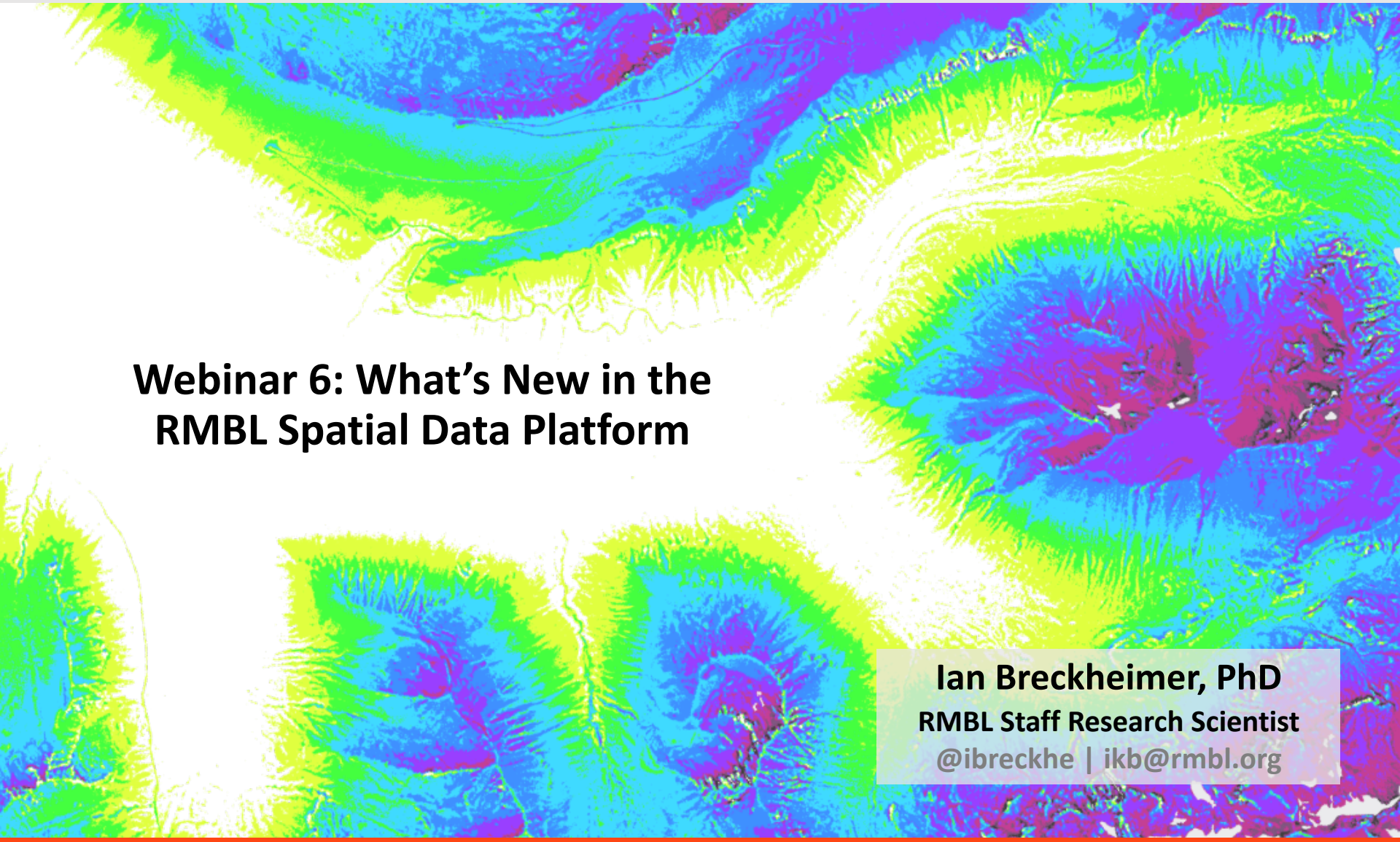


Webinar 6: What's New in the RMBL Spatial Data Platform

Ian Breckheimer, PhD
RMBL Staff Research Scientist
@ibreckhe | ikb@rmbl.org

Webinar Schedule

Tuesday September 22nd 2020
Introduction to the RMBL Spatial Data Platform,
How to access RMBL SDP data in GIS and programming environments, and where we are going with the platform.

Tuesday October 20th 2020 *Designing Robust Field Studies using Geospatial Tools*
How to optimize site selection using GIS and the RMBL SDP.

Tuesday January 26th, 2021 *Successful UAV Data Collection in Mountain Environments*
How to design and execute UAV flights for high-quality scientific data in challenging environments.

Tuesday February 23rd, 2021 *Leveraging Point Cloud Data from Lidar and UAV Photogrammetry*
Mapping vegetation structure and function using 3D data from lidar and drones.

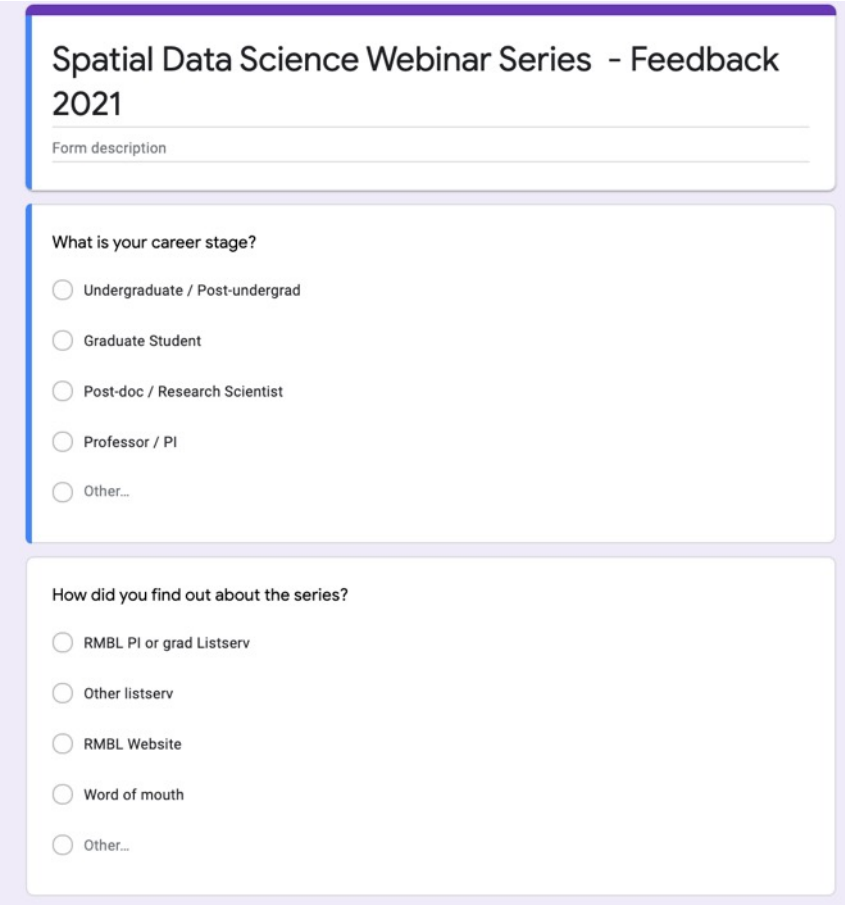
Tuesday March 23rd, 2021 *Linking Field Data with Remote Sensing for Spatial Prediction*
How to leverage high-resolution remote sensing from imaging spectroscopy and lidar to map species, traits, and processes.

Tuesday April 20th, 2021 *What's New in the RMBL Spatial Data Platform*
Introduction to new snow and phenology datasets that form part of the SDP Release 2 and Release 3.

Outline

- **Why?**
  - Why should you invest time in learning Spatial Data Science?
  - Why should you be excited about the RMBL SDP?
- **What?**
  - What new data products are available?
  - What's coming down the pipe in 2021 and 2022?
- **How?**
  - How do I find SDP Datasets?
  - How can I put them on a map?
  - How can I take them into the field?
  - How can I use them in analysis?

Webinar Series Feedback Survey



Spatial Data Science Webinar Series - Feedback 2021

Form description

What is your career stage?

