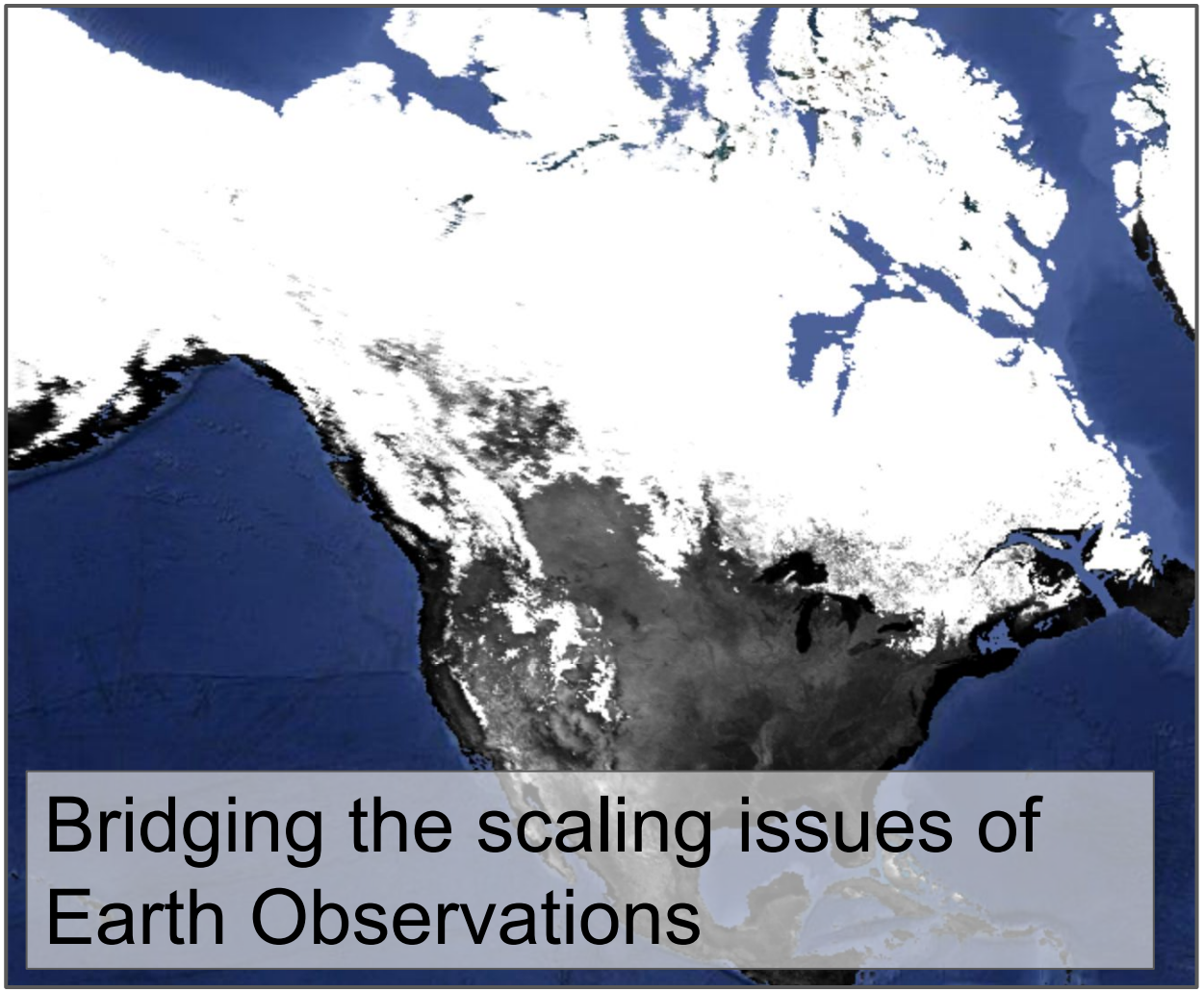
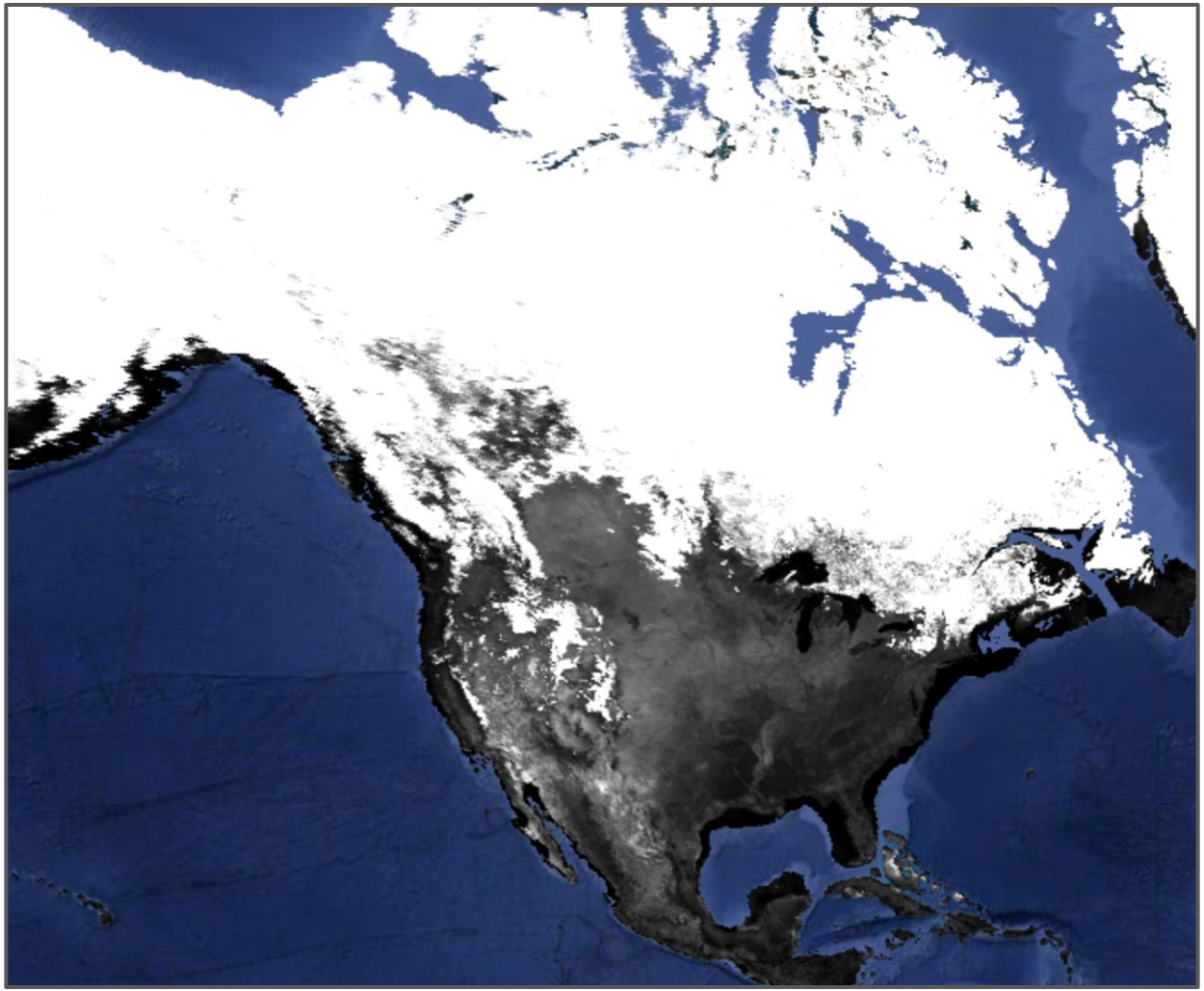


