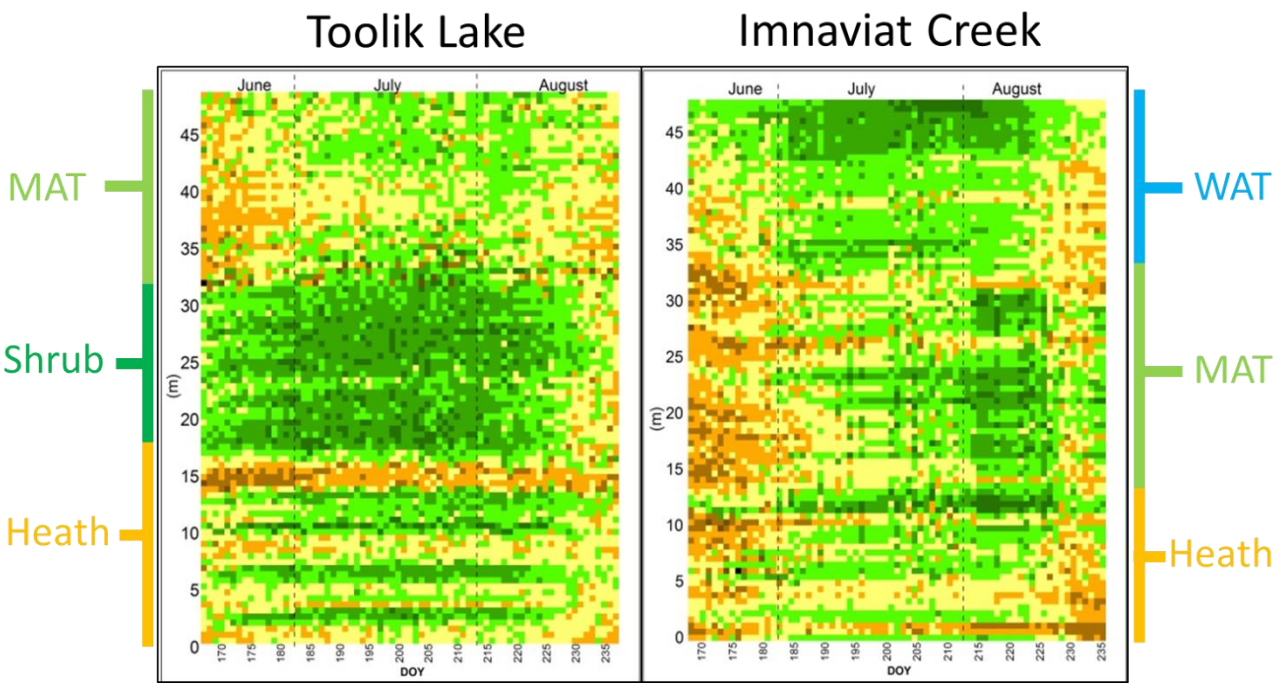
9cm resolution



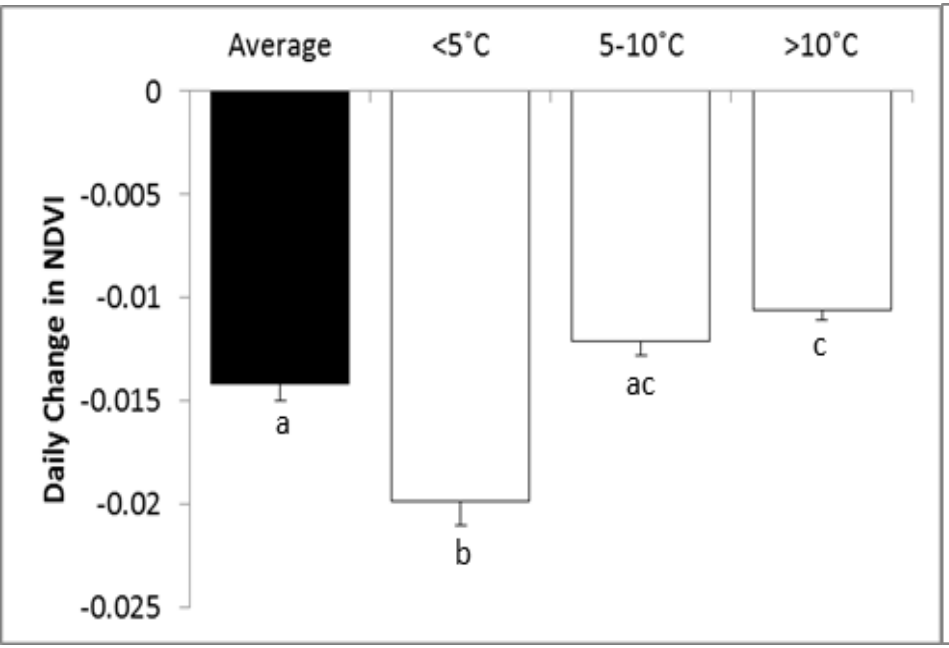
MISP Instrumentation

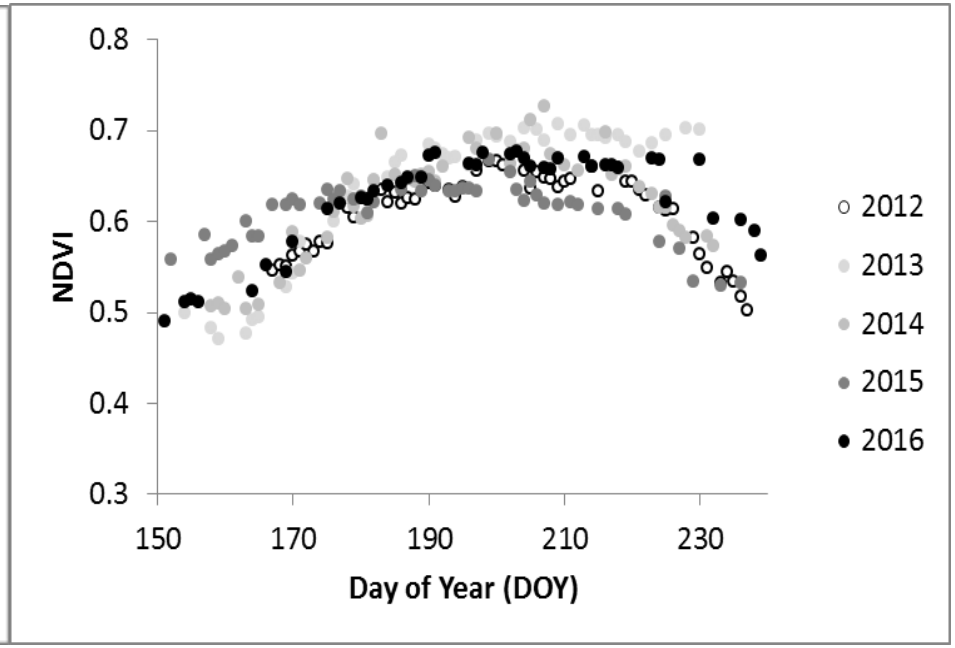


Not pictured: MicaSense RedEdge MX multi spectral cameras



Healey et al. 2014, *Environment Informatics*