- Undergraduate / Post-undergrad
- Graduate Student
- Post-doc / Research Scientist
- Professor / PI
- Other...

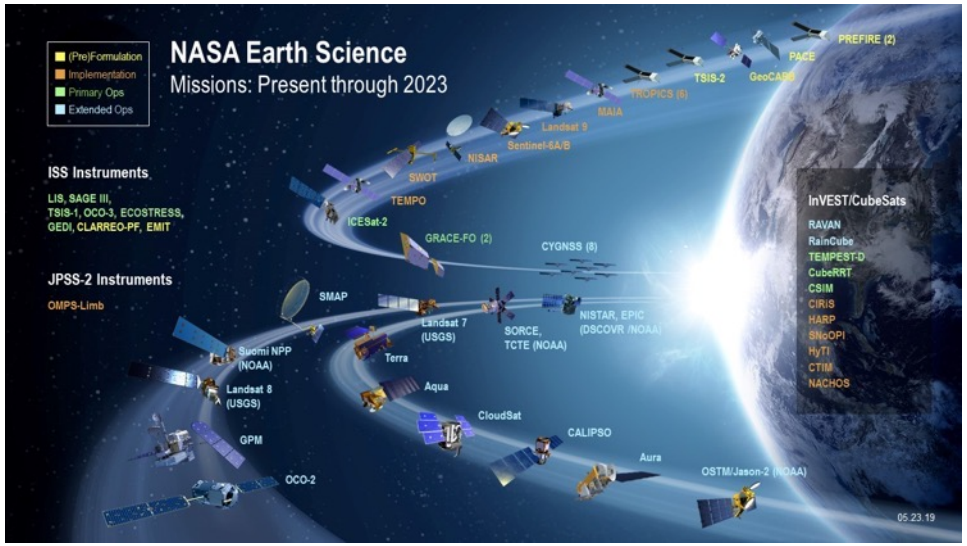
How did you find out about the series?

- RMBL PI or grad Listserv
- Other listserv
- RMBL Website
- Word of mouth
- Other...

https://forms.gle/LW9F1Dq3wgc75eWN6

Why Spatial Data Science?

Observations are abundant



https://www1.grc.nasa.gov/

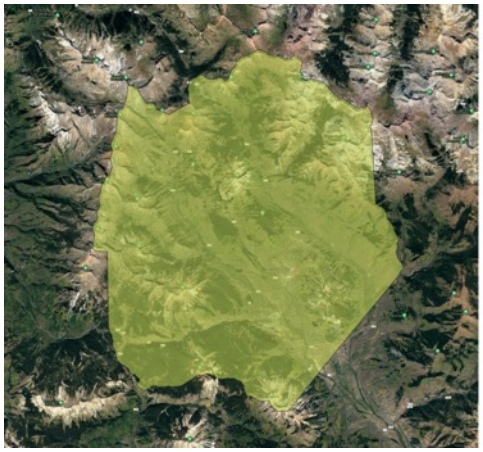
Great free tools are available:

QGIS R Google Earth Engine

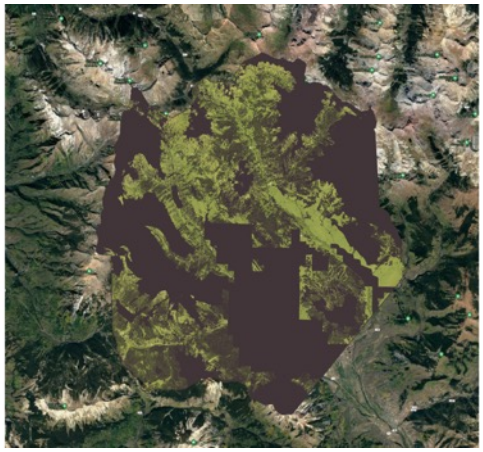
Why Spatial Data Science?

It can make our field studies more rigorous

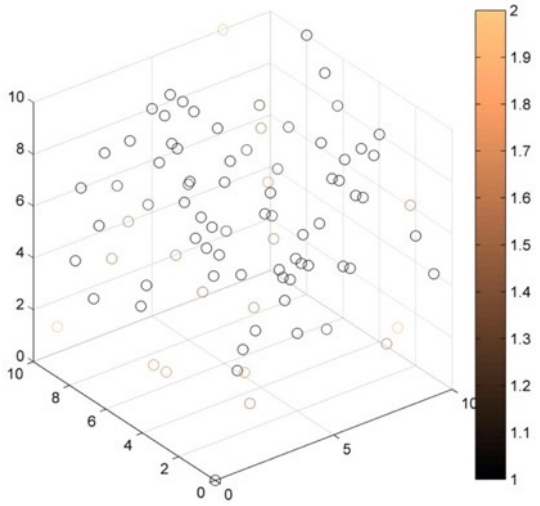
Study Area



Sampling Frame

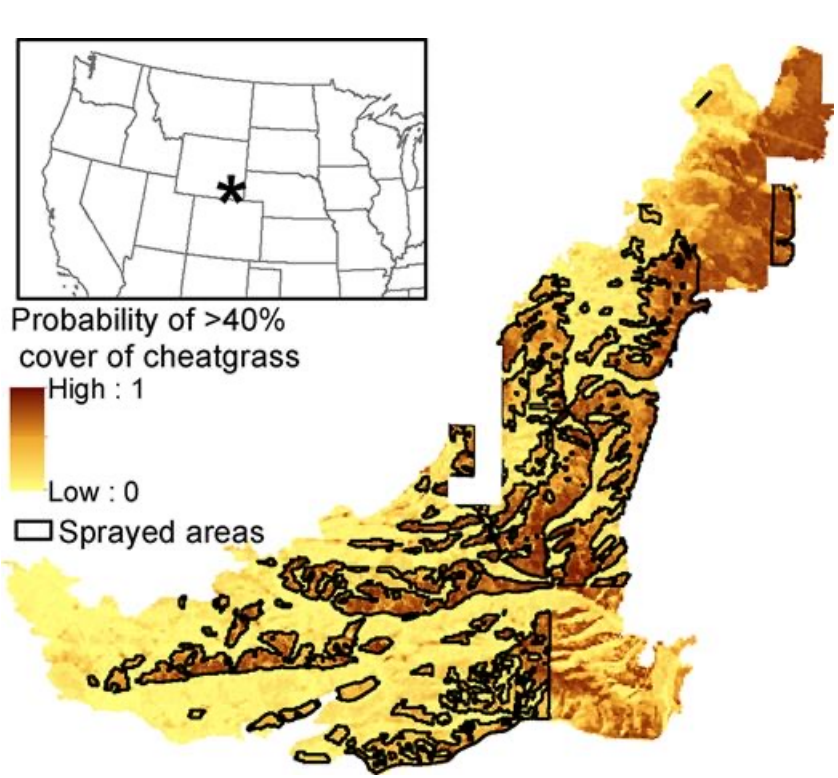


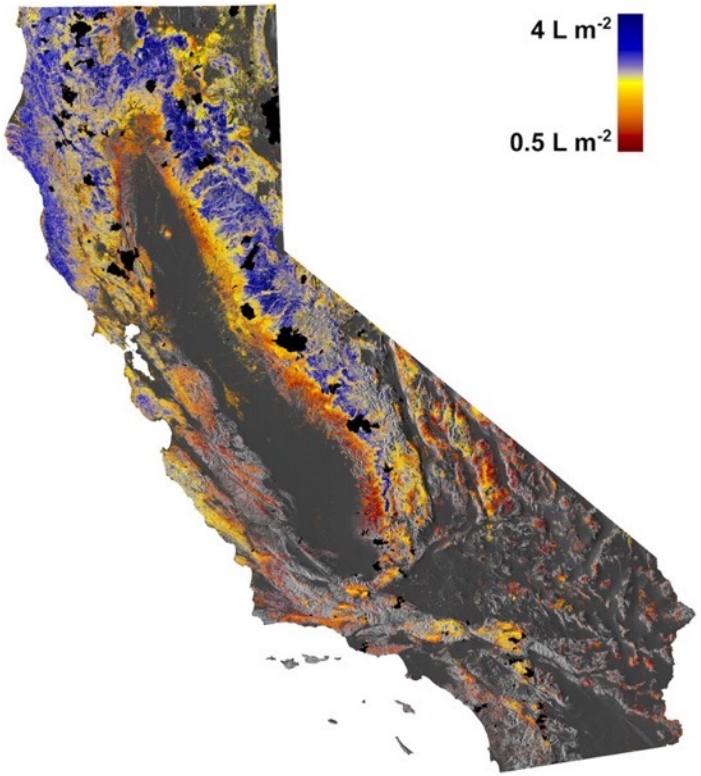
Latin Cube Samples



Why Spatial Data Science?

