



FUTURE TRENDS in REMOTE SENSING

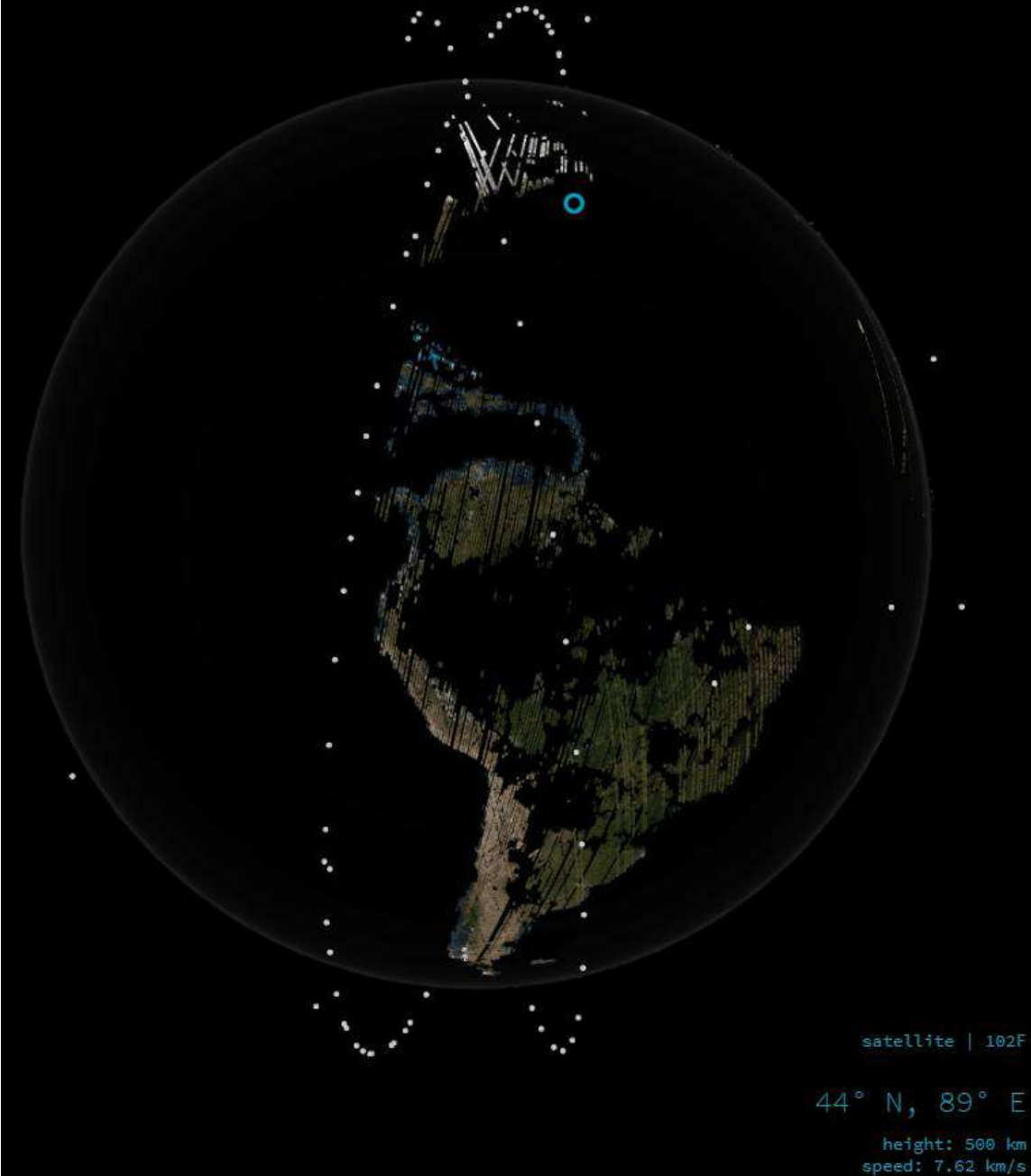
Alex Bevington

GEOG 357

Nov. 26, 2025

The Future of Remote Sensing

- Analysis ready data
- Increased resolution
- Programmatic data access
- 'GeoAI'