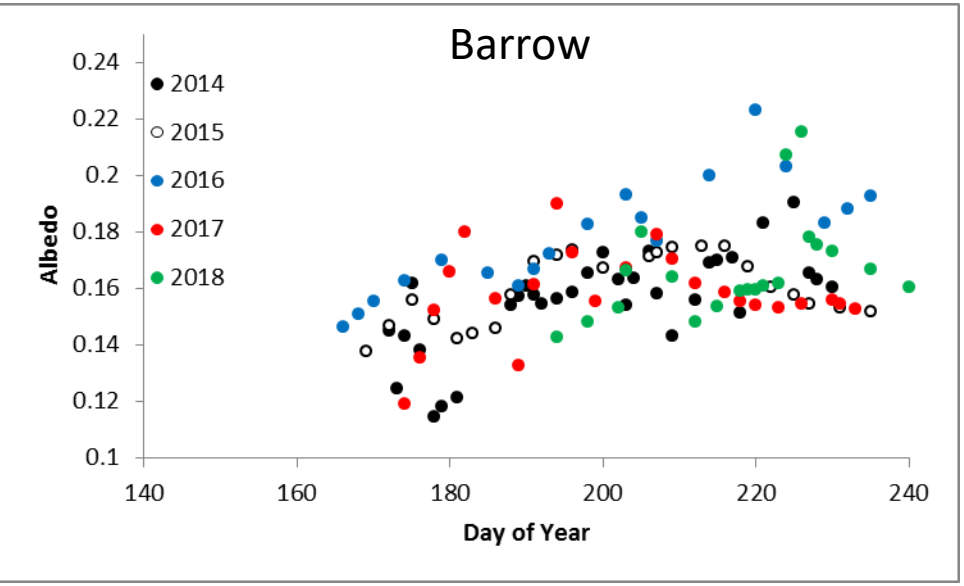
May et al. 2017, *Remote Sensing*

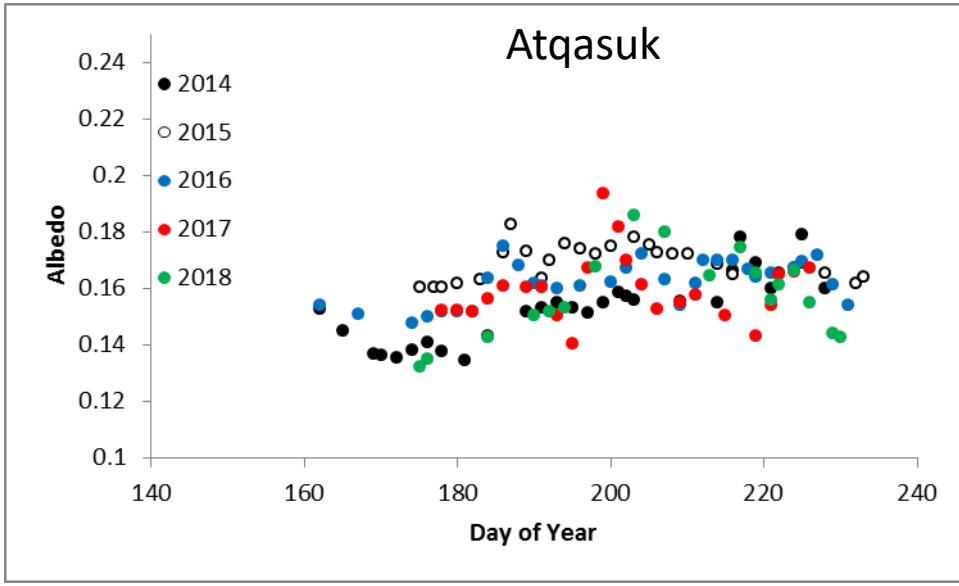
CNR4 Net Radiometer
(Albedo)

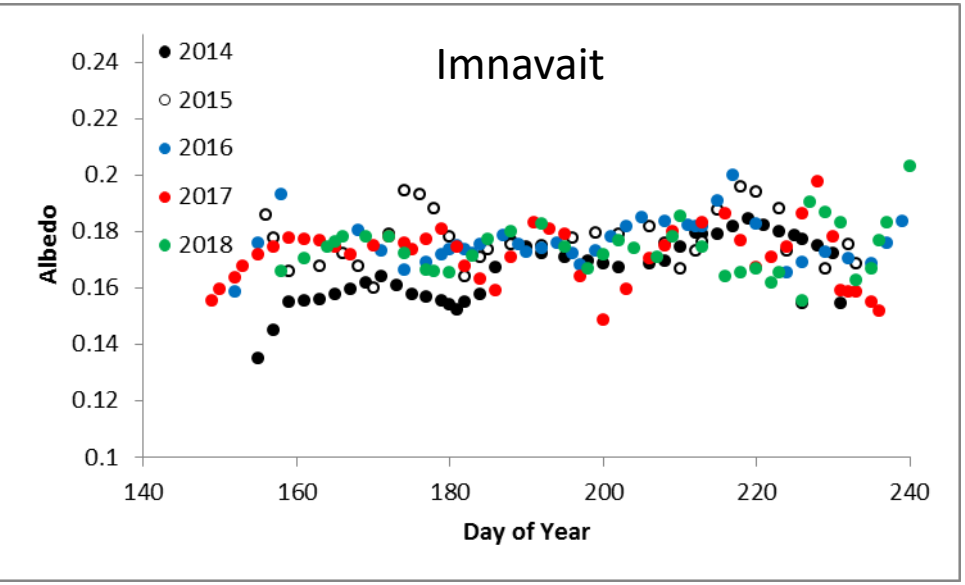
Measures incoming and reflected short wave (380-2500nm) and long wave (4500-42,000nm) radiation