It can enable scaling our science up to what matters





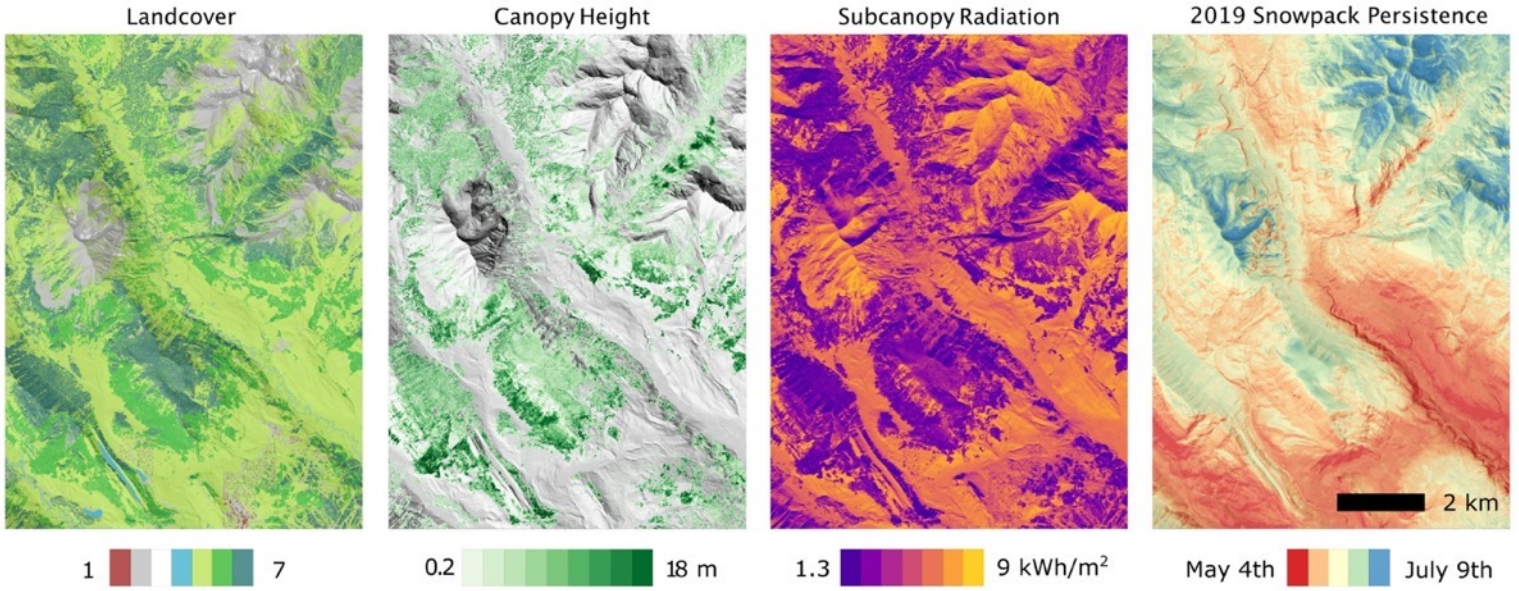
Images: Sofaer et al. 2019, CSU

Figures: Asner et al. 2016

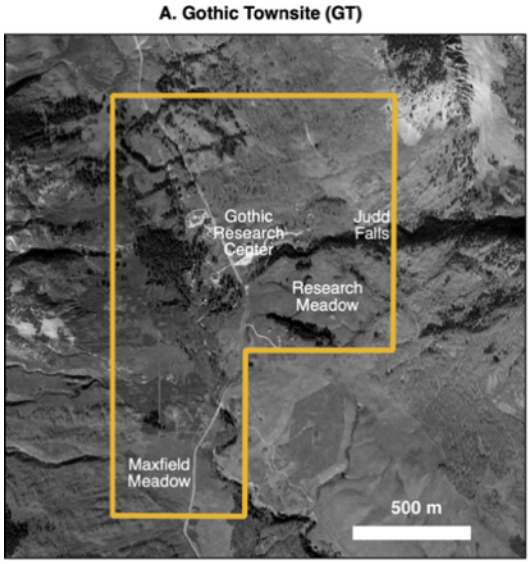
Spatial Data Platform

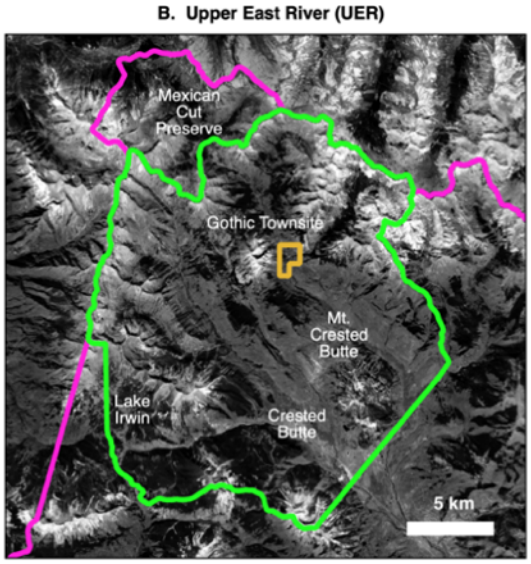
Gridded environmental data for the RMBL Domain

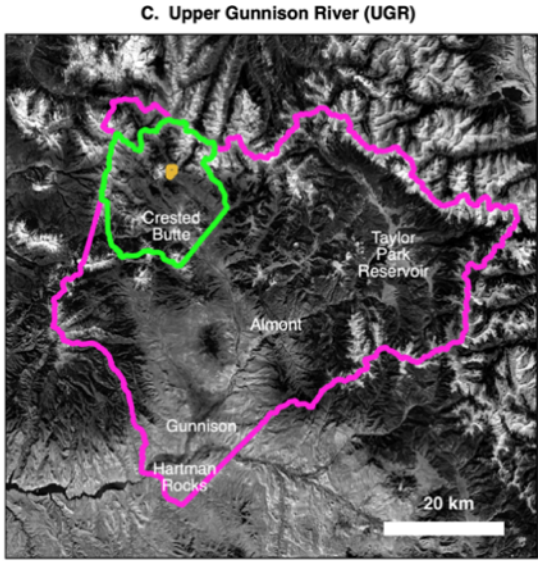
High Fidelity High Resolution Open Citeable