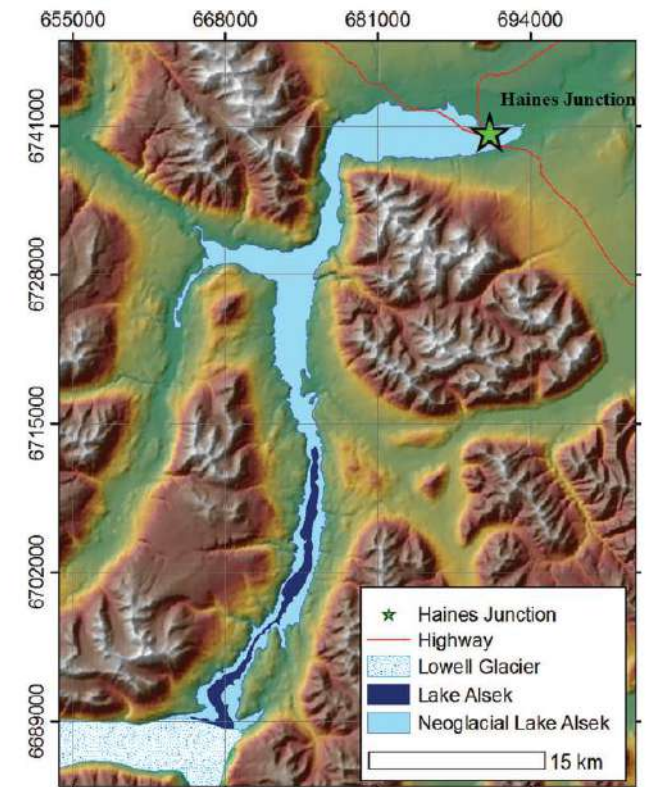
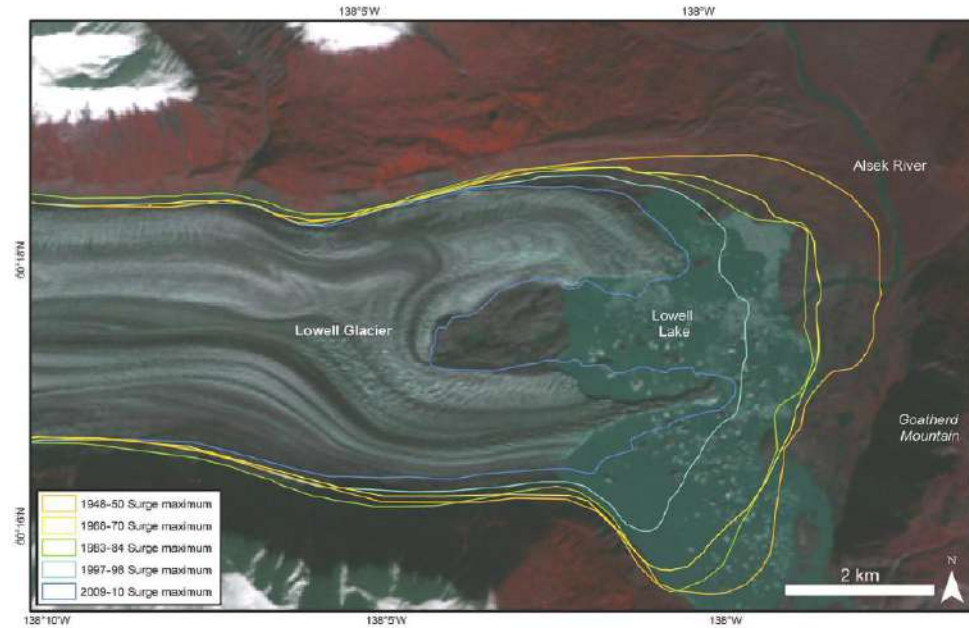