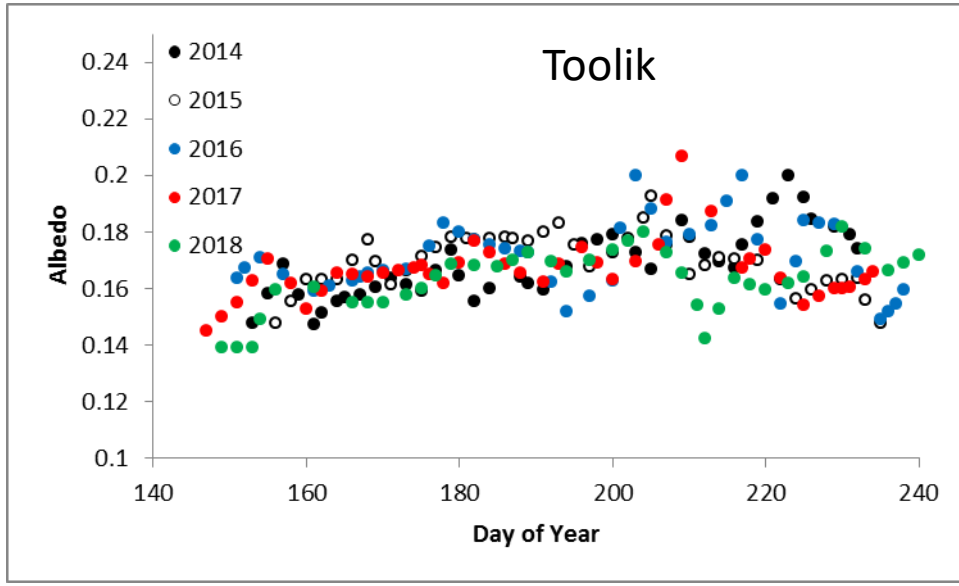
This ratio of incoming and reflected long/short wave radiation is albedo

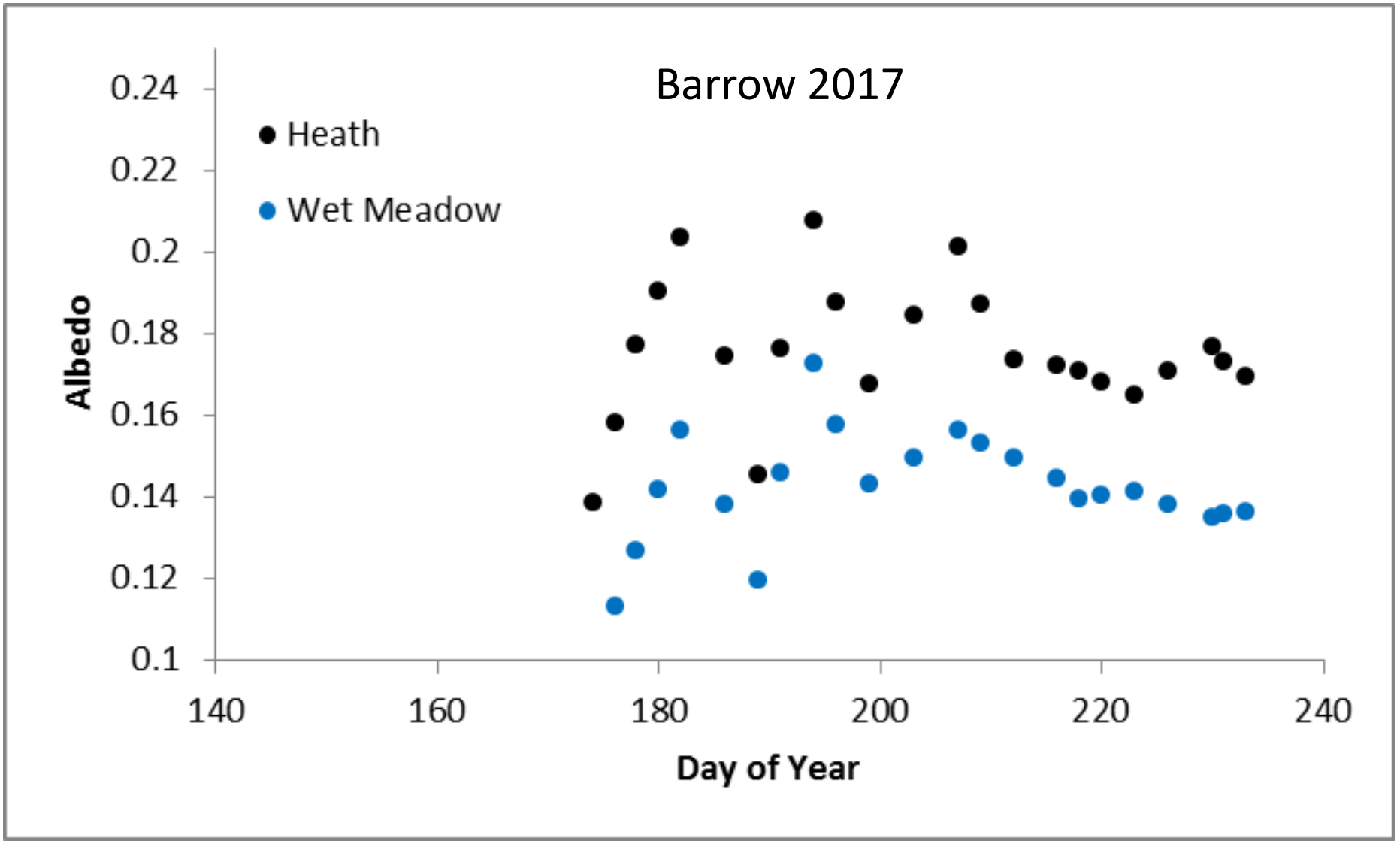
Season Long Albedo Values for four MISP tranesects