SDP Domains and Scales





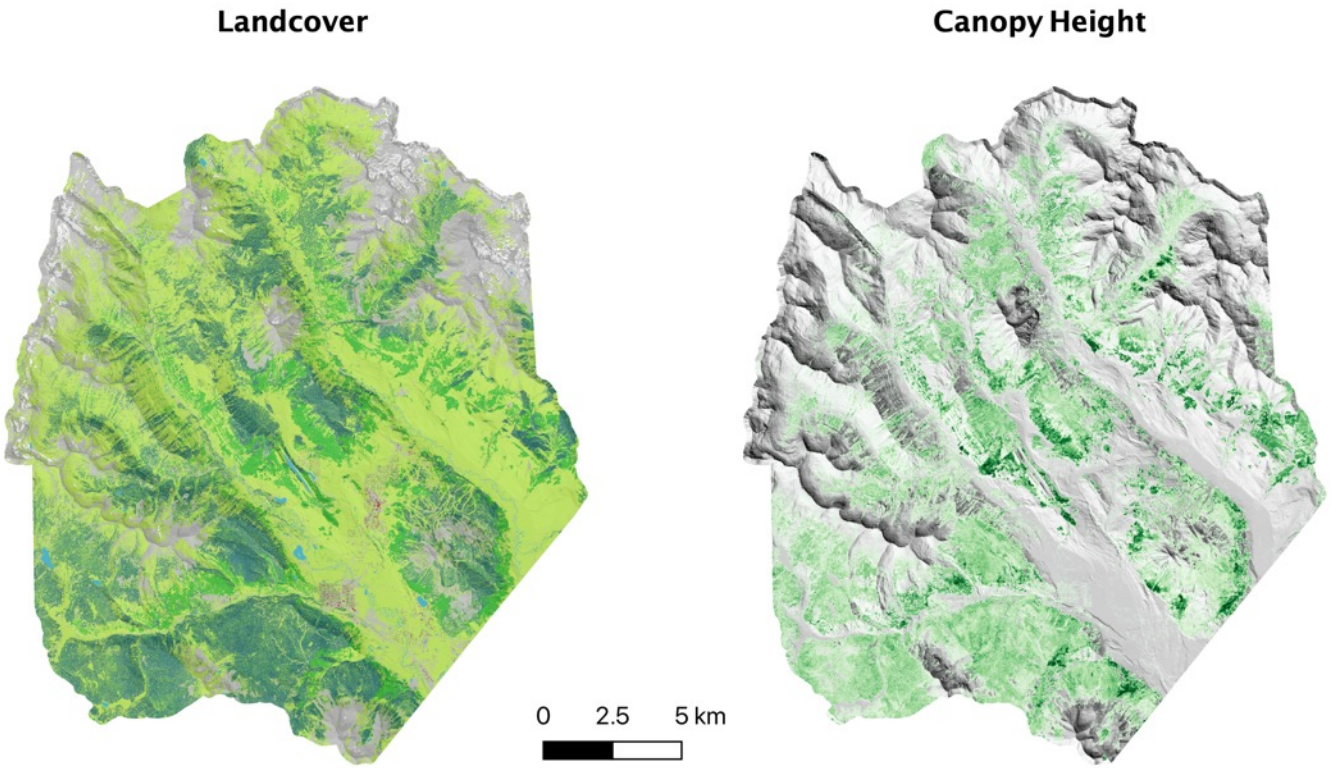


0.33m, 1m

1m, 3m

1m, 3m, 9m, 27m

SDP Release 1 – May 2020



DEM, DSM, Flowlines, Watersheds

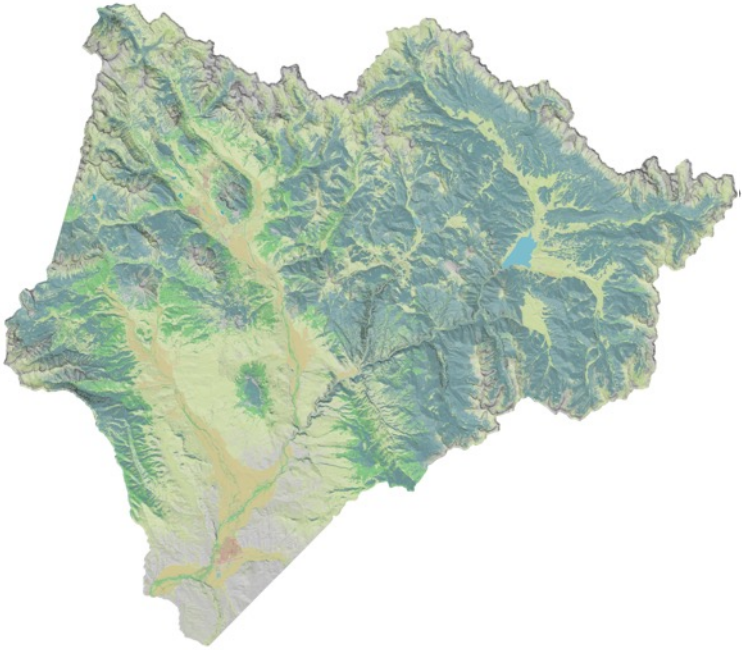
SDP Release 2 and 3 – April 2021

UER Domain

June 21st

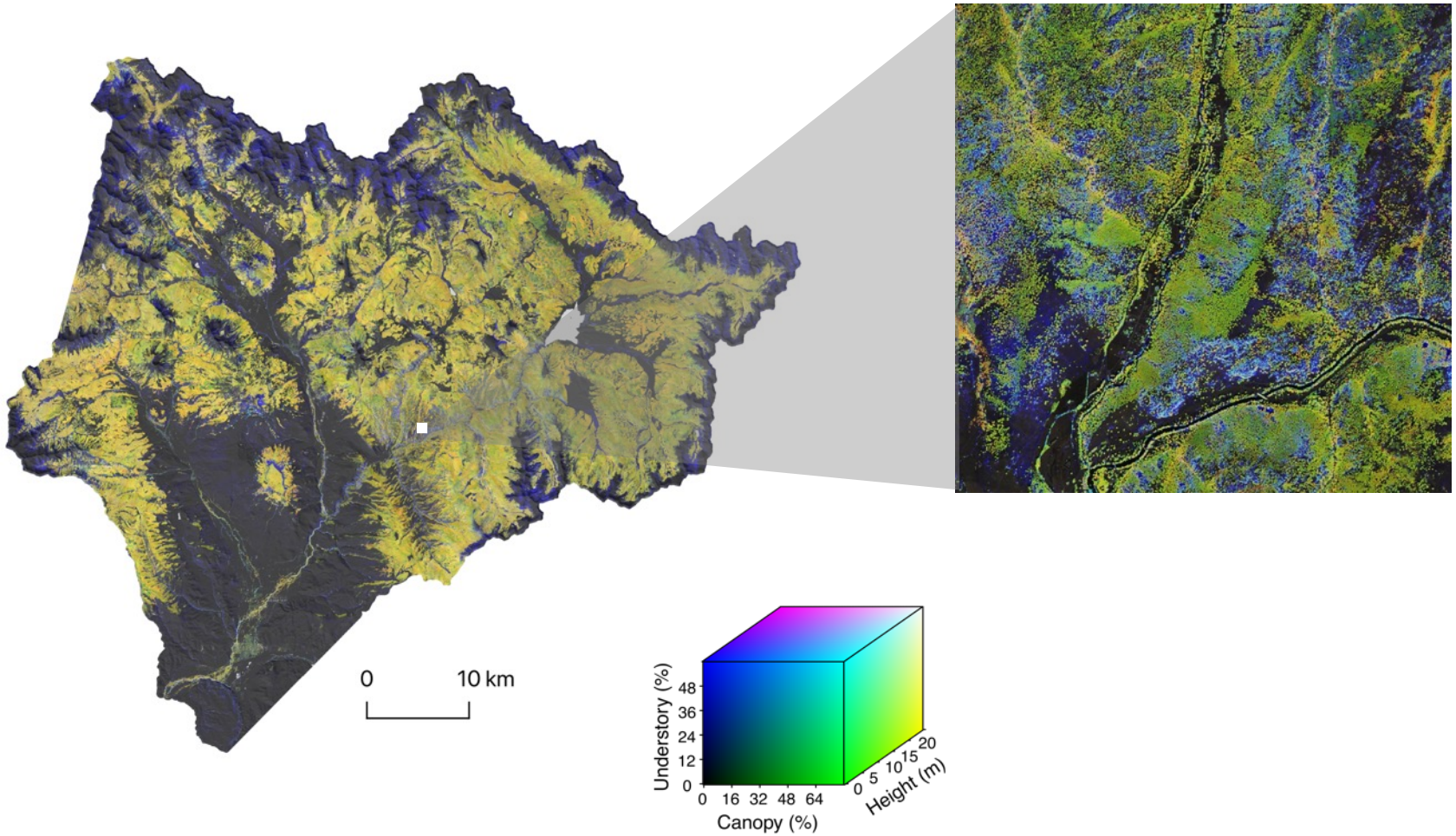
Potential Insolation
Winter and Summer Travel Time
33cm Canopy Height