# Bridging the scaling issues of Earth Observations

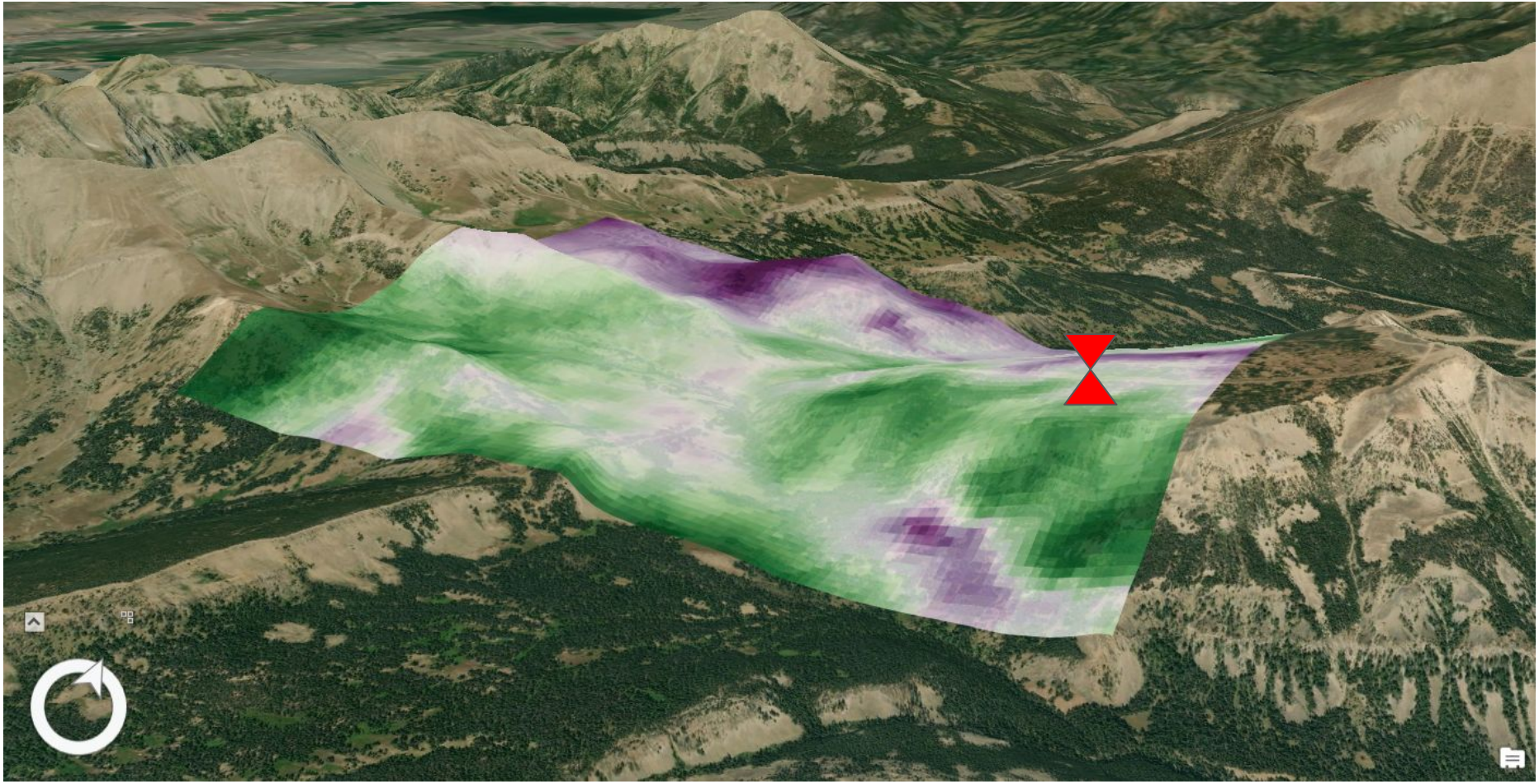
Eric A. Sproles
Andrew Mullen
Jordy Hendrikx
Charles Gatebe
Suzi Taylor

MONTANA STATE UNIVERSITY
Mountains & Minds

NASA



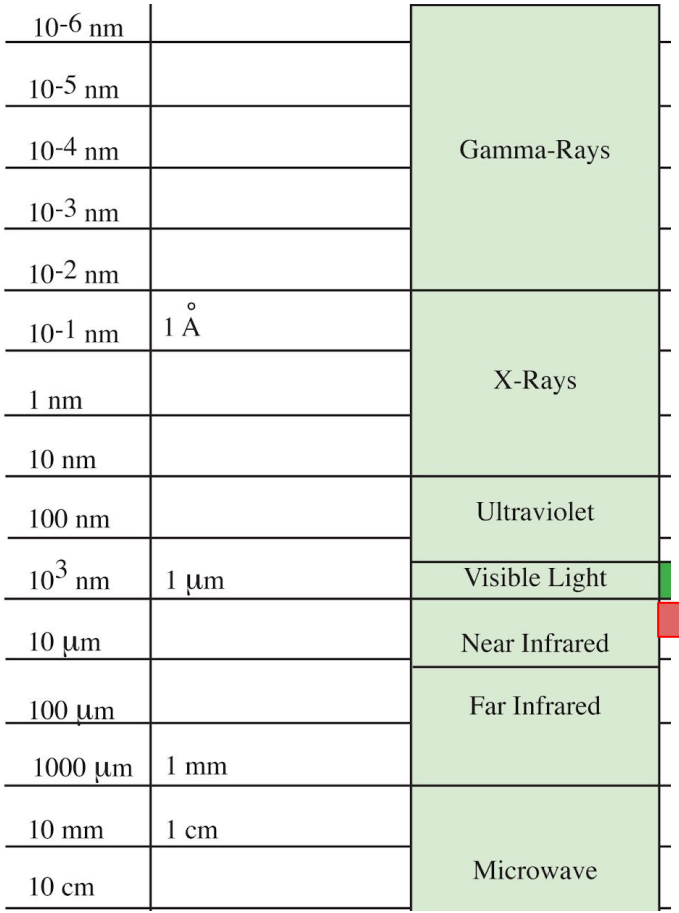

www.semanticscholar.org



Can UAVs provide a new means to better measure albedo?