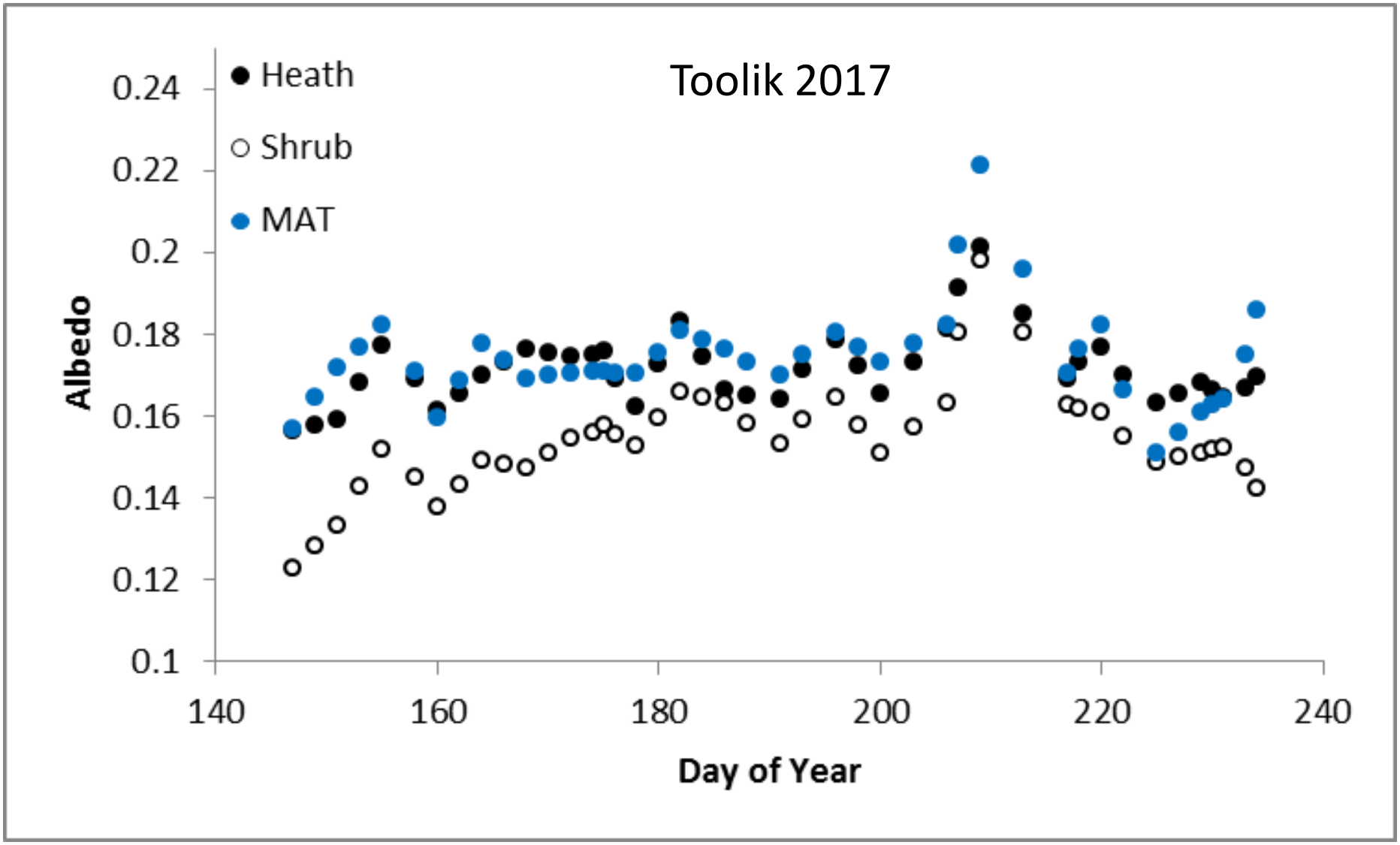


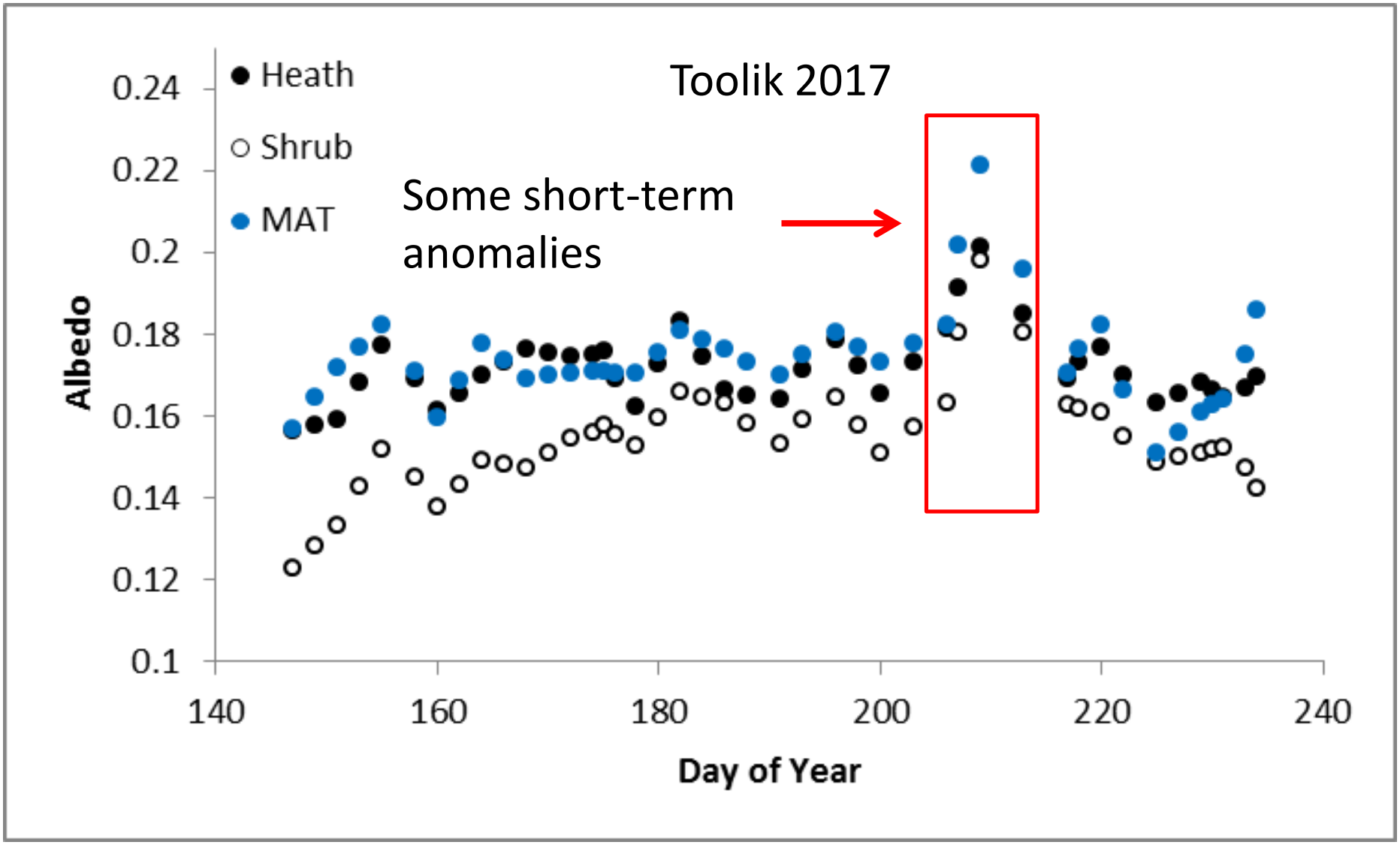