UG Domain



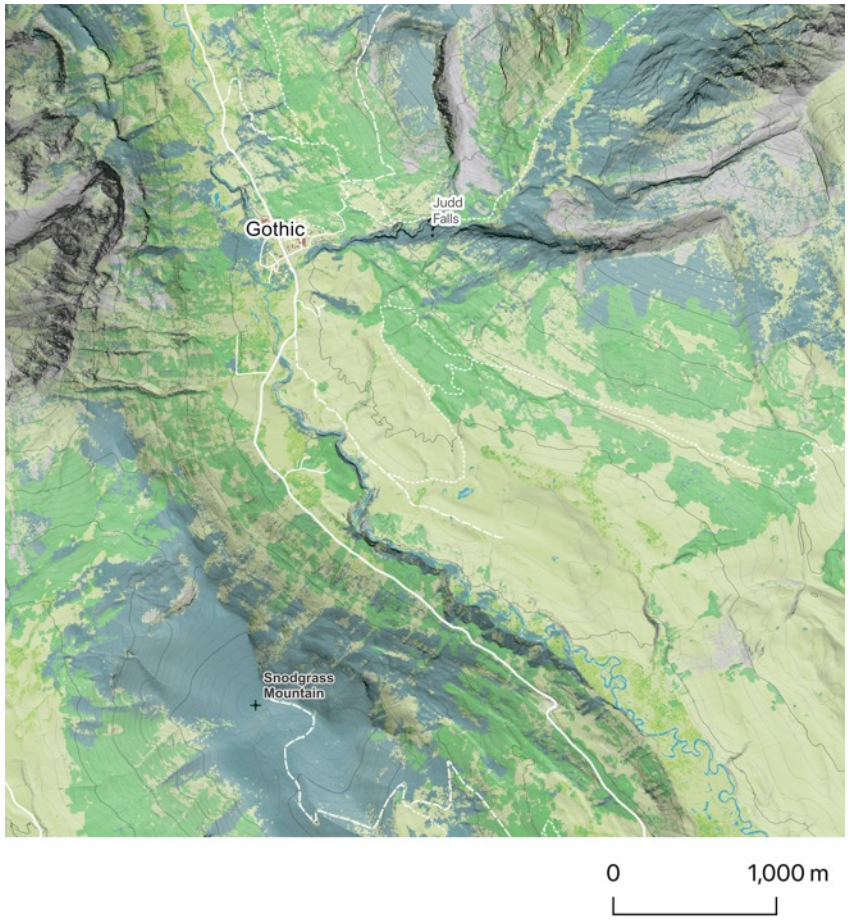
New 1m DEM and derivatives
1m Landcover
1m Imagery, NDVI
3m LiDAR Vegetation Structure