# The Electromagnetic Spectrum

Chart by LASP/University of Colorado, Boulder

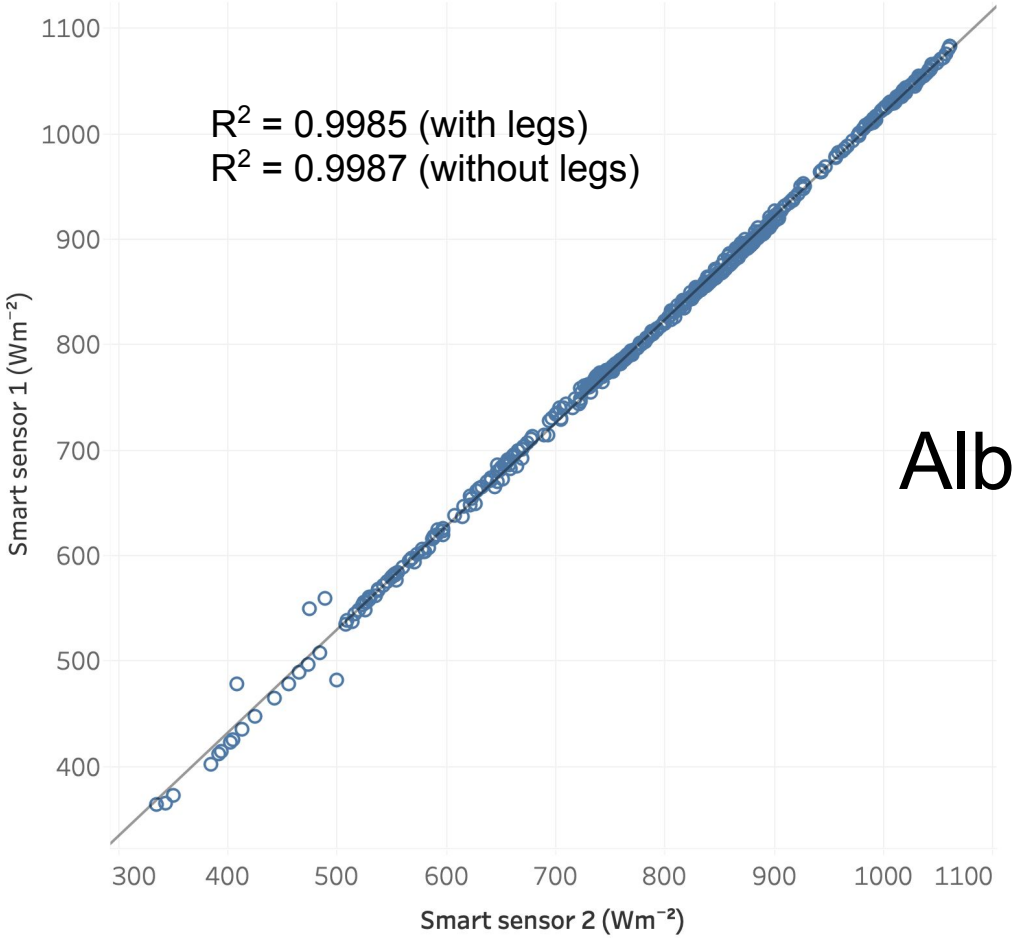



KIPP & ZONEN


Kipp and Zonen SMP3
1000 nm-2500 nm

Albedo =


Calibration on UAV with landing legs




Albedo =


# DJI Matrice 210 V2


BIC

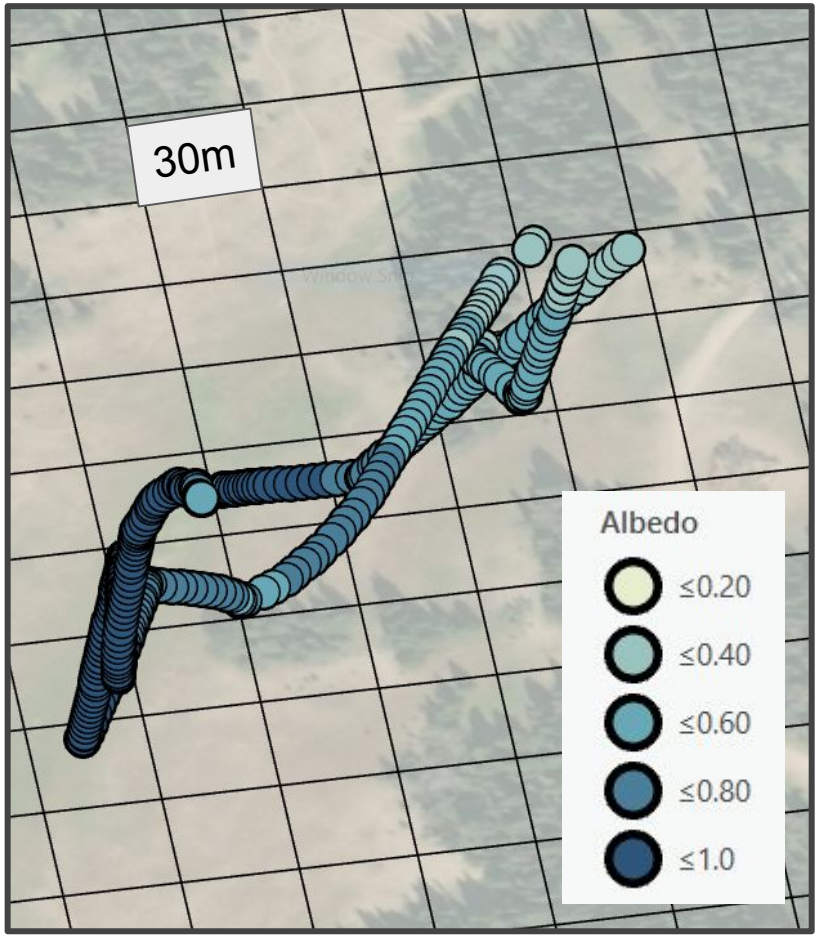

Kipp and Zonen SMP3
1000 nm-2500 nm

Andrew Mullen

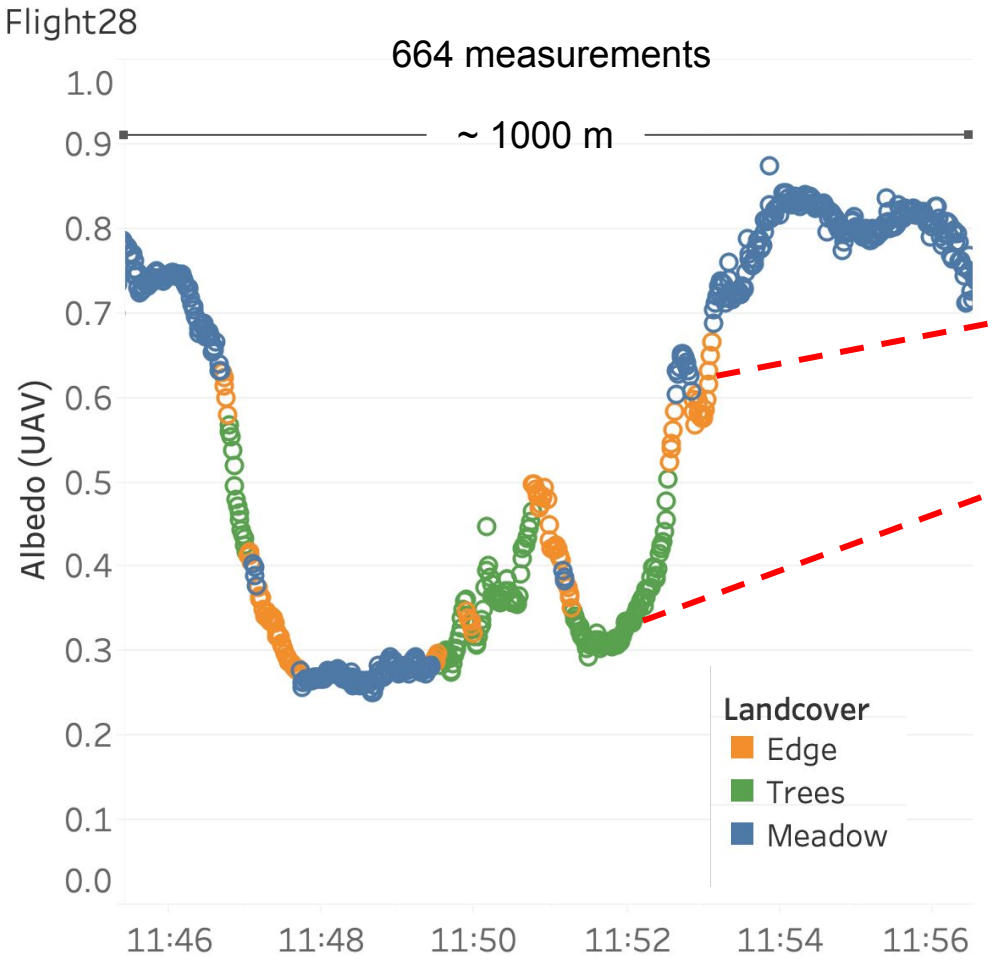
Flight 27 | Flight 28
15 April 2019
Cloudy and Snowy