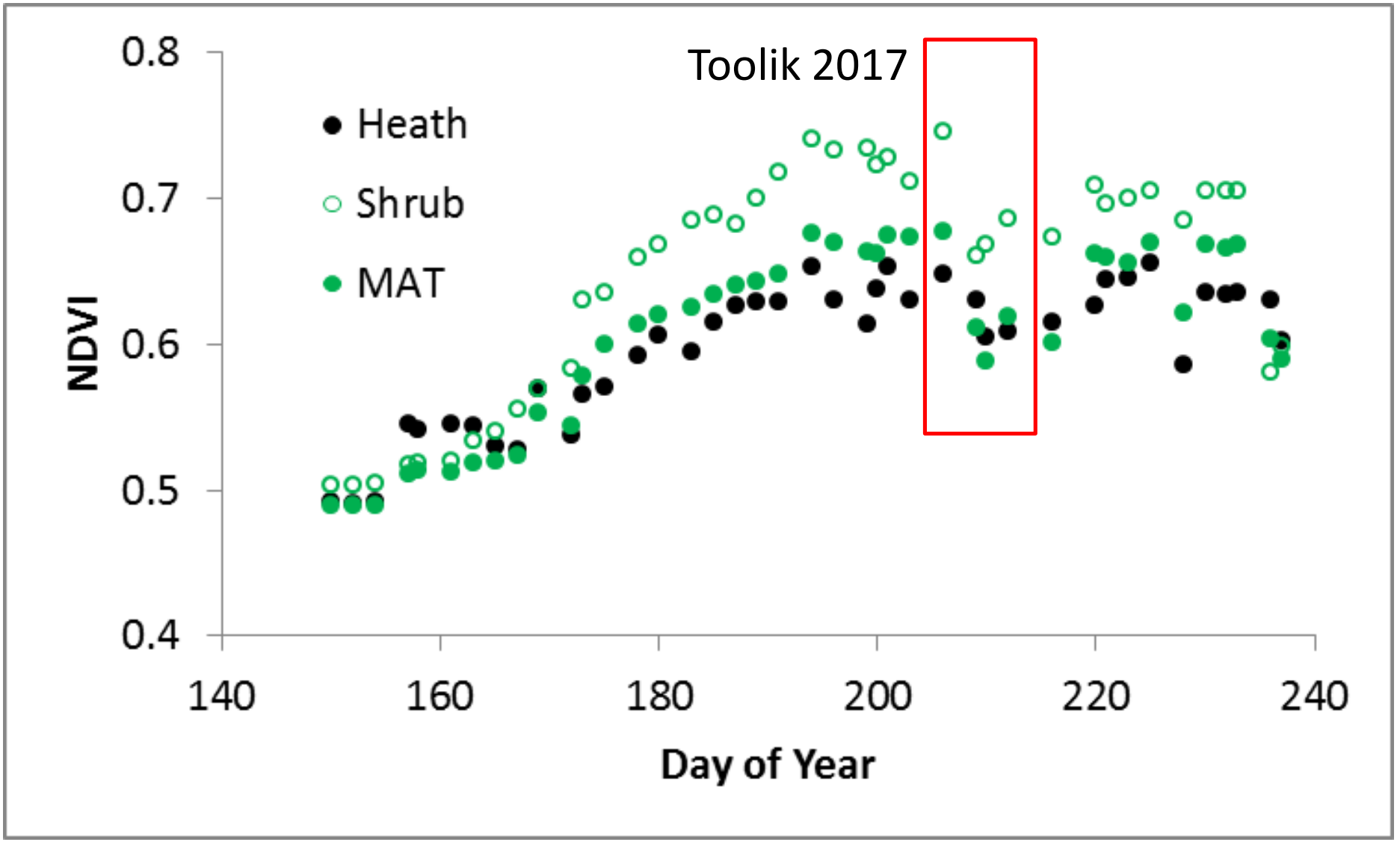
Increased vegetation cover shows lower albedo