LiDAR Vegetation Structure

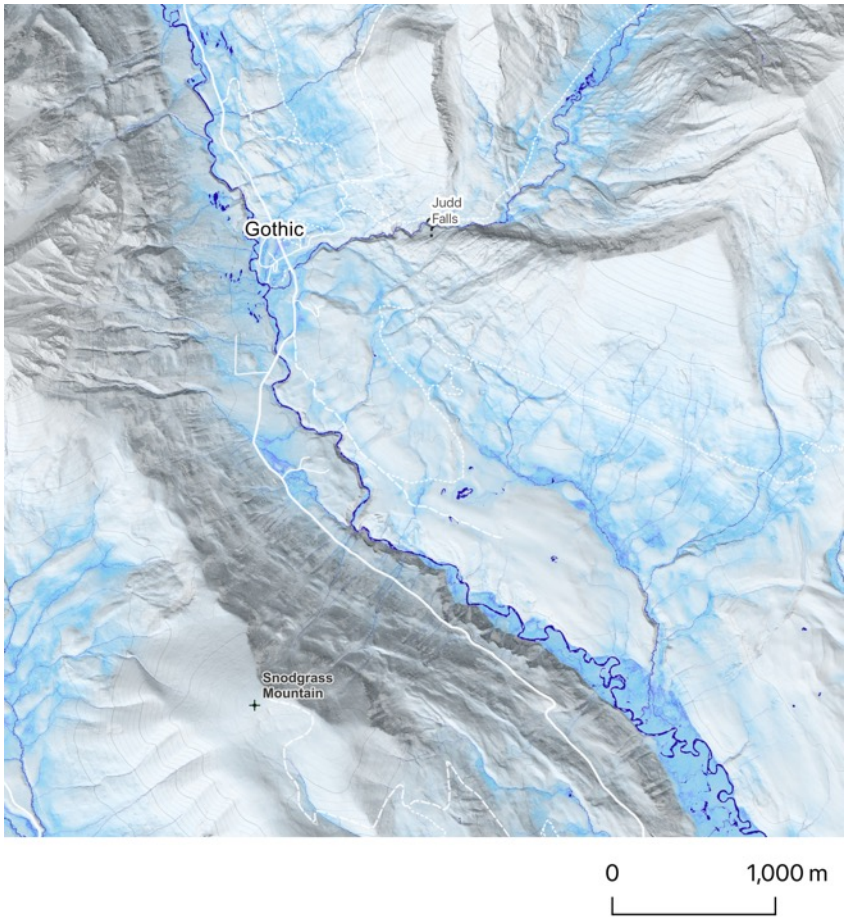


Thematic Basemaps

Landcover Theme

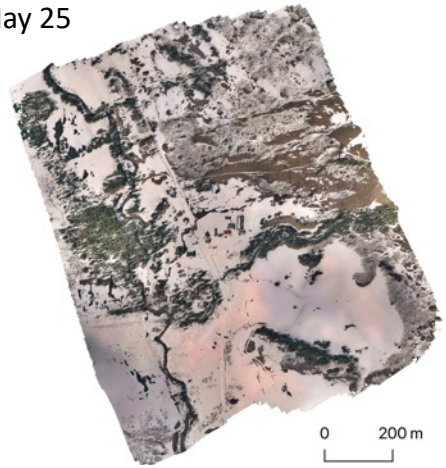


Hydro Theme



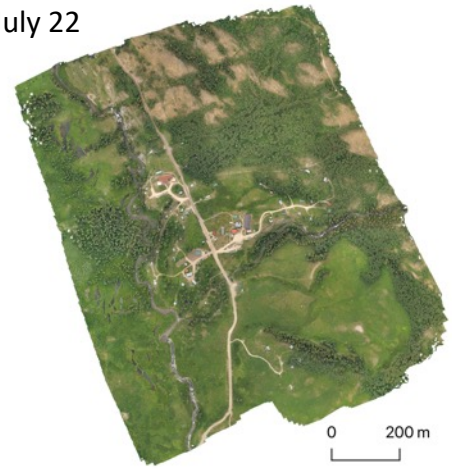
Imagery Basemaps

May 25

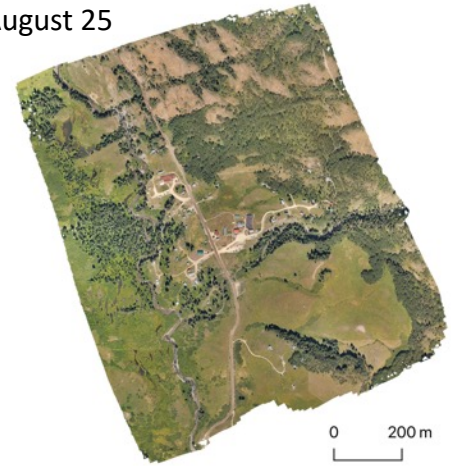


June 17

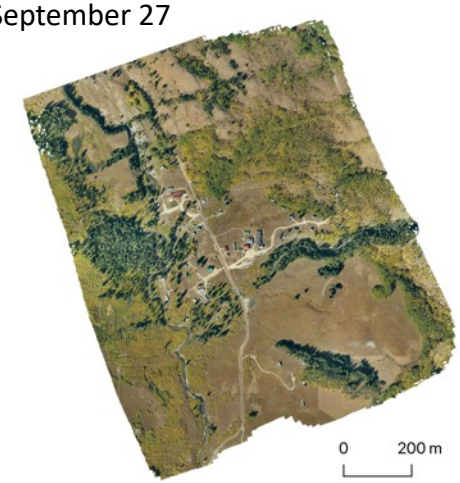
July 22



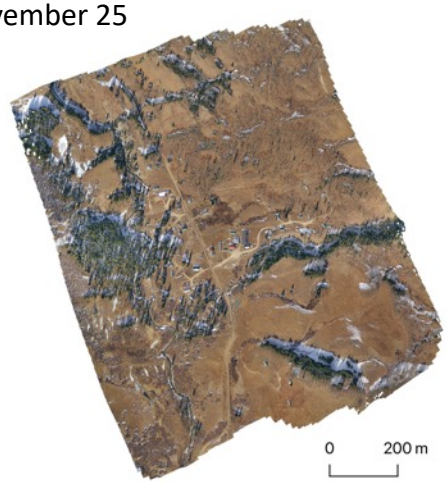
August 25



September 27



November 25

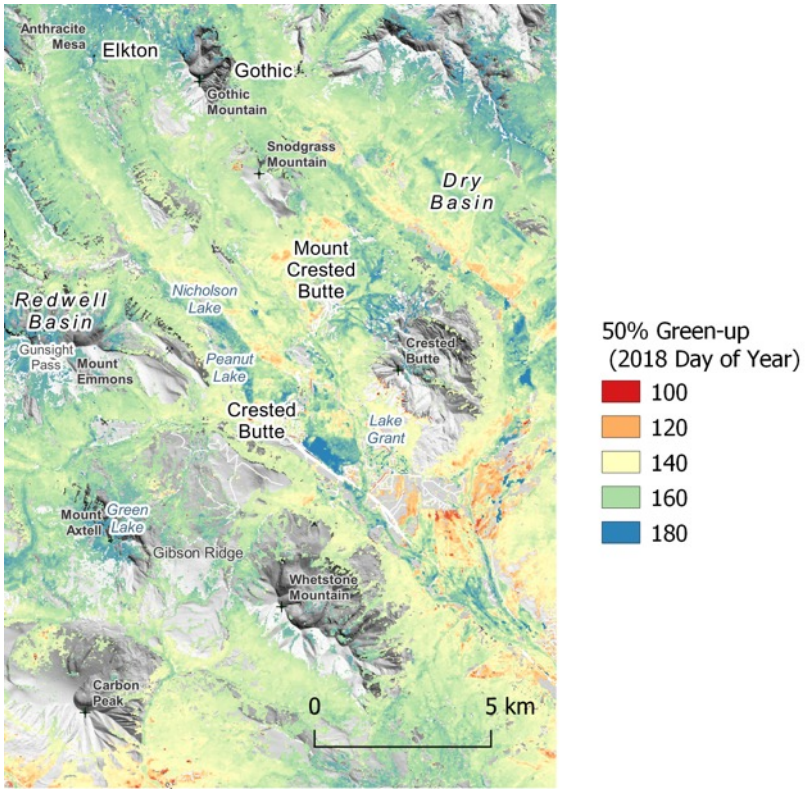


What's Coming in 2021 and 2022

Landsat / Sentinel 2 / UAV-based
Snow and Land Surface Phenology

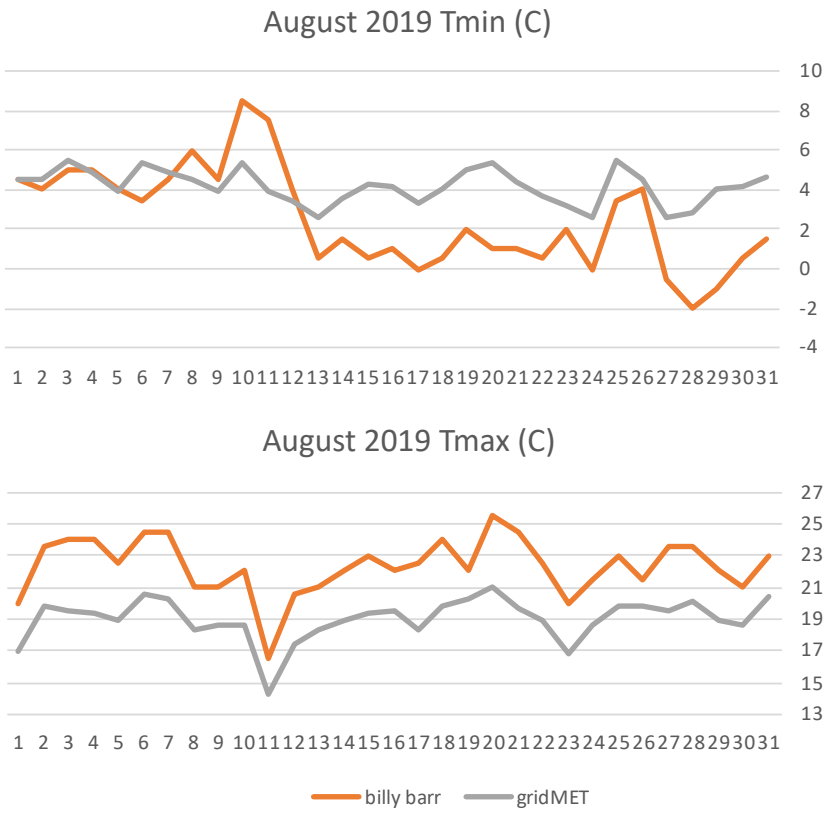
Weekly fractional snow
and leaf area index
~30m resolution
2016 - 2021