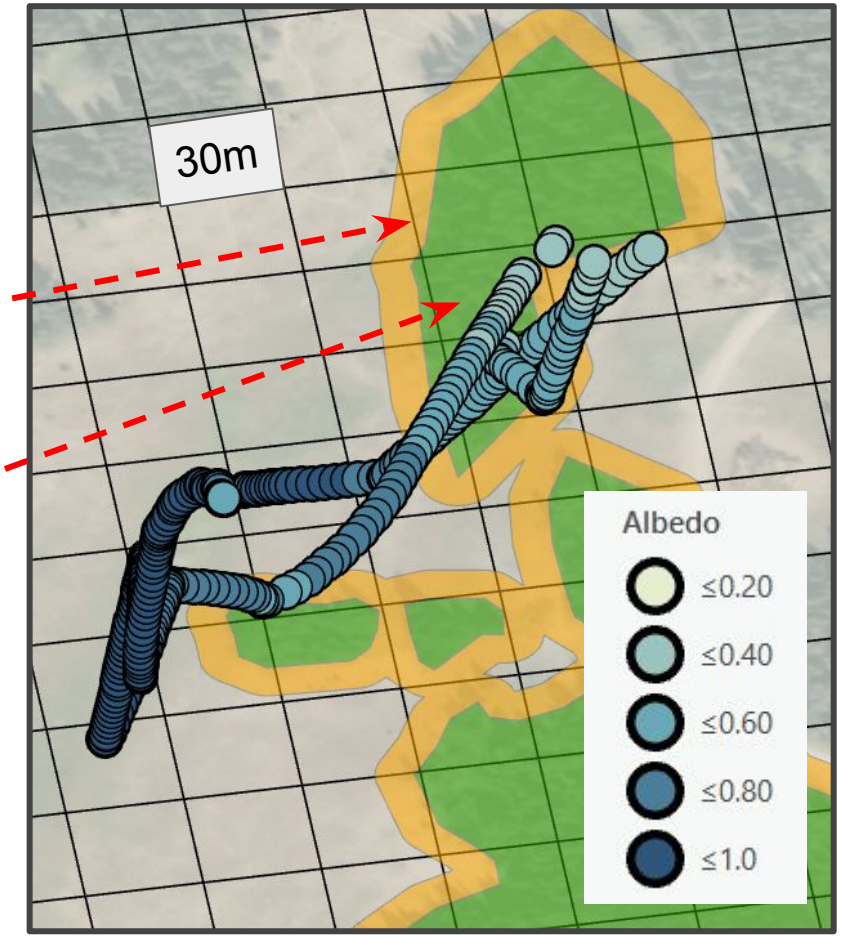
Flight 41 | Flight 42
1 May 2019
Clear and Sunny

# Flight 28

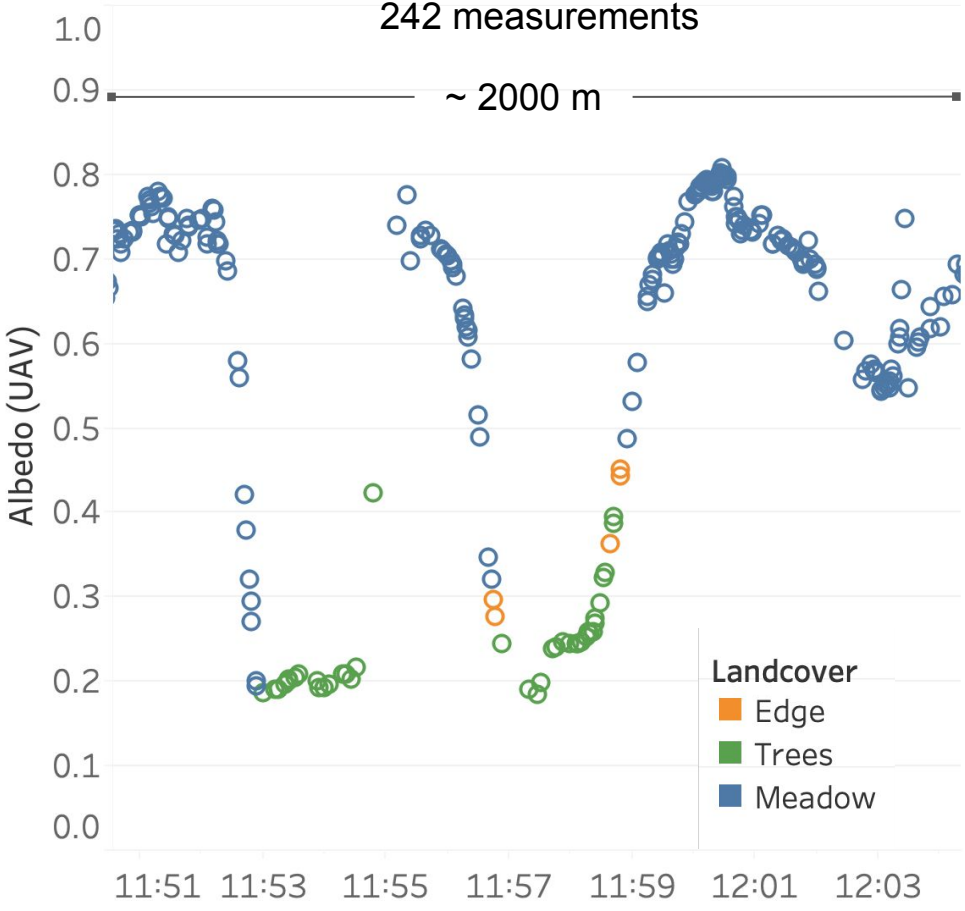


# Flight 28

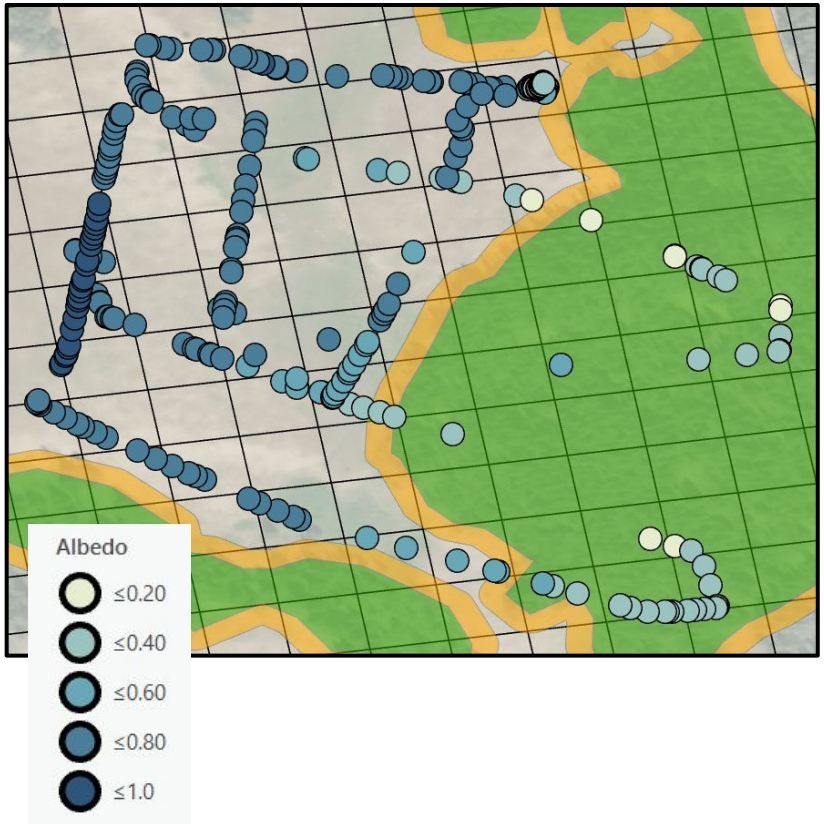

Flight28
664 measurements
~ 1000 m
Albedo (UAV)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
11:46
11:48
11:50
11:52
11:54
11:56
Landcover
Edge
Trees
Meadow


