Spring Snowmelt Drivers in Interior Alaskan Watersheds

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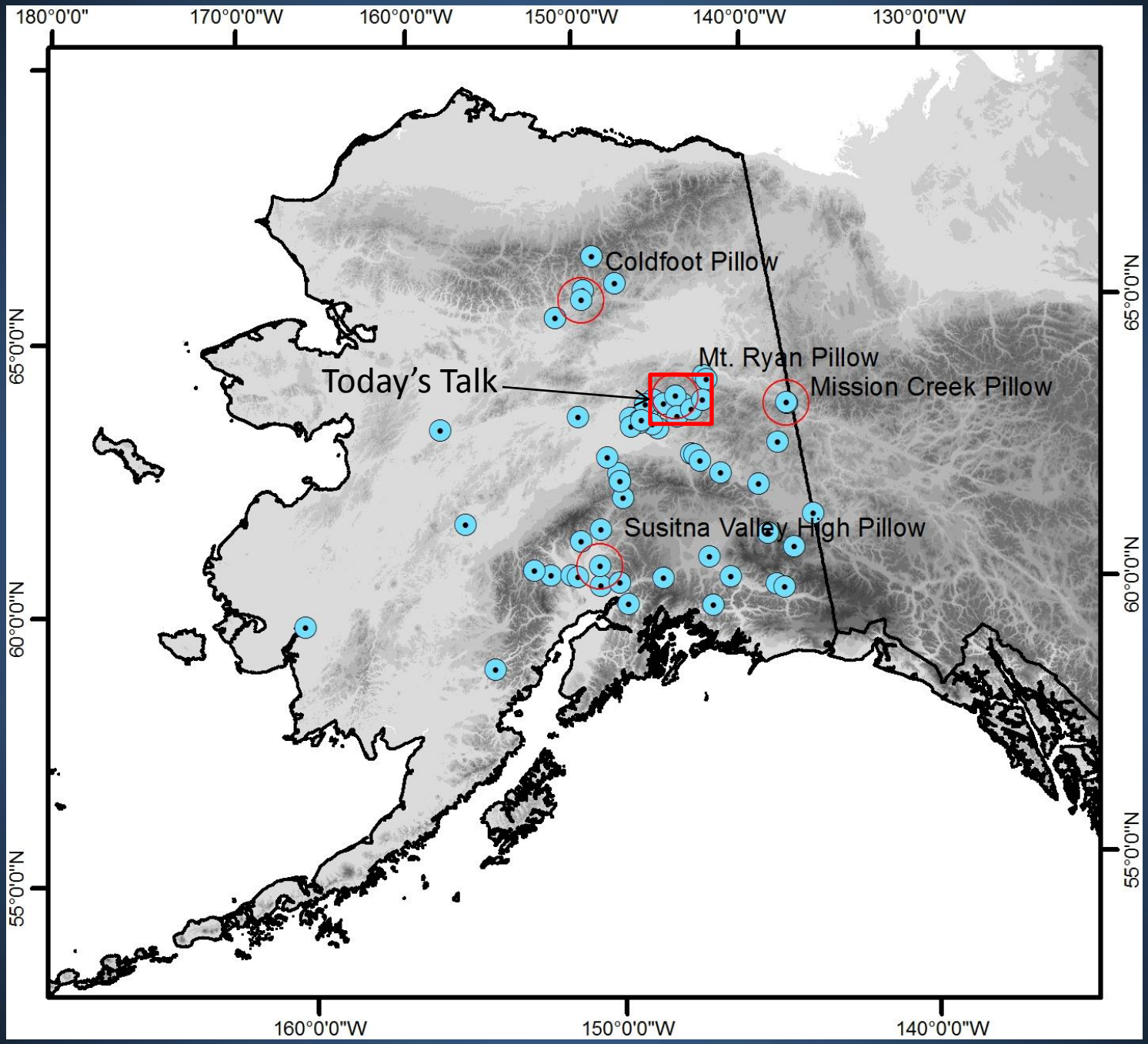
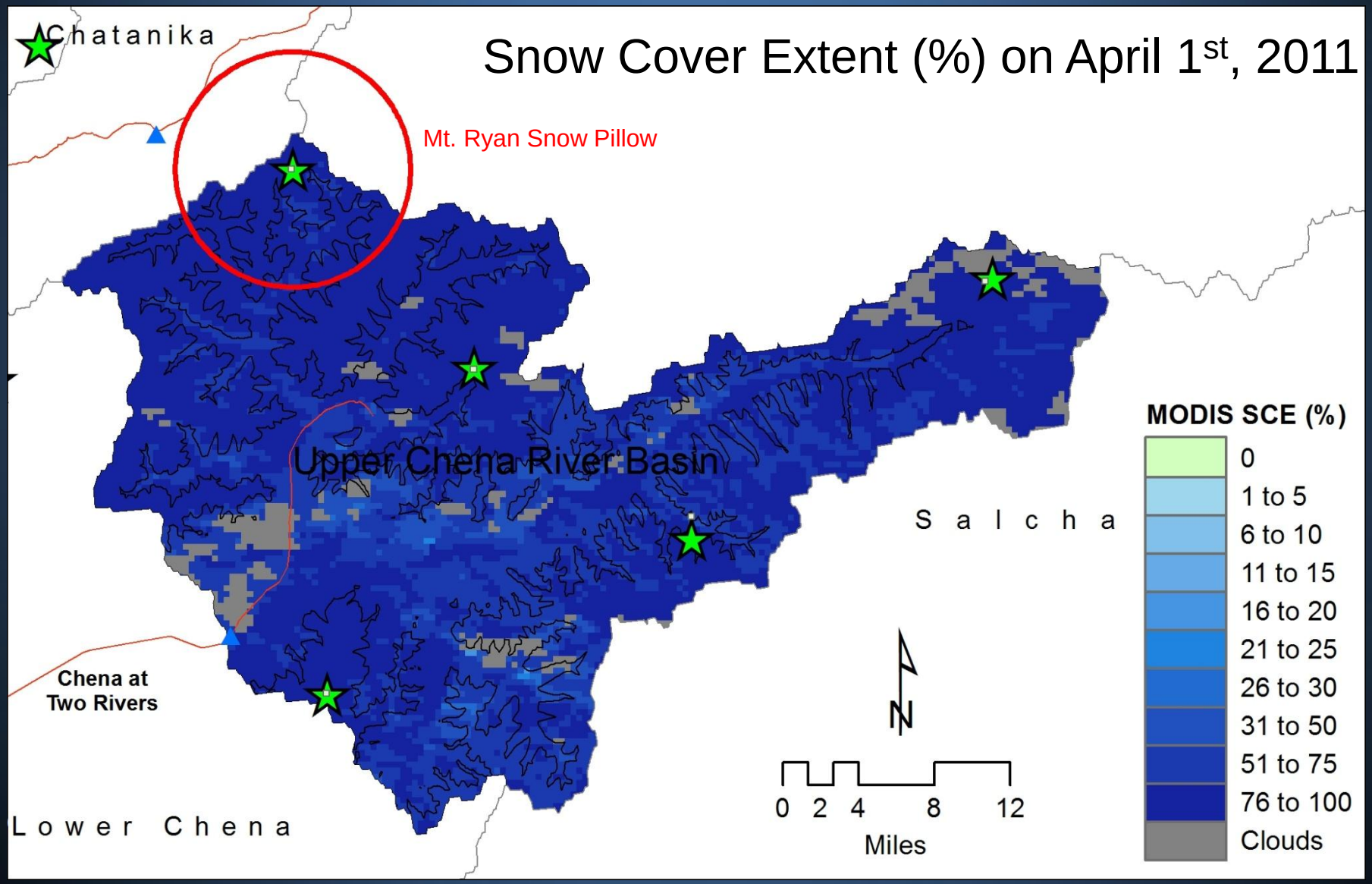
introduction