Bolton et al. 2020

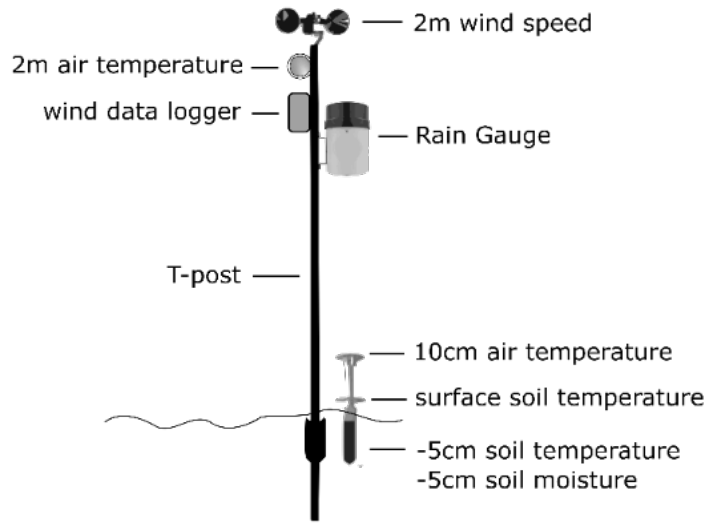


What's Coming in 2021 and 2022

New Microclimate Maps Incorporating Snow, Phenology, and Cold-air Pooling



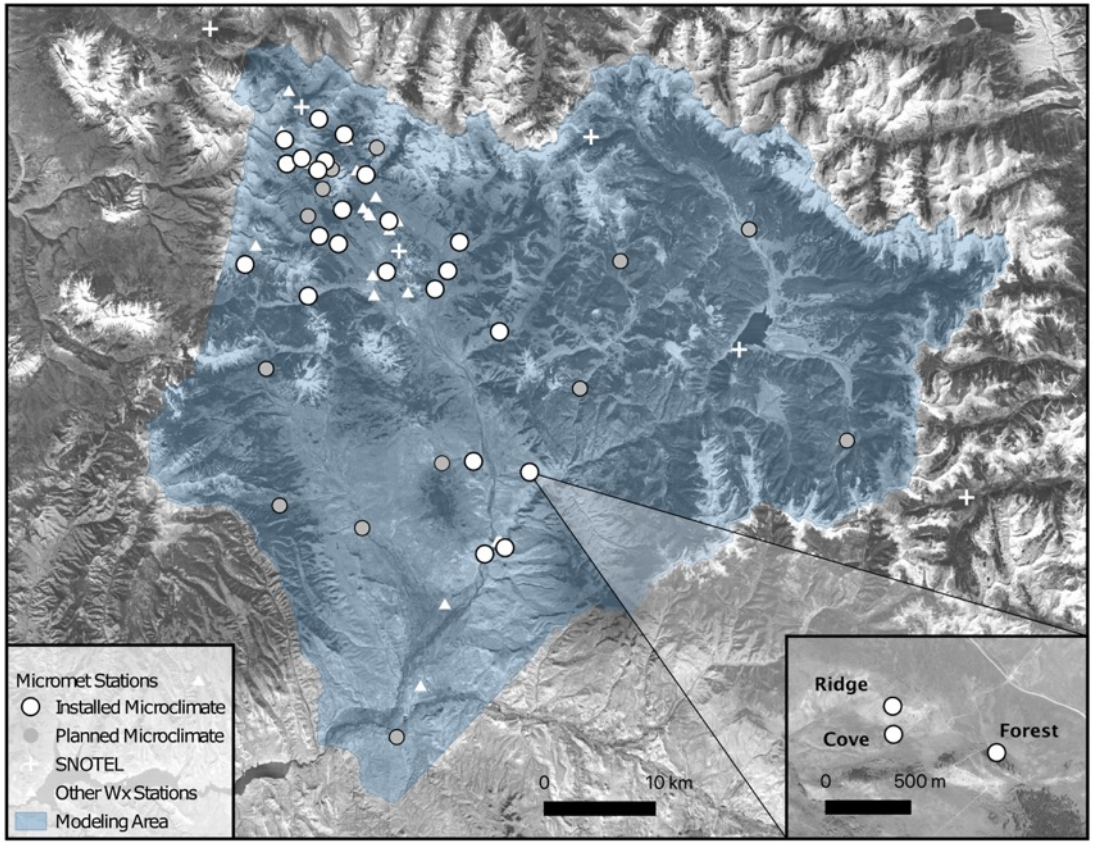
A Distributed Low-cost Sensor Network



Equipment cost ~$800 / node

Sensor Network Deployment so-far

- 66 stations instrumented in 2020
- Forest / microtopography balance
- Funding dependent:
  - additional instrumentation
  - Expanded network



Discovering SDP Datasets

RMBL Data Catalog

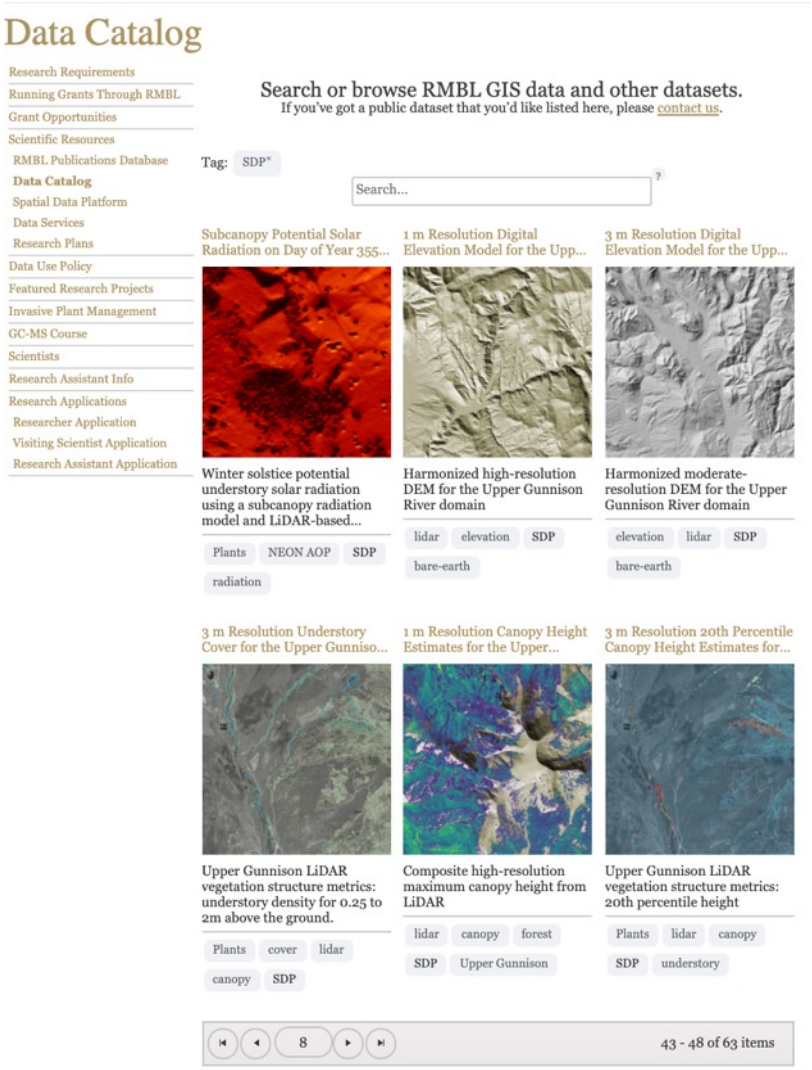
https://www.rmbl.org/scientists/resources/data-catalog/?tag-id=84

Current Product Table

https://www.rmbl.org/wp-content/uploads/2021/04/SDP_product_table_4_26_2021.csv

Long-term Archiving

ESS-DIVE
Deep Insight for Earth Science Data



So How Can I Access This Stuff?

All published datasets are in a [public Amazon S3 Bucket]

Data Products

Direct Cloud Access (no download):

QGIS ArcGIS Pro

Programmatic Access (no download):

python R

Basemaps

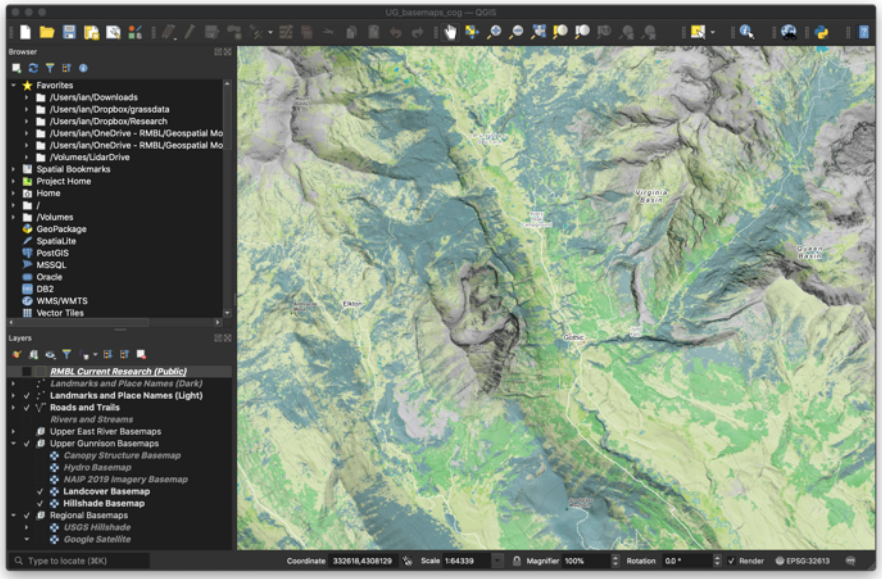
ArcGIS Online

Mapping and analysis: location intelligence for everyone

ArcGIS® Field Maps

Any software that can
Load a tiled map service.

Demo: Loading basemaps and data products in QGIS



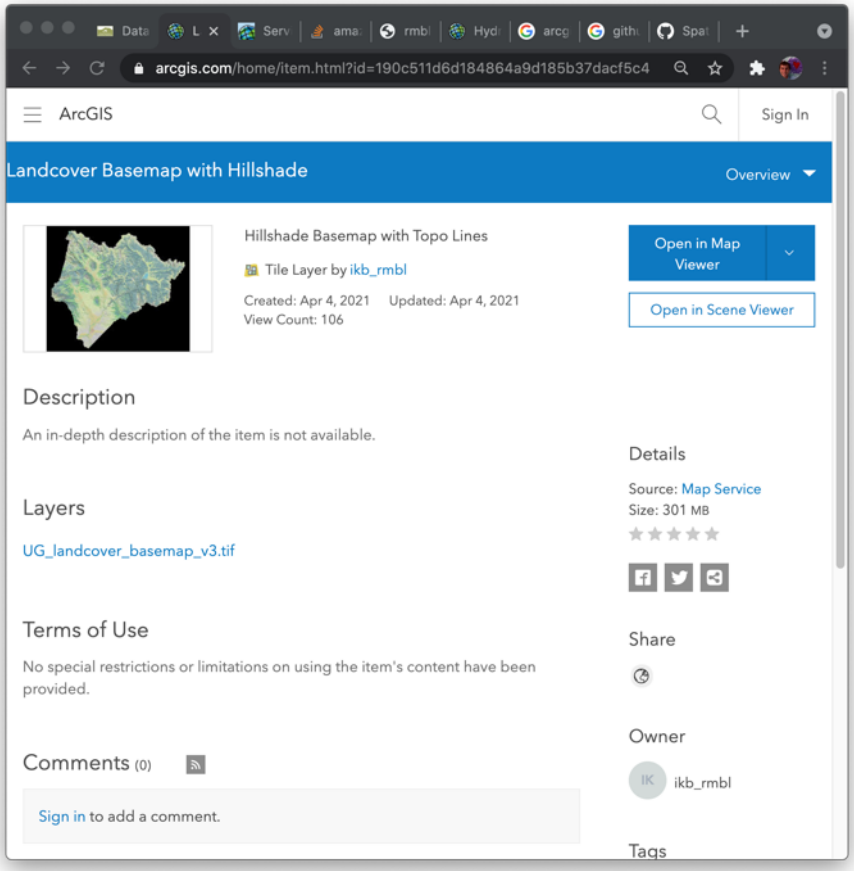
Download and Install [QGIS]:

QGIS

Download and Open [Demo Map:]

GitHub

Demo: Accessing basemaps in ArcGIS Online and Field Maps



Install ArcGIS Field Maps on your mobile device:

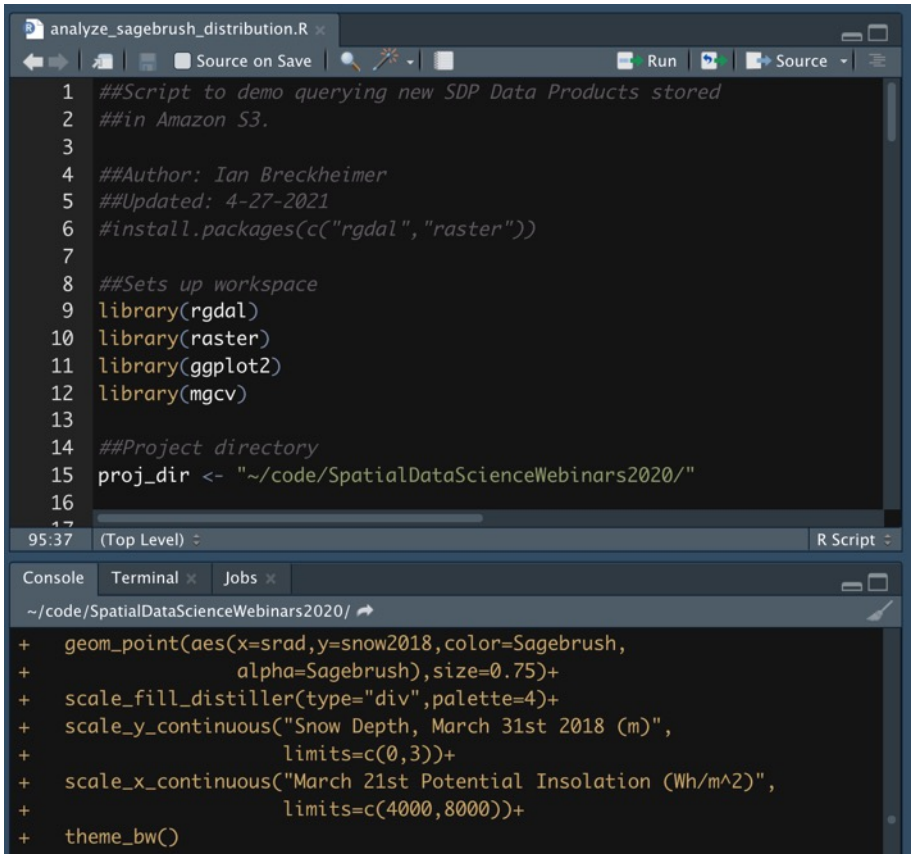
Google Play

iOS App Store

Open the app, and search for: ”RMBL Research” (skip sign-in).

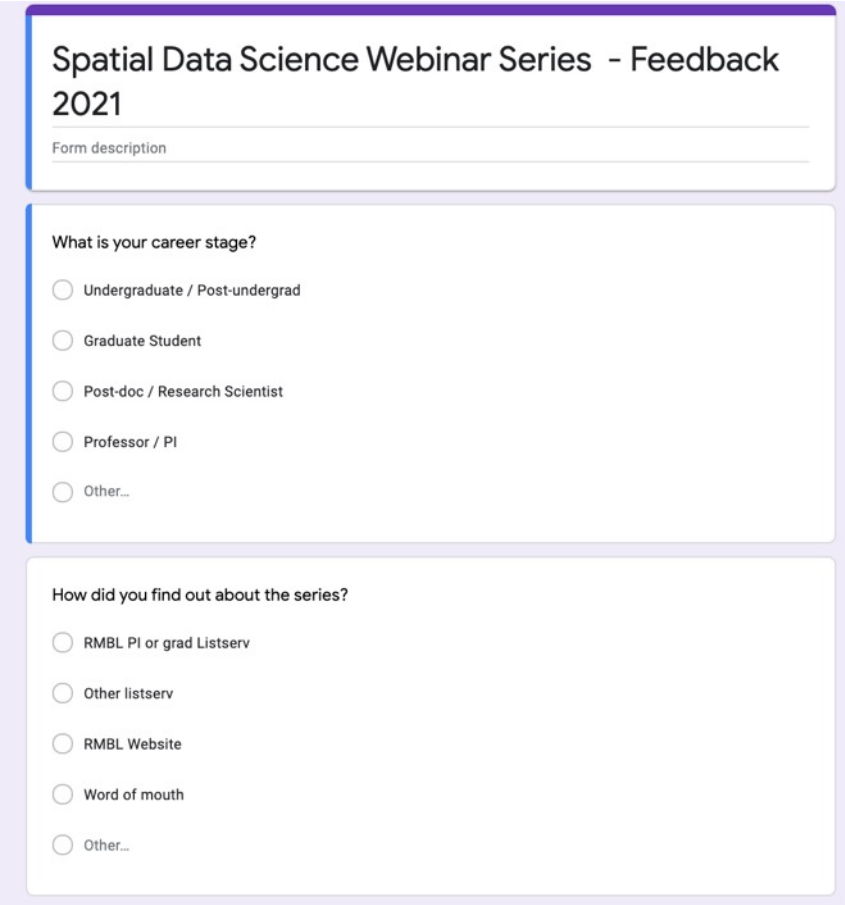
Contact us (gis@rmbl.org) to get Offline access, and access to non-public data.

Demo: Accessing SDP datasets programmatically with R



Access to cloud-based datasets via raster, terra, rgdal, gdalUtils packages

Webinar Series Feedback Survey



Spatial Data Science Webinar Series - Feedback 2021

Form description

What is your career stage?

- Undergraduate / Post-undergrad
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- Professor / PI
- Other...

How did you find out about the series?

- RMBL PI or grad Listserv
- Other listserv
- RMBL Website
- Word of mouth
- Other...

https://forms.gle/LW9F1Dq3wgc75eWN6

Thanks!

Contact Me:

Ian Breckheimer
ikb@rmbl.org
Twitter, Github: @ibreckhe

References

- Asner, G. P., Brodrick, P. G., Anderson, C. B., Vaughn, N., Knapp, D. E., & Martin, R. E. (2016). Progressive forest canopy water loss during the 2012–2015 California drought. Proceedings of the National Academy of Sciences, 113(2), E249-E255.
- Sofaer, H. R., Jarnevich, C. S., Pearse, I. S., Smyth, R. L., Auer, S., Cook, G. L., ... & Hamilton, H. (2019). Development and delivery of species distribution models to inform decision-making. BioScience, 69(7), 544-557.
- Bolton, D. K., Gray, J. M., Melaas, E. K., Moon, M., Eklundh, L., & Friedl, M. A. (2020). Continental-scale land surface phenology from harmonized Landsat 8 and Sentinel-2 imagery. Remote Sensing of Environment, 240, 111685.