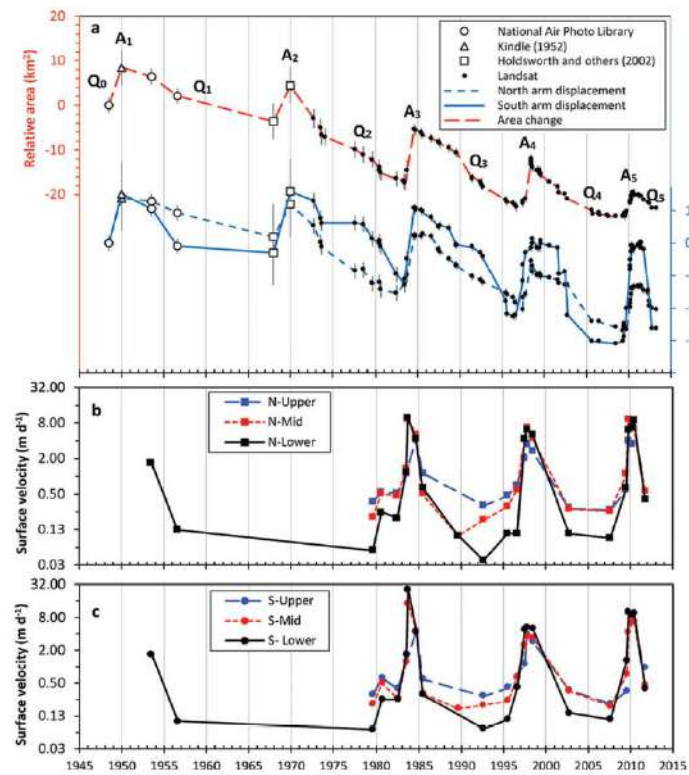