Heath the highest albedo

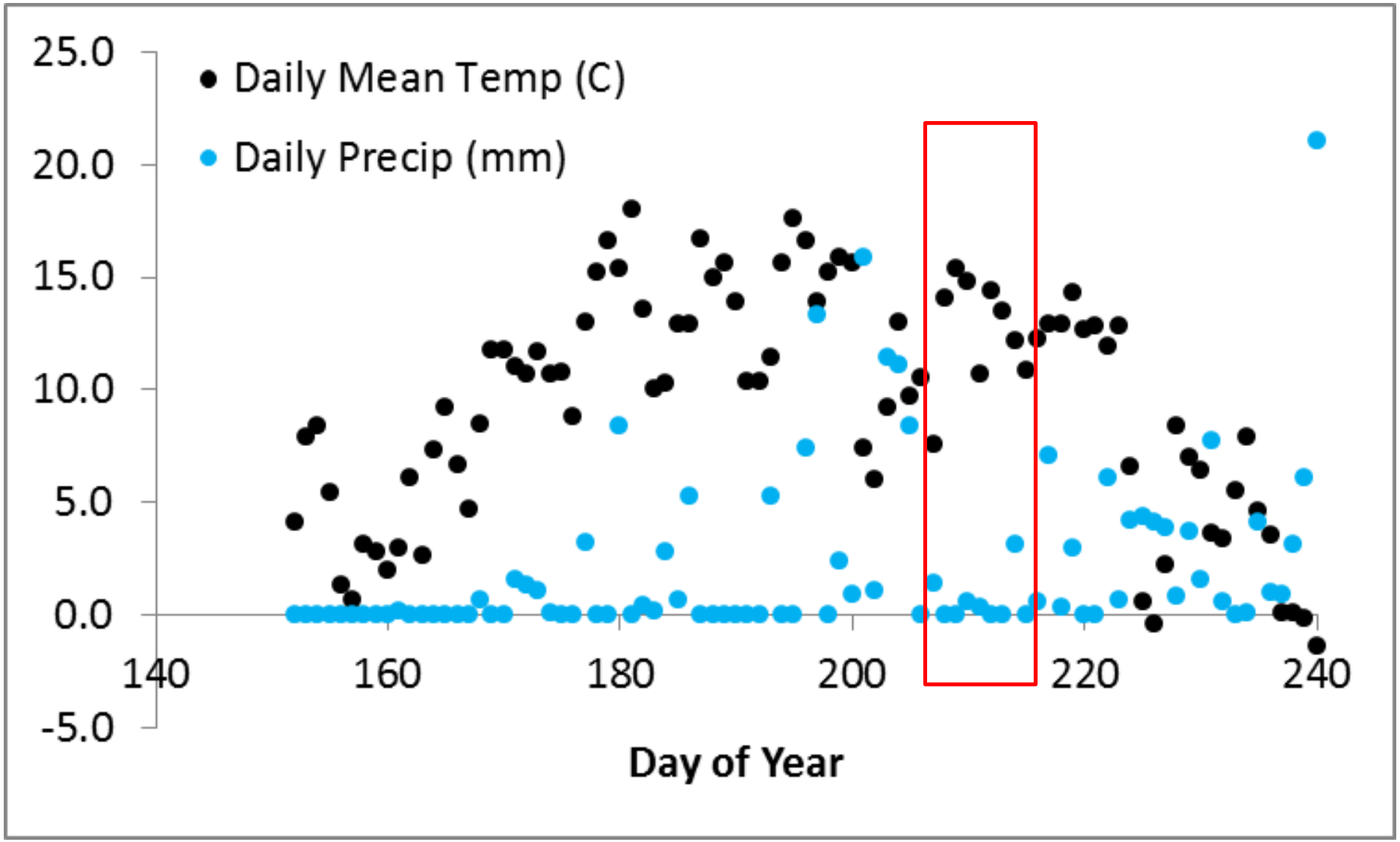

Toolik 2017
Heath
Shrub
MAT
Albedo
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
140
160
180
200
220
240
Day of Year