30m
Albedo
≤0.20
≤0.40
≤0.60
≤0.80
≤1.0

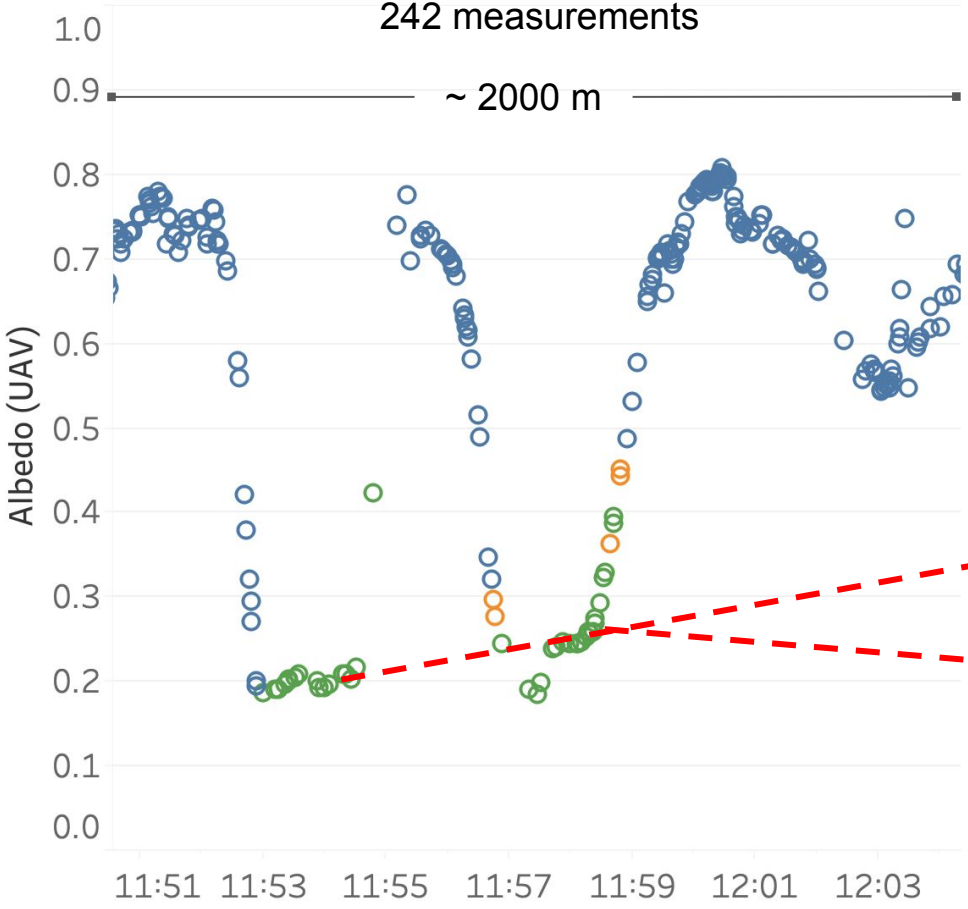
Flight 41



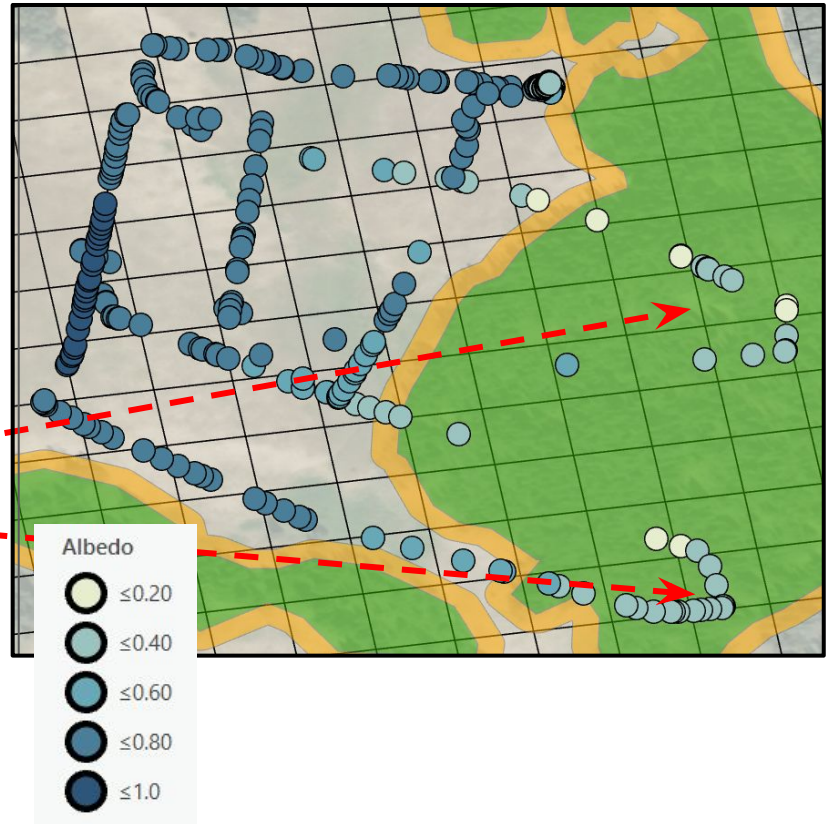

# Flight 42



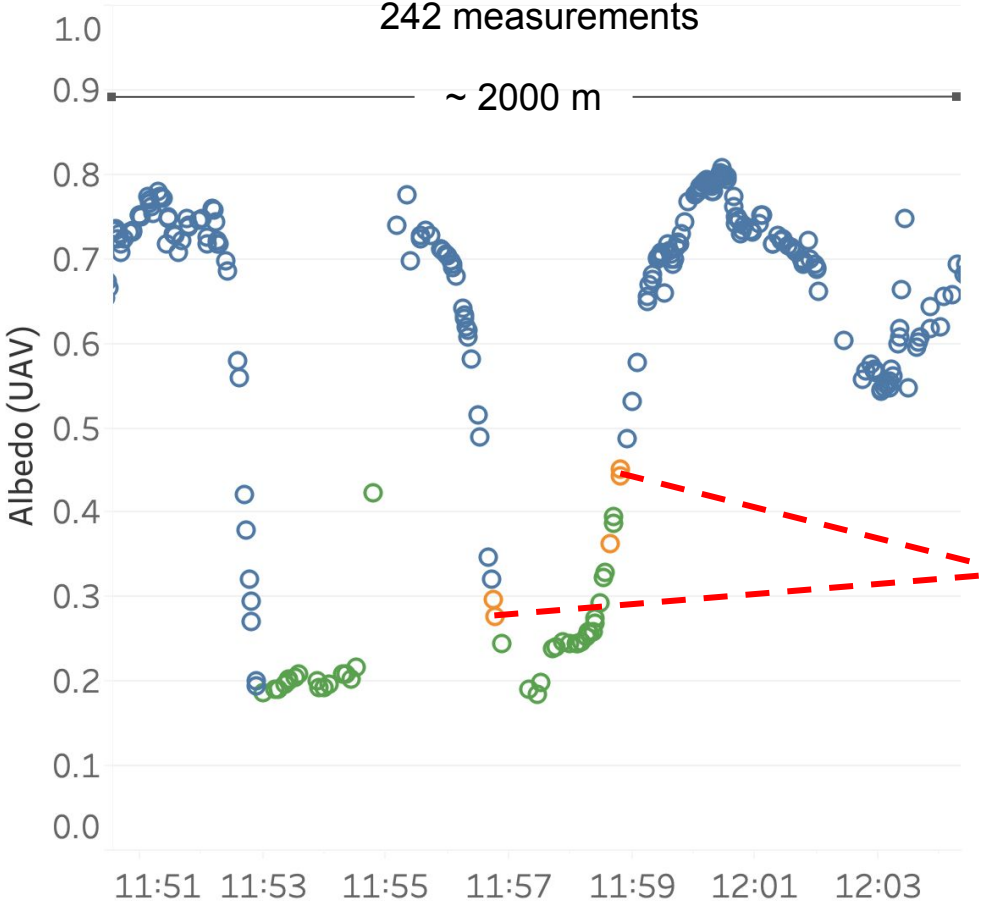
Flight 41



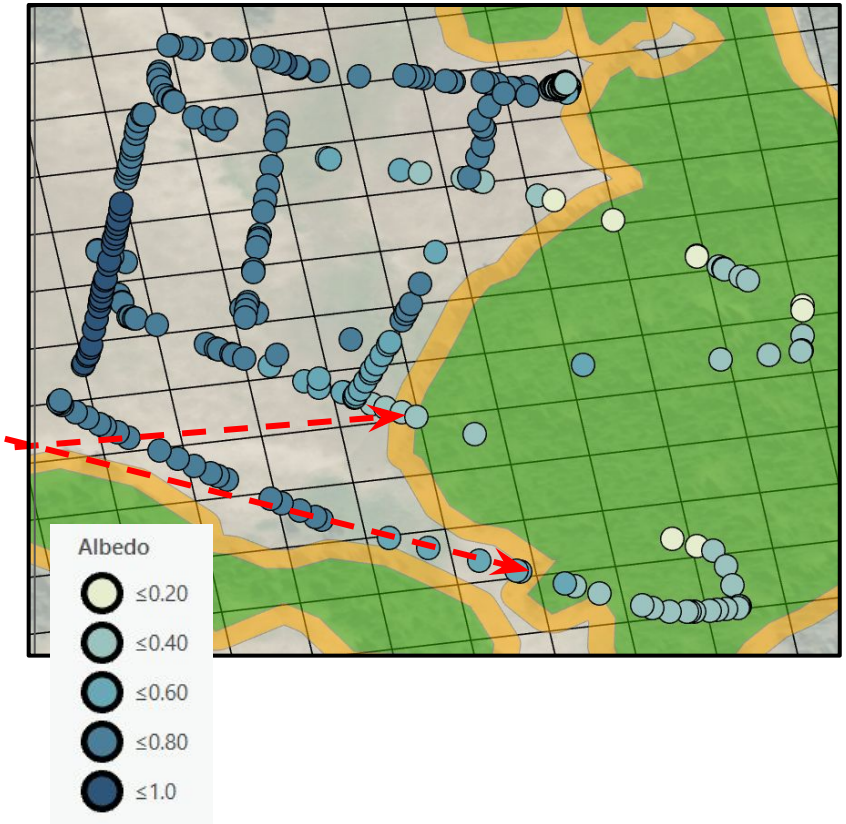