Characteristics of the last five surges of Lowell Glacier, Yukon, Canada, since 1948

Alexandre BEVINGTON, Luke COPLAND

Department of Geography, University of Ottawa, Ottawa, Ontario, Canada

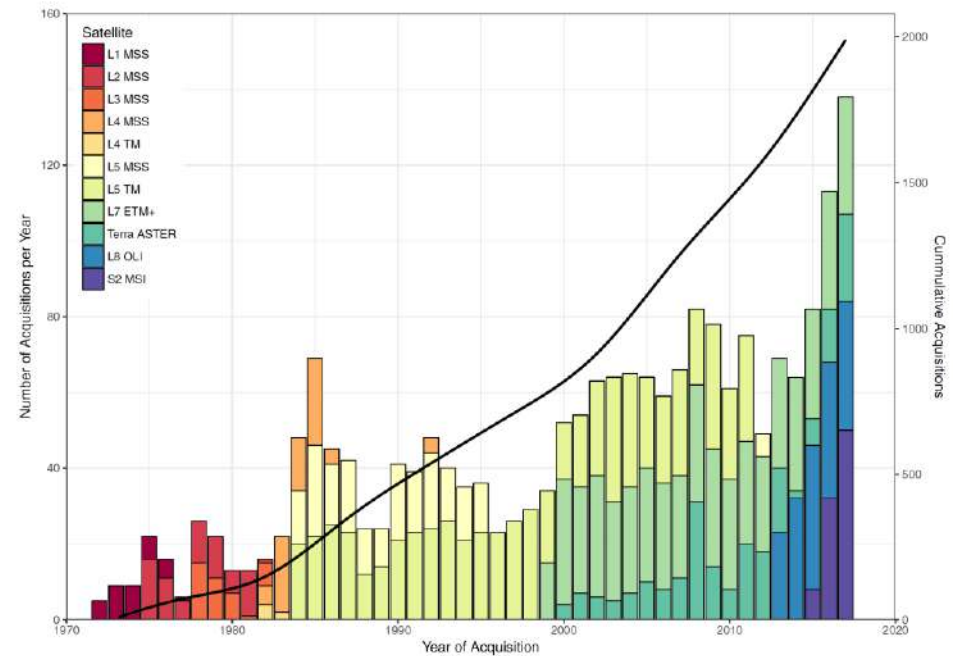
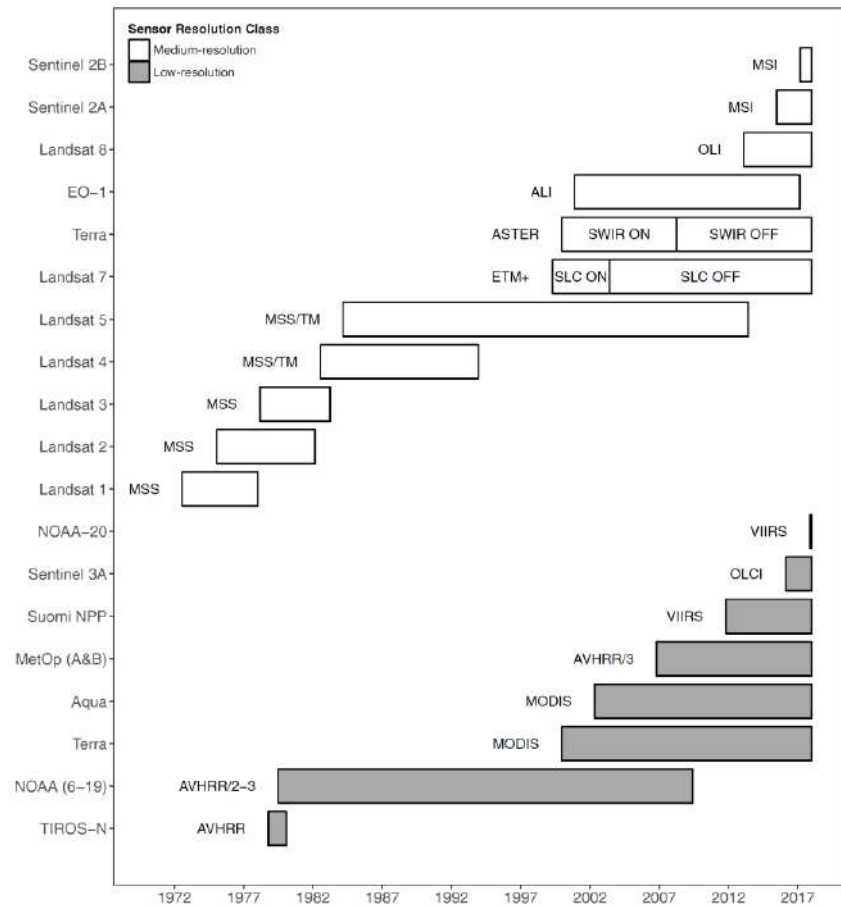
E-mail: luke.copland@uottawa.ca