- Validate the MODIS satellite data at sites → watershed scale
- Examine and characterize the drivers of snow melt at sites across Interior Alaska
- Analysis of climate drivers correlated with key parameters in a simple snowmelt regression model
- Early results from one example site in Interior AK

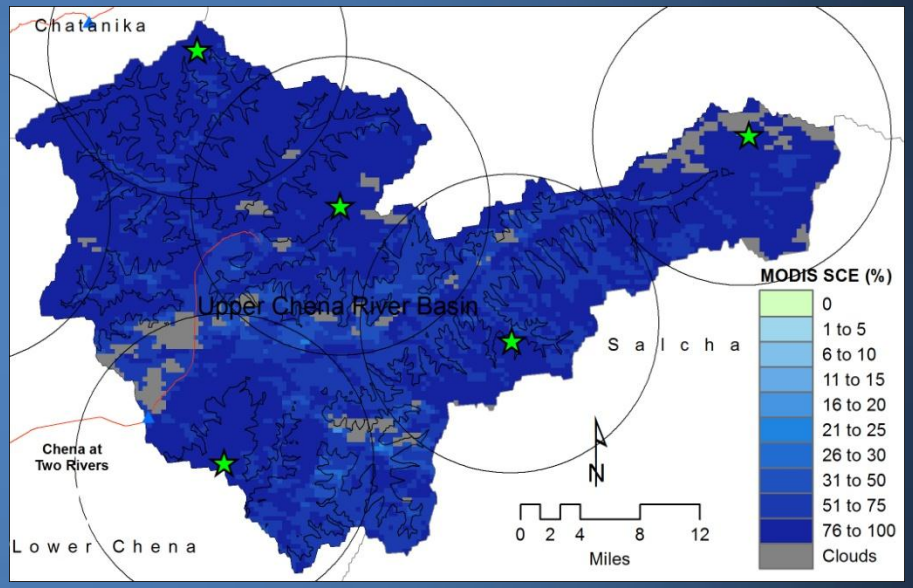

180°0'0"
170°0'0"W
160°0'0"W
150°0'0"W
140°0'0"W
130°0'0"W
65°0'0"N
60°0'0"N
55°0'0"N
Coldfoot Pillow
Mt. Ryan Pillow
Mission Creek Pillow
Today's Talk
Susitna Valley High Pillow
160°0'0"W
150°0'0"W
140°0'0"W