# Flight 42



Flight 41

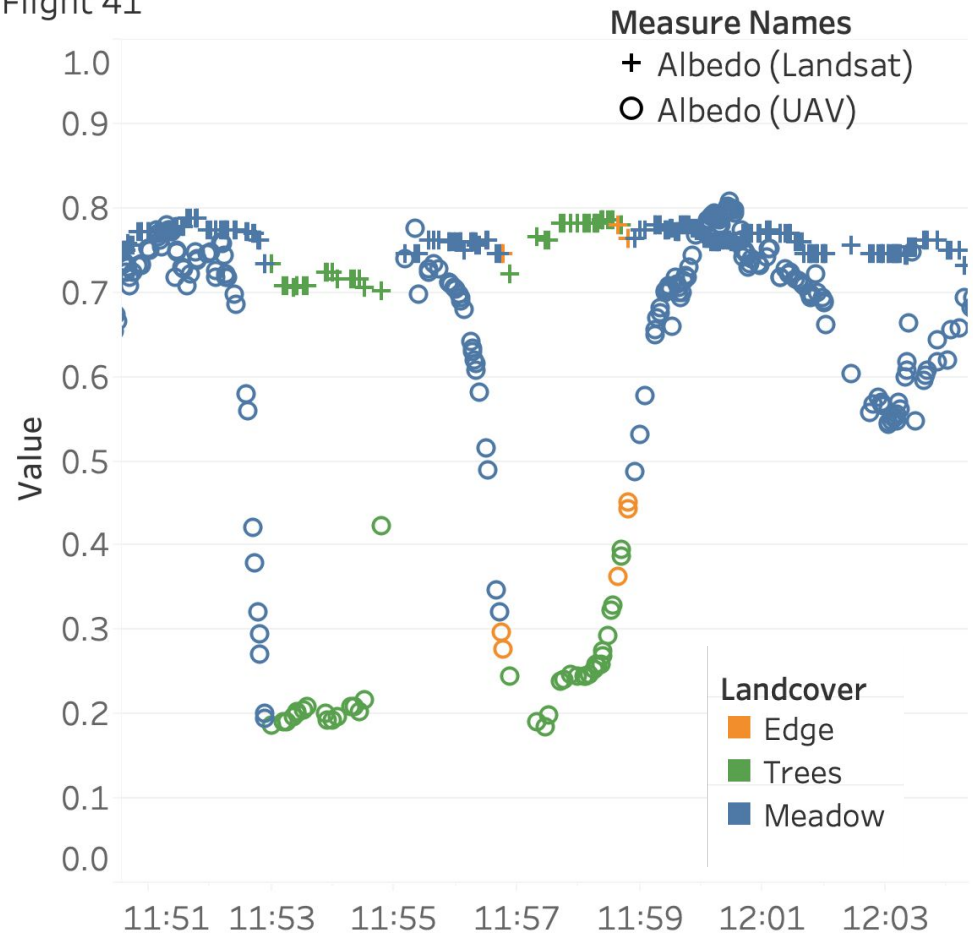



# Flight 42

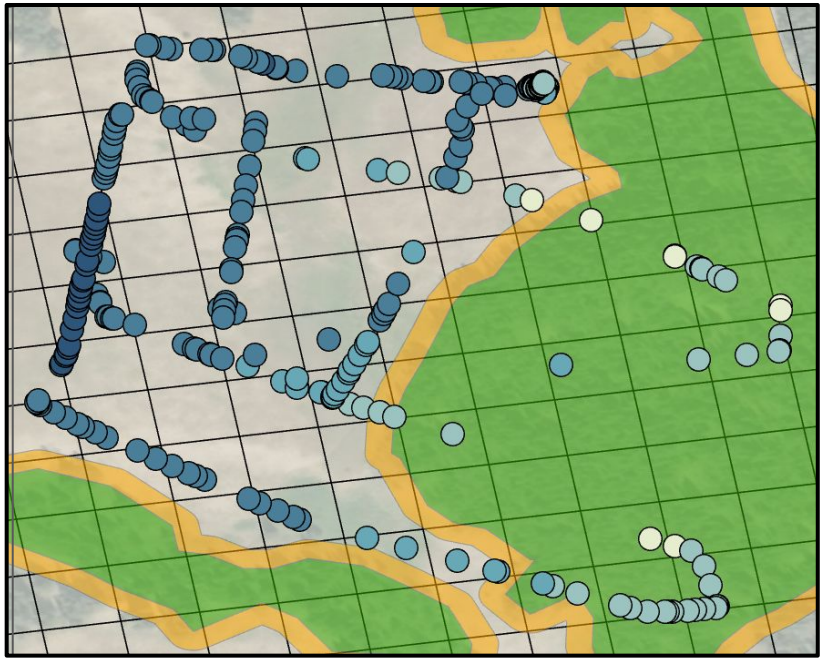


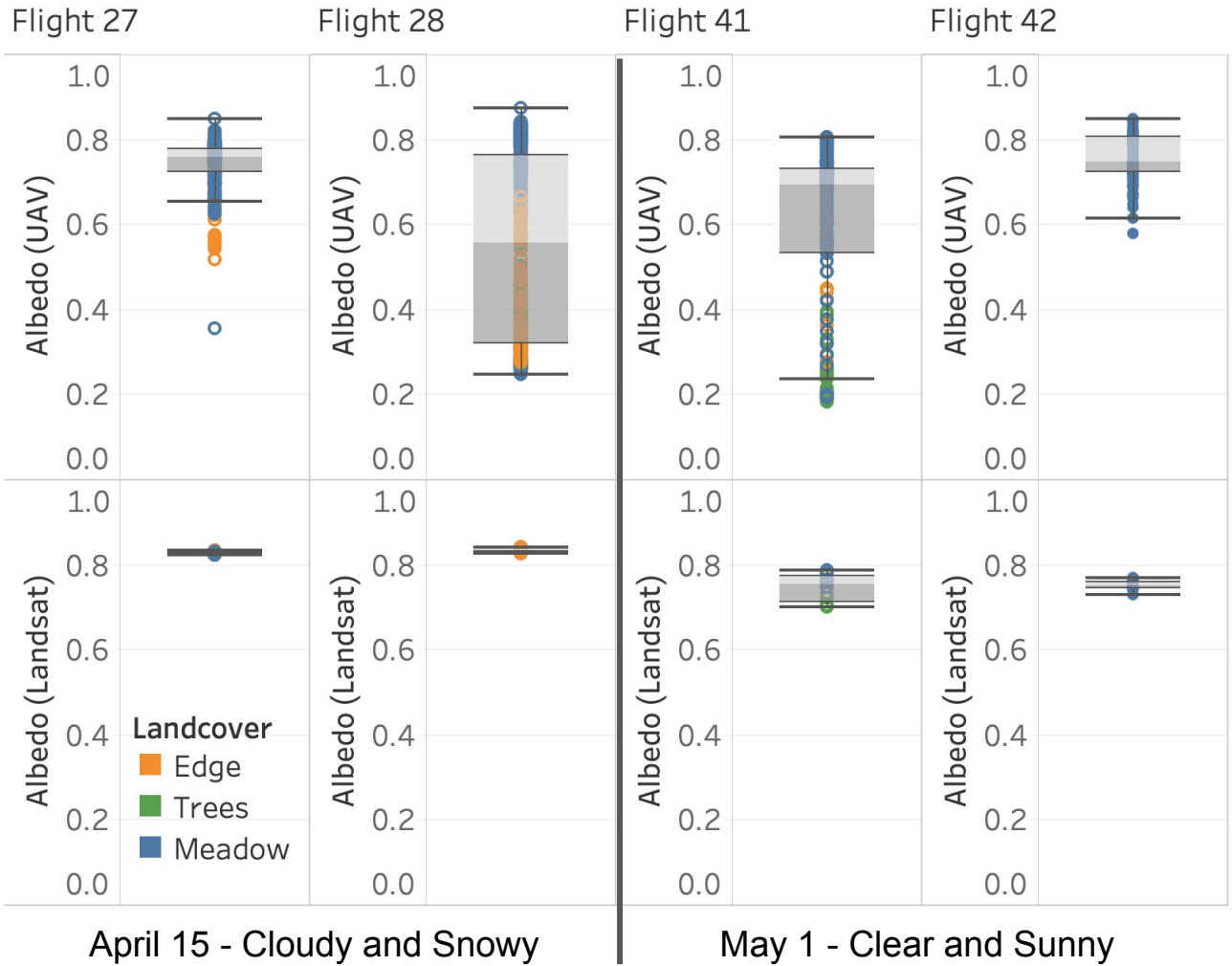
How do these measurements compare to Earth Observations from space?