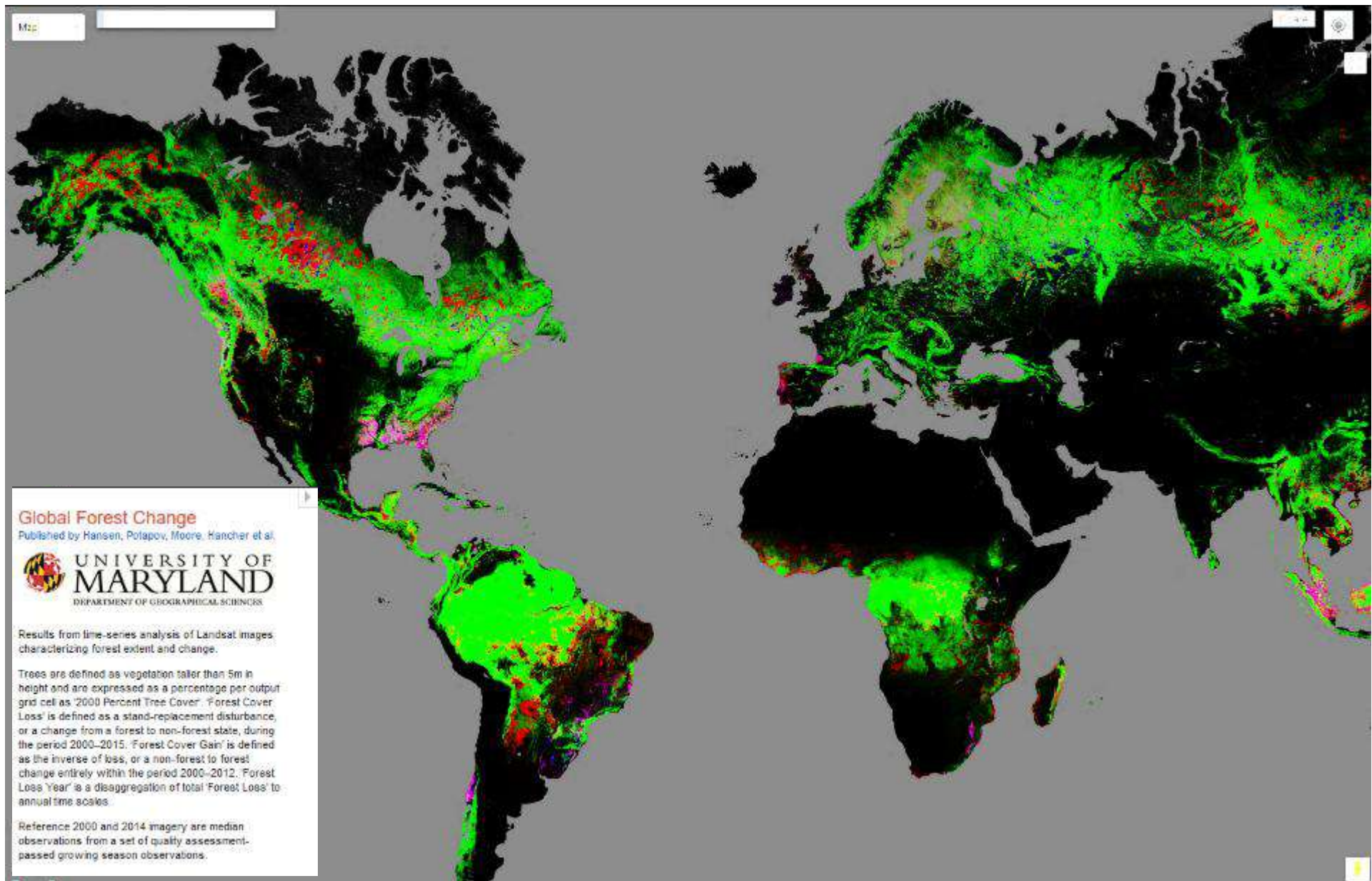




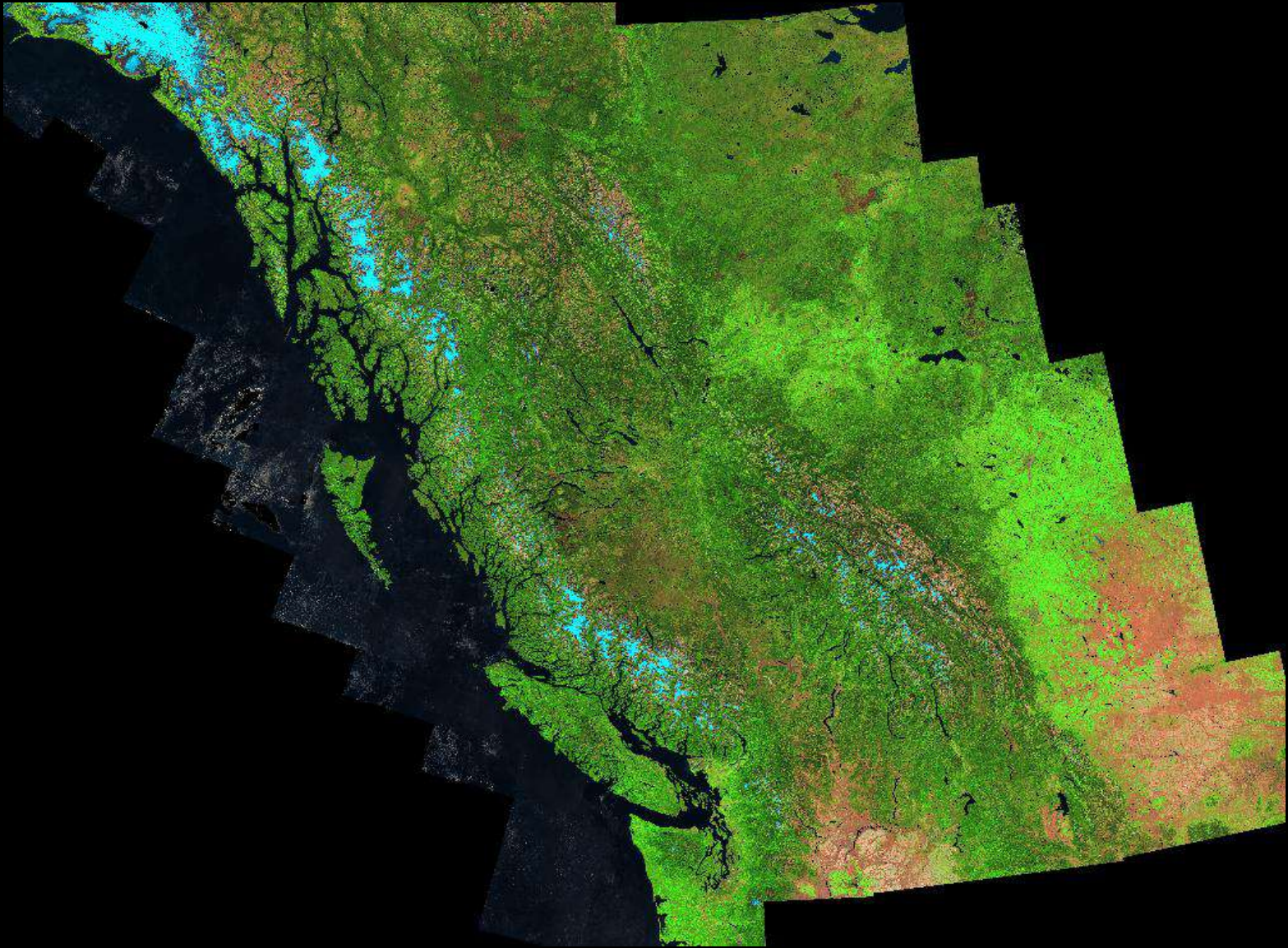
A Review of Free Optical Satellite Imagery for Watershed-Scale Landscape Analysis