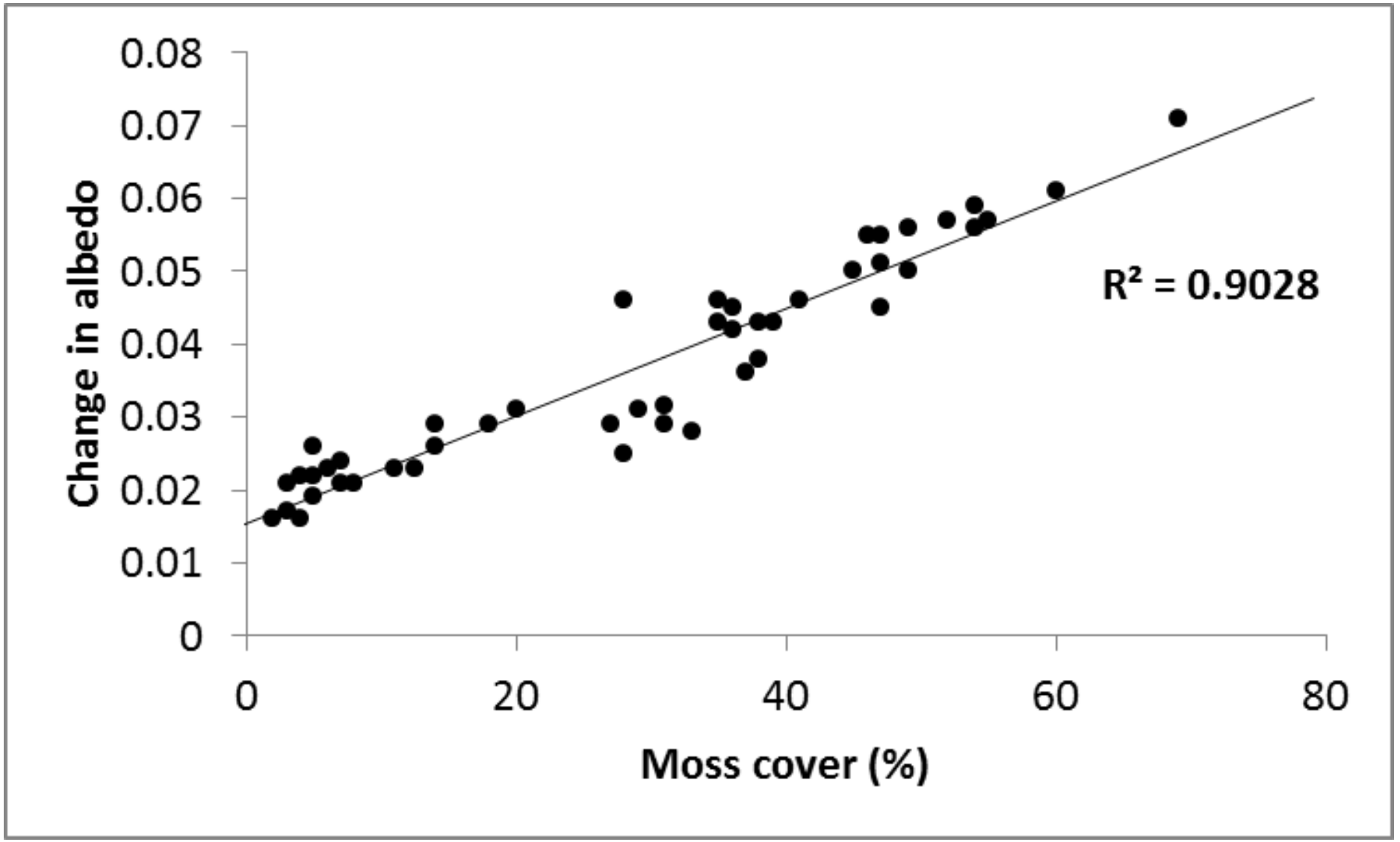
Pronounced albedo “spike” in late July



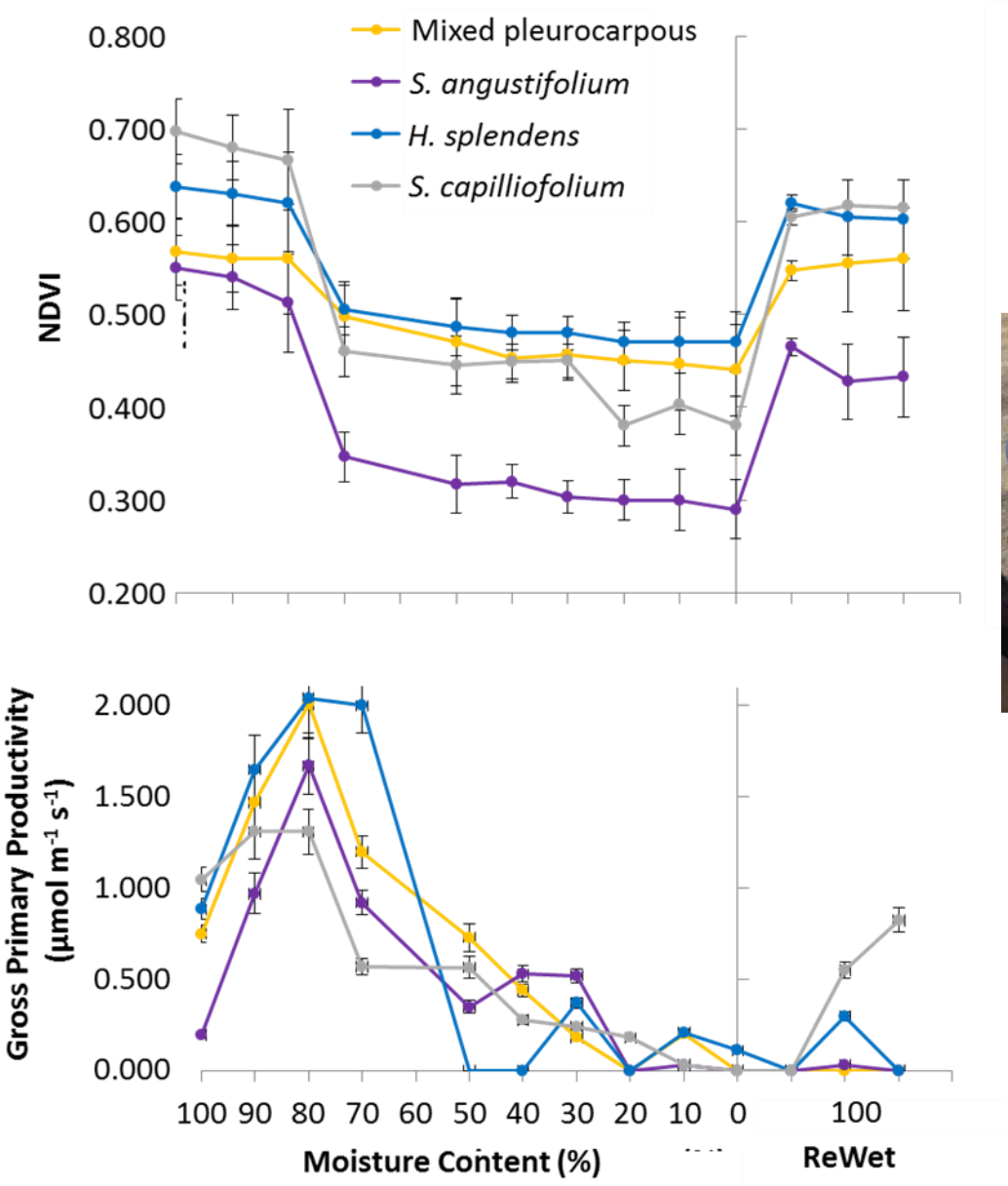
Same time period had decline in NDVI



Warm, dry, and windy conditions



% moss cover was directly related to the intensity of the albedo spike



Dry

Re-saturated
1 minute

May et al. 2018 *Remote Sensing of Environment*

Conclusions and future work

Moss cover is a driver of community spectral properties

Conclusions and future work