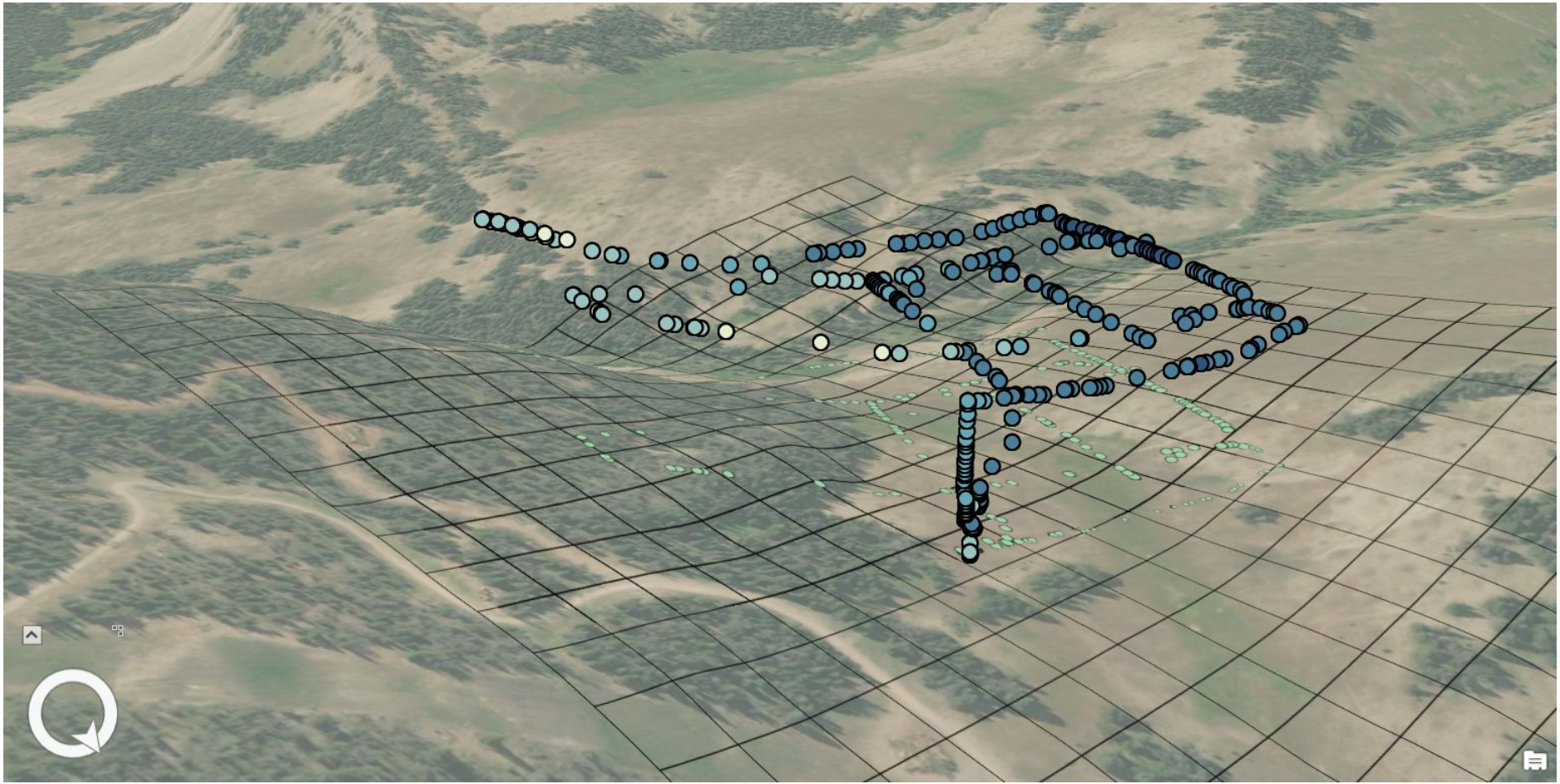
Flight 41

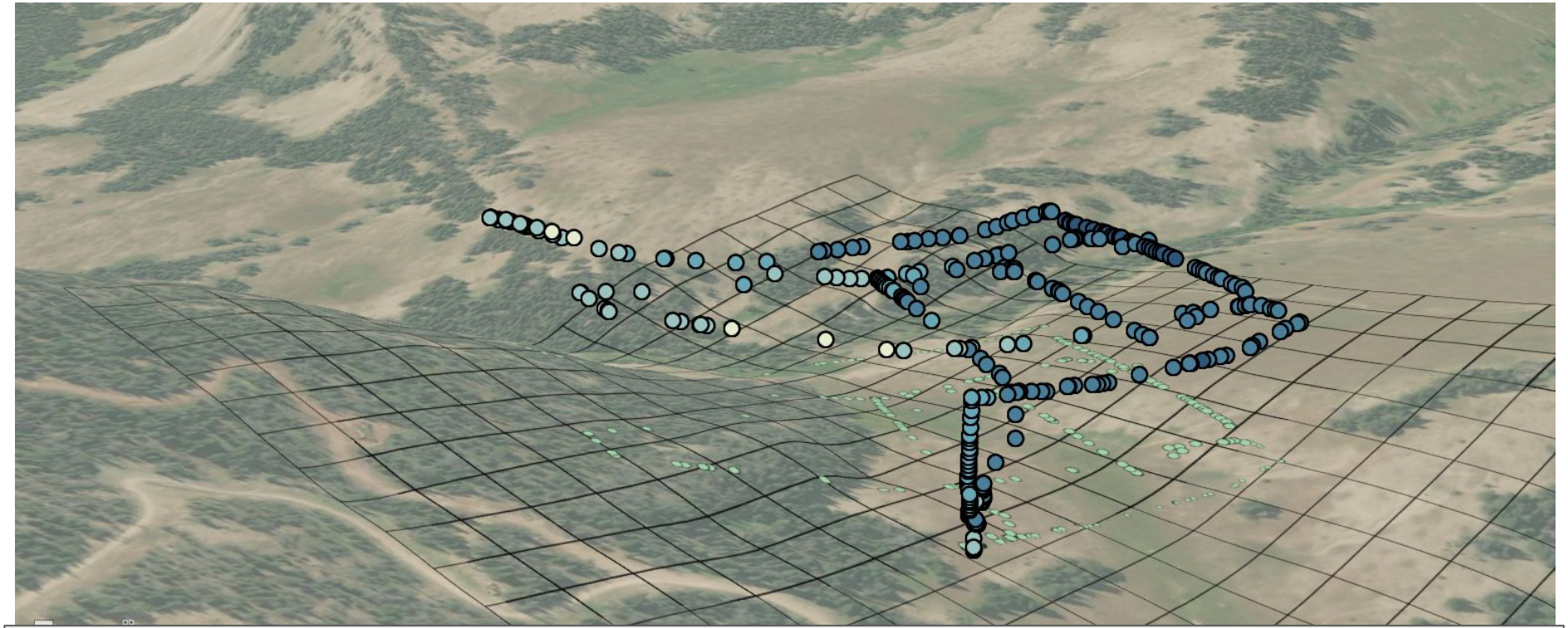



# Flight 42




Flight 27
Flight 28
Flight 41
Flight 42
Albedo (UAV)
Albedo (Landsat)
1.0
0.8
0.6
0.4
0.2
0.0
Landcover
Edge
Trees
Meadow
April 15 - Cloudy and Snowy
May 1 - Clear and Sunny





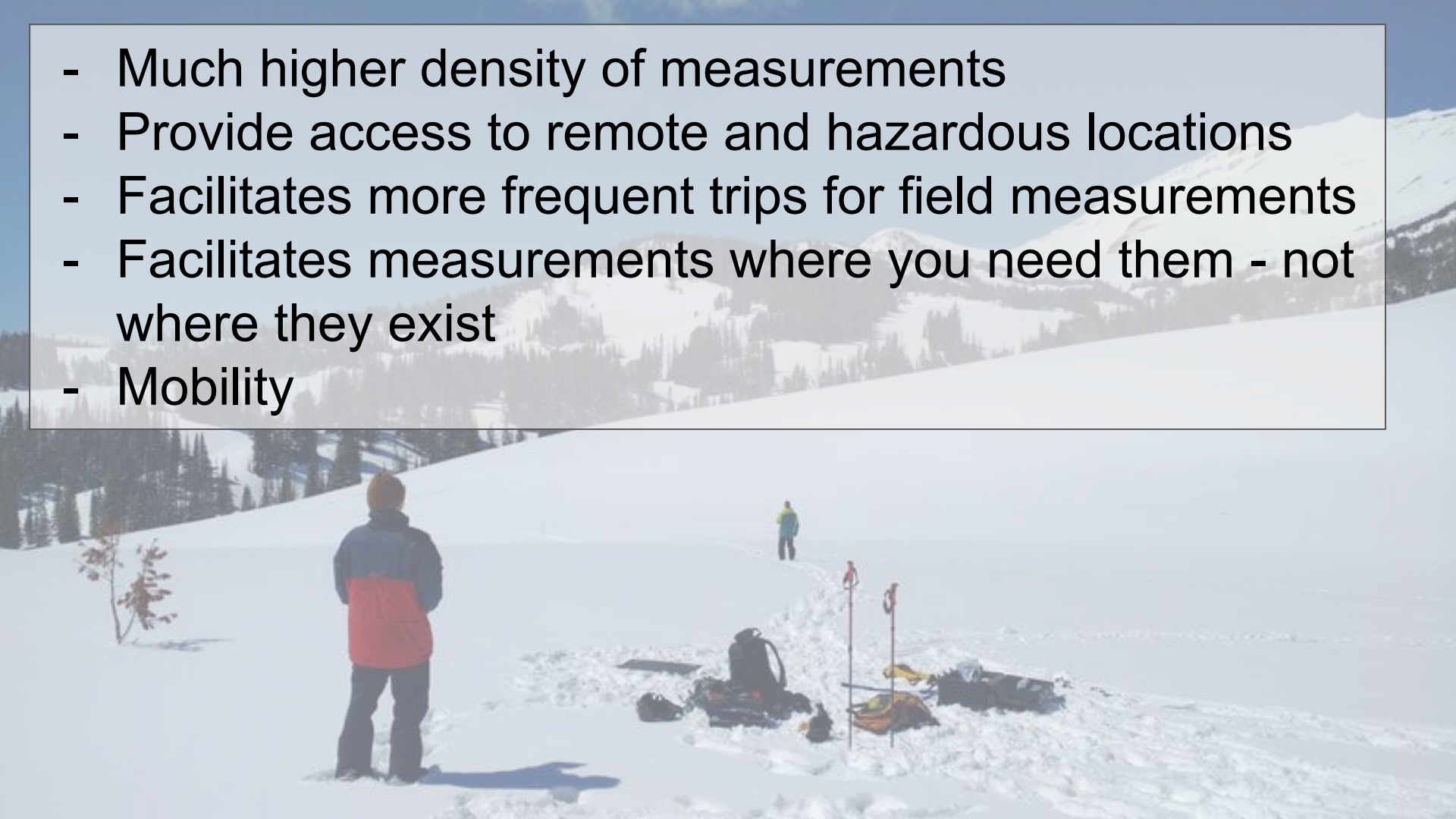
Can UAVs provide a new means to better measure albedo?

Bloomberg Businessweek interview with
Cisco CEO Chuck Robbins

Bloomberg: How different will 5G be?

*Think about where you are today and what you can do with your mobile device vs. what you could 15 years ago.*

*This is no different. Your gonna see a steep change, and this one is probably exponentially better than what we have felt over the past decade.*



- Much higher density of measurements
- Provide access to remote and hazardous locations
- Facilitates more frequent trips for field measurements
- Facilitates measurements where you need them - not where they exist
- Mobility

eric.sproles@montana.edu