MODIS snow cover extents

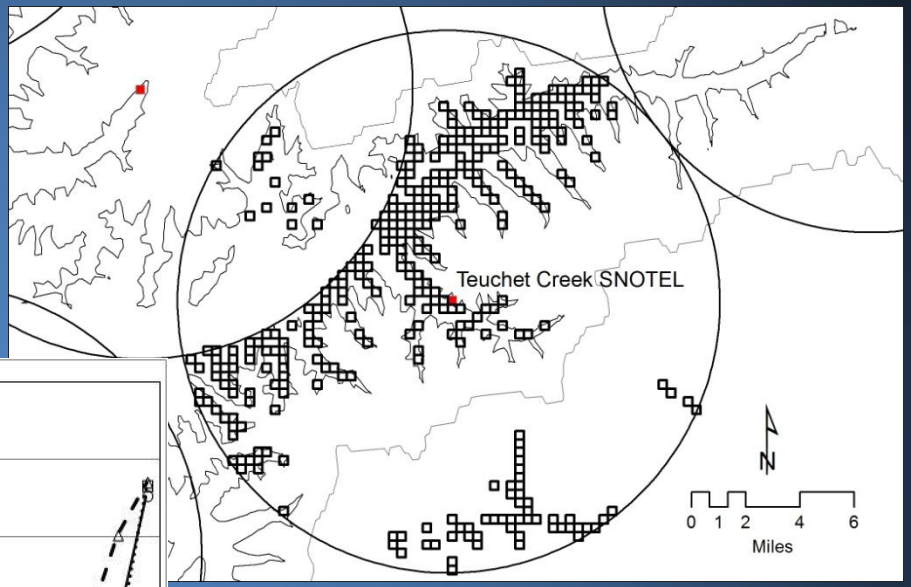


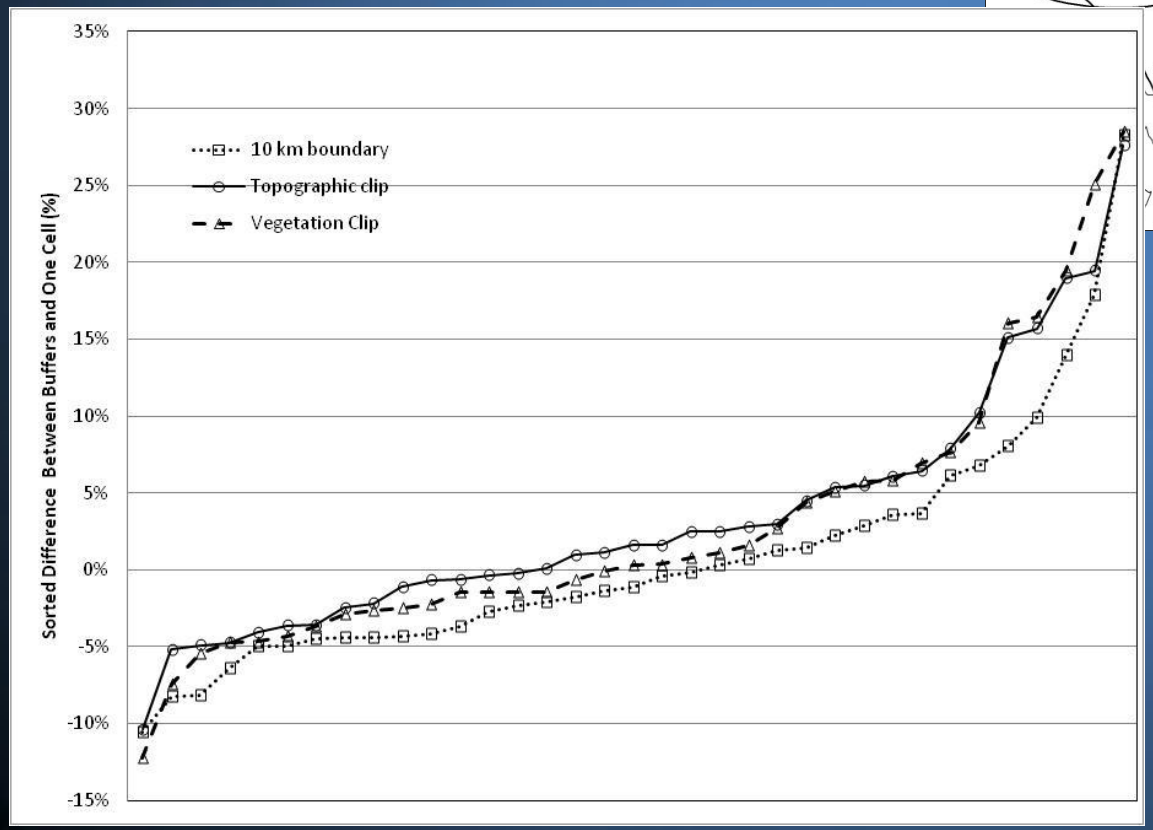
Buffer Testing

- Scaling issues challenging when trying to validate satellite information
- 10 km circular buffer zones around sites
- a) slope, aspect, and elevation similar to station (based on NED DEM analysis)
- b) vegetation characteristics