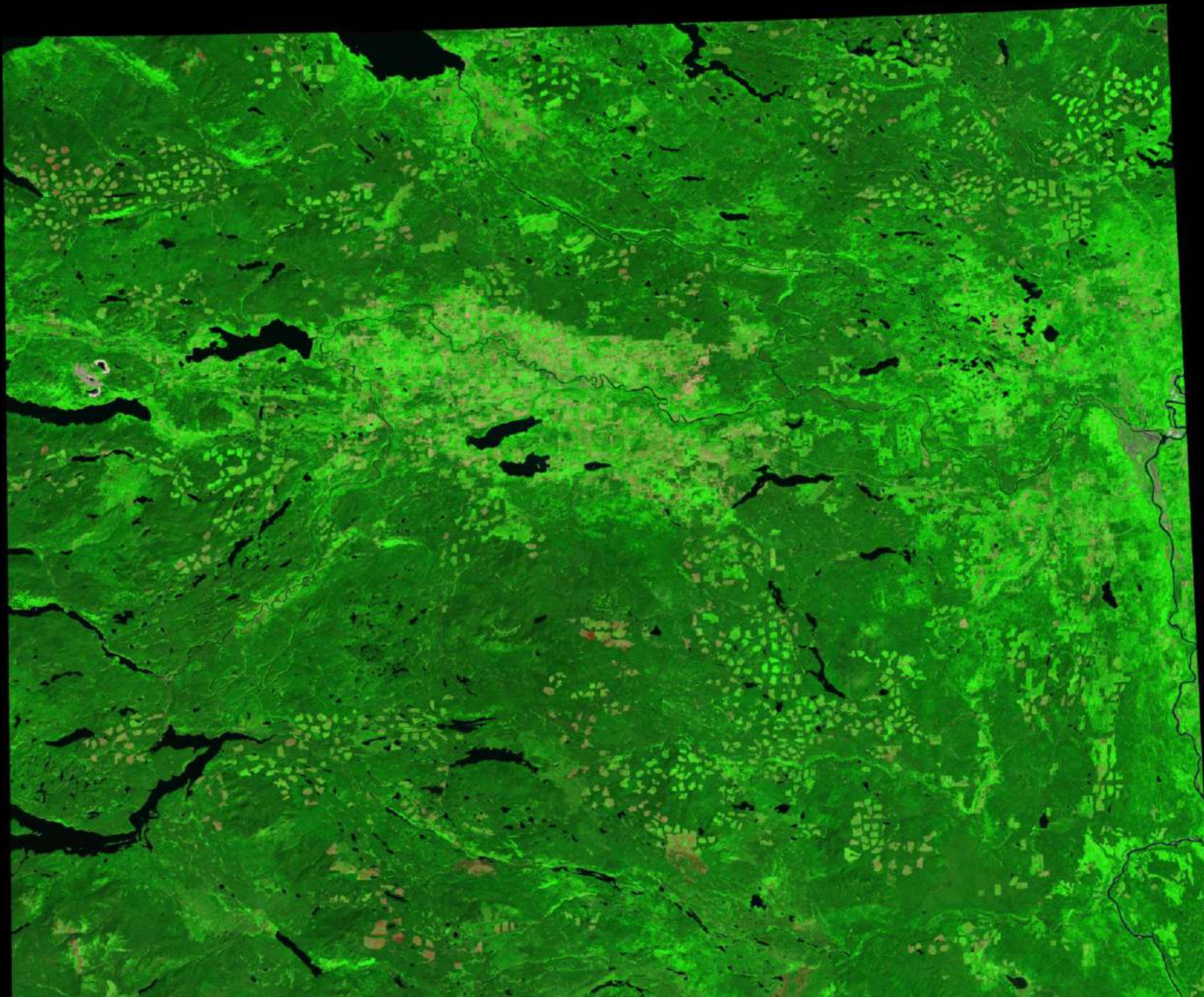
Alexandre Bevington, Hunter Gleason, Xavier Giroux-Bougard, & Tyler de Jong