Moss cover is a driver of community spectral properties

2019 In-situ experimentation

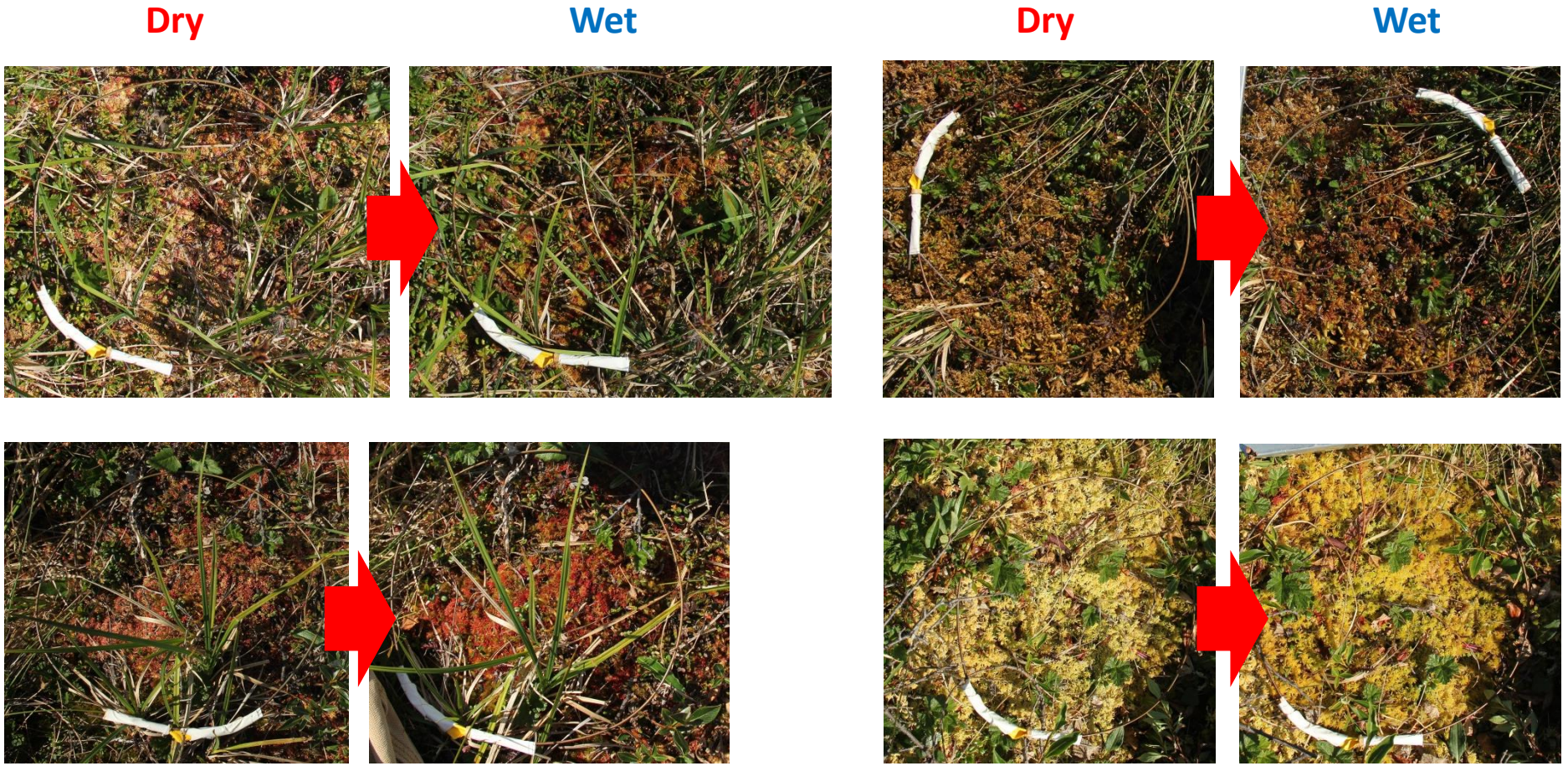
Dry

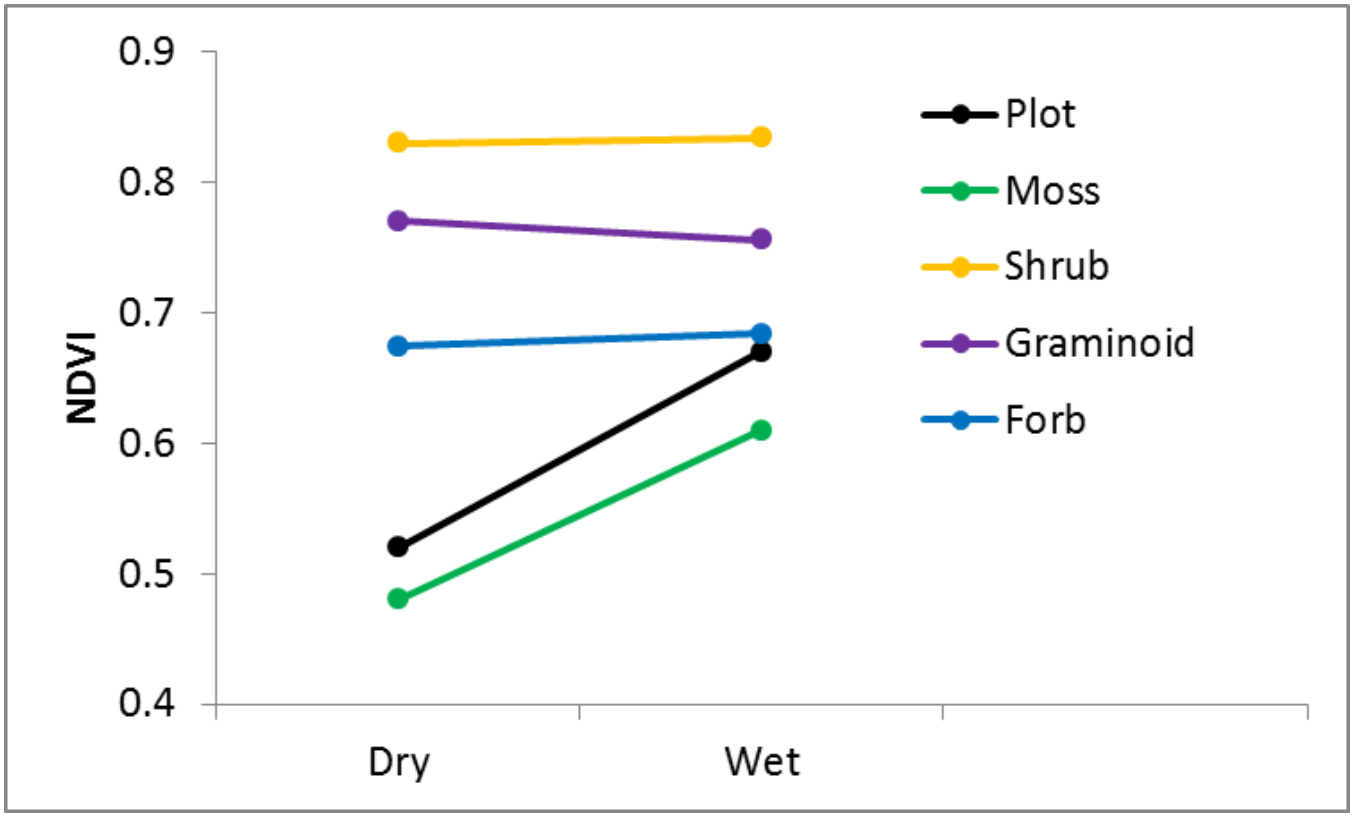
Dry

Conclusions and future work

Moss cover is a driver of community spectral properties

2019 In-situ experimentation





~15 minutes after re-wetting, moss components of the community changed NDVI values significant while vascular did not

Moss is driving the increase in community level NDVI

Questions?