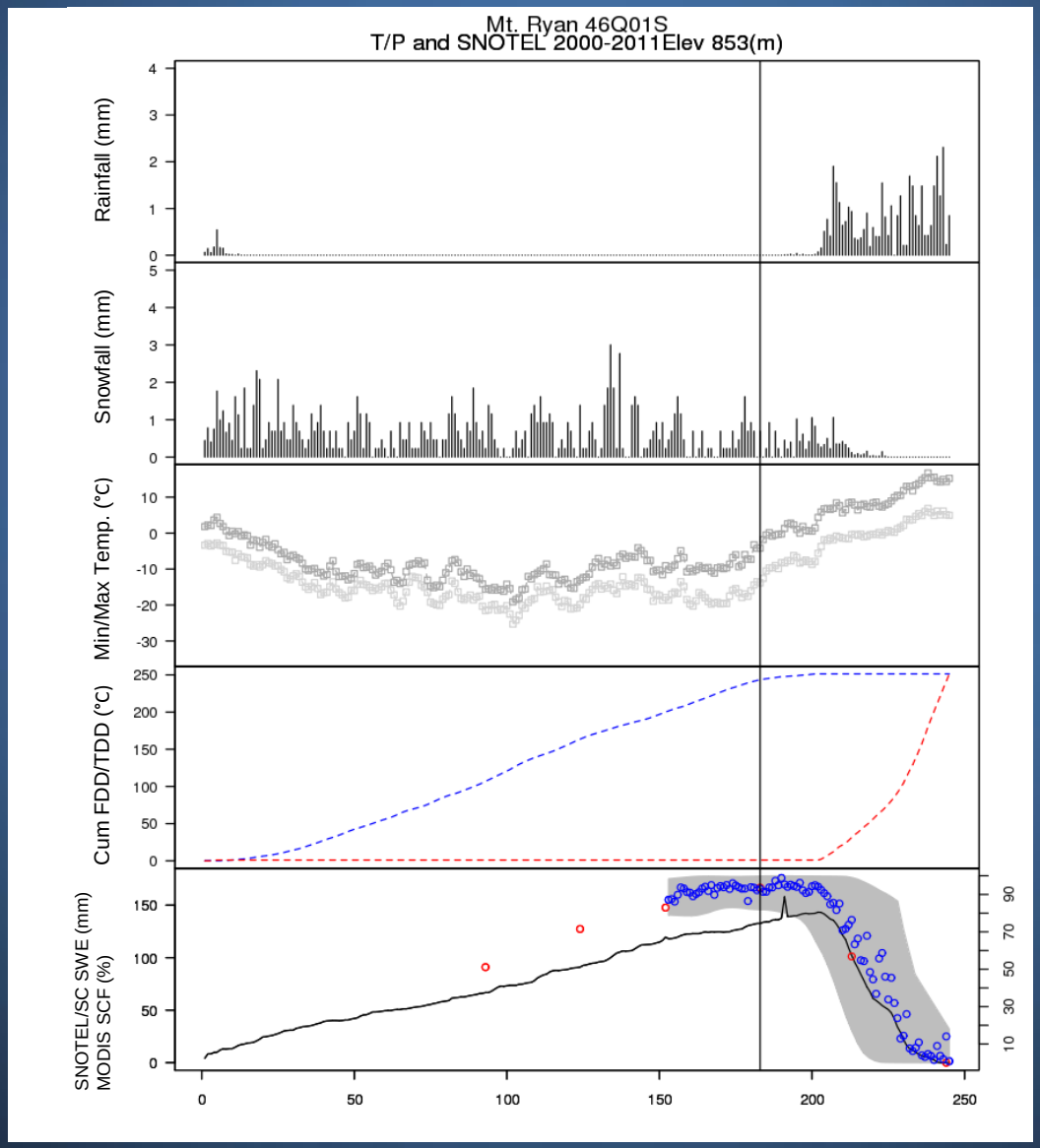


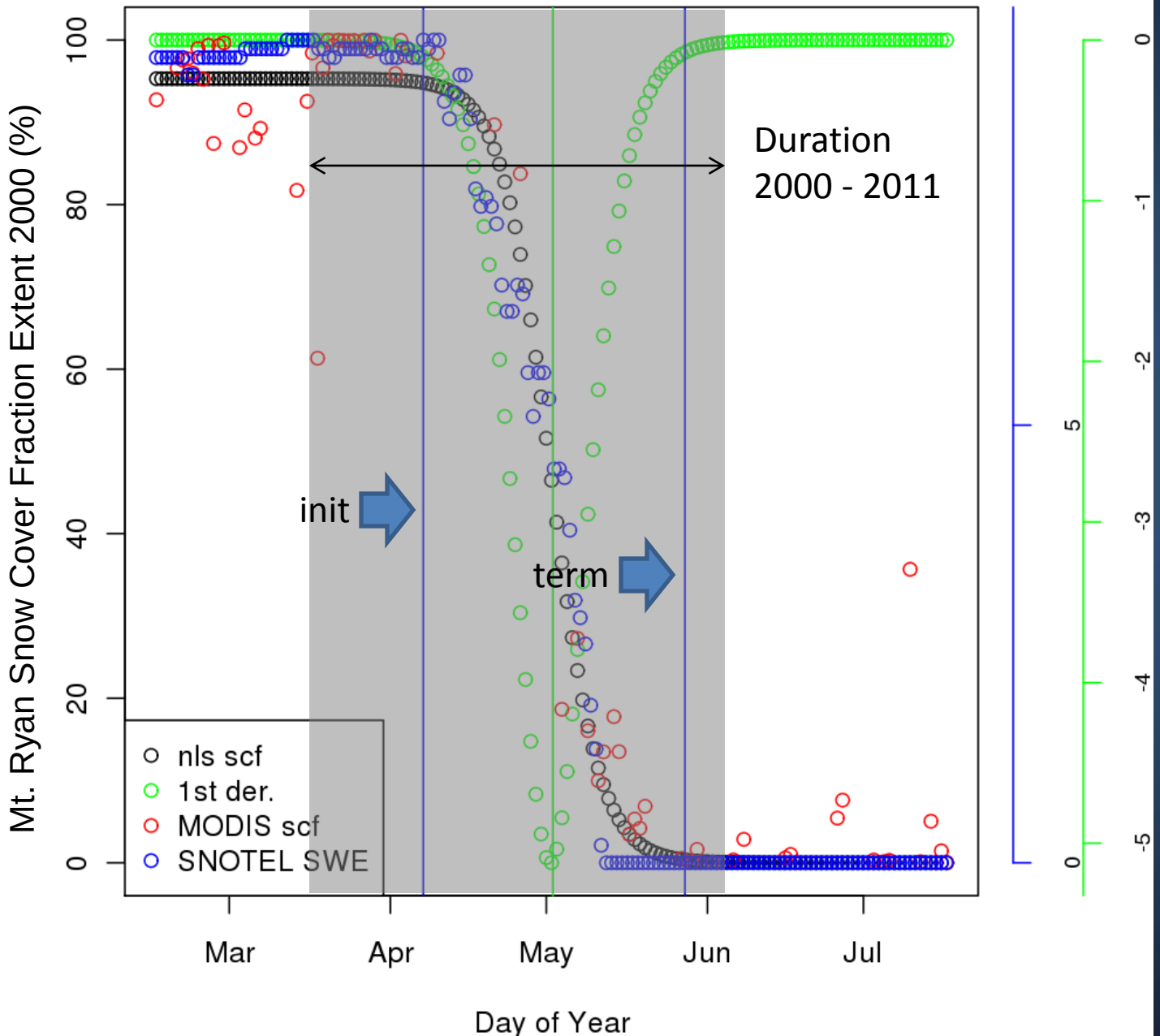
Buffer Testing Results



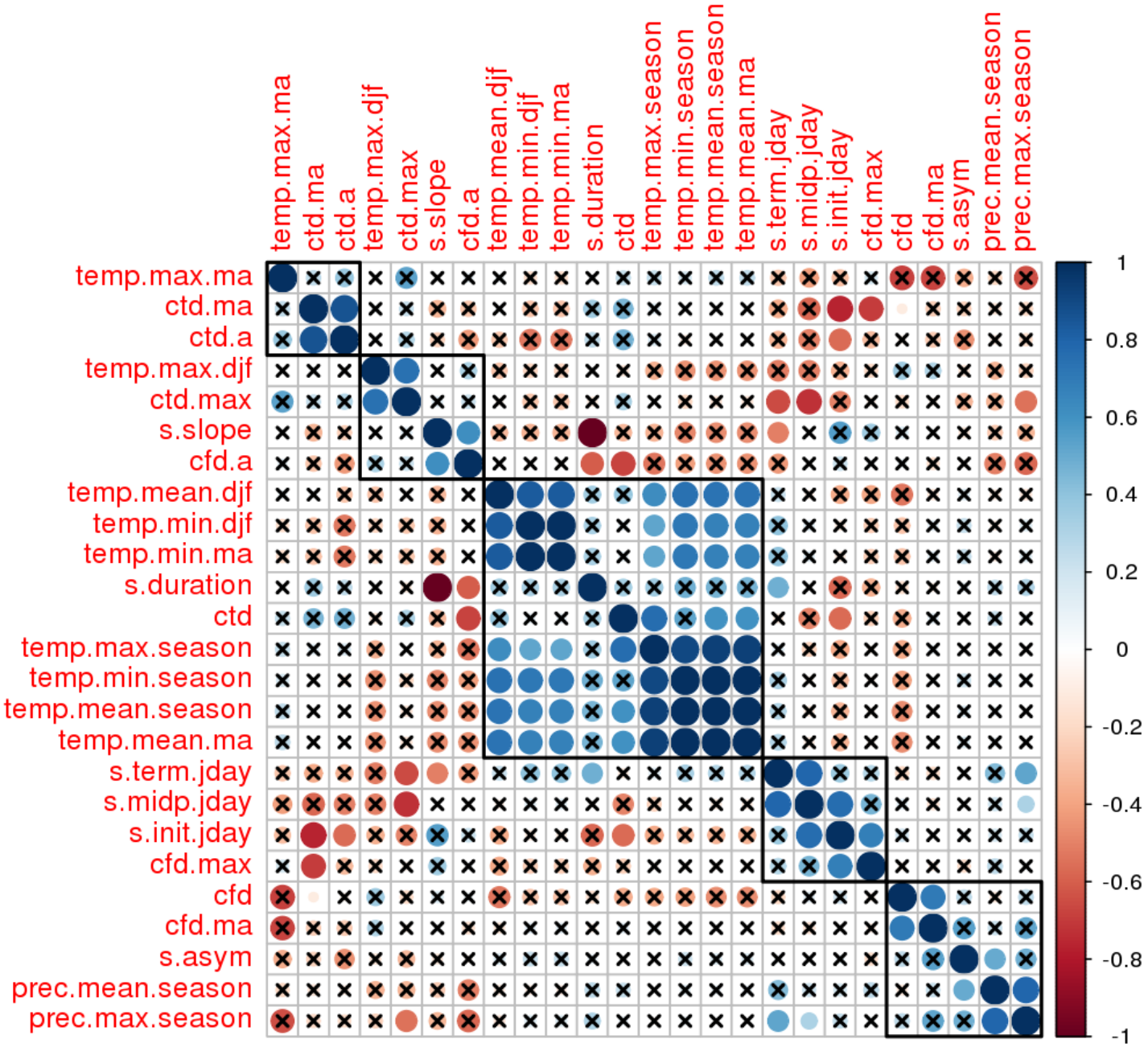


Mt. Ryan SNOTEL




Mt. Ryan Snow Cover Fraction Extent 2000 (%)
100
80
60
40
20
0
Duration
2000 - 2011
init
term
nls scf
1st der.
MODIS scf
SNOTEL SWE
Mar
Apr
May
Jun
Jul
Day of Year
5
0
0
-1
-2
-3
-4
-5

Mt Ryan (46Q01)



next steps

- Validation statistics for SNOTEL and MODIS data
- Linear model from highly correlated climate drivers and regression terms
- Examine changes in climate drivers representative of future projected change
- Input MODIS data into RFC's CHPS (SAC-SMA/SNOW-17 models)

acknowledgements

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PACMAN

NSF

IARC

International Arctic Research Center

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Understanding the Arctic As A System

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