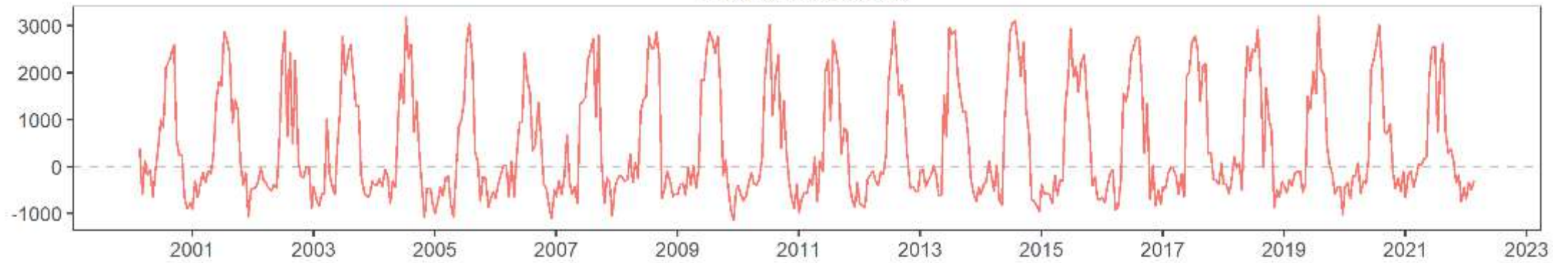
<https://glad.earthengine.app/view/global-forest-change>



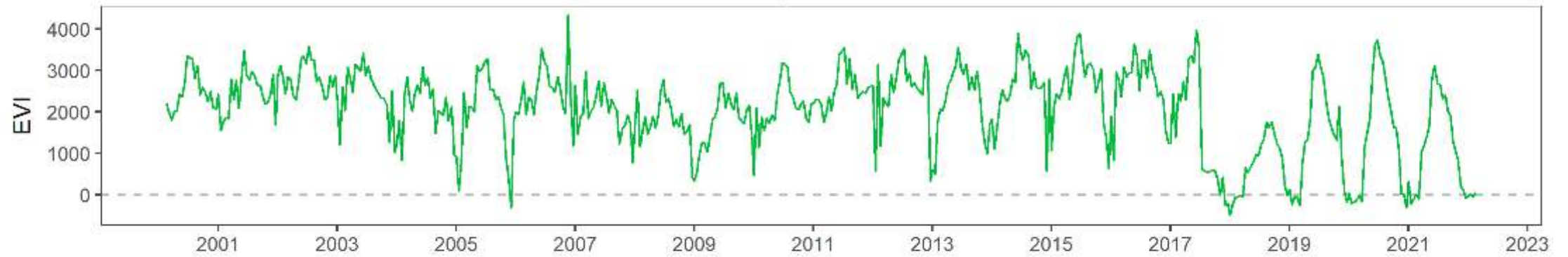


1984-2018

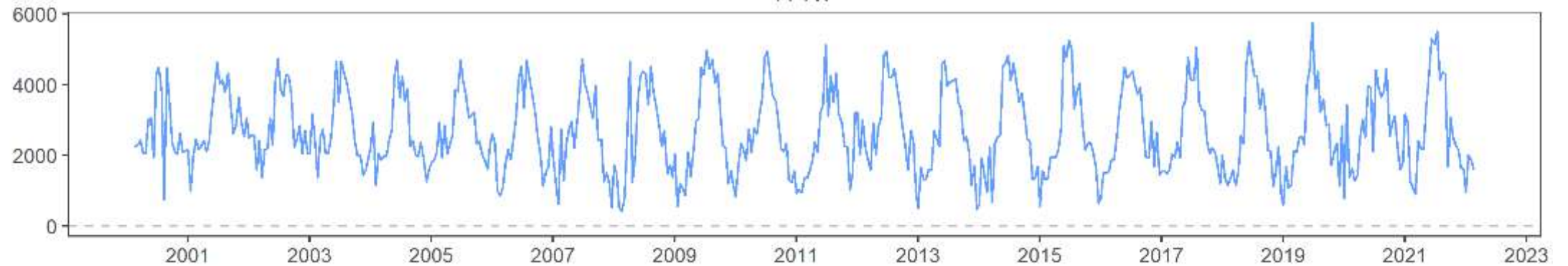
Berg Lake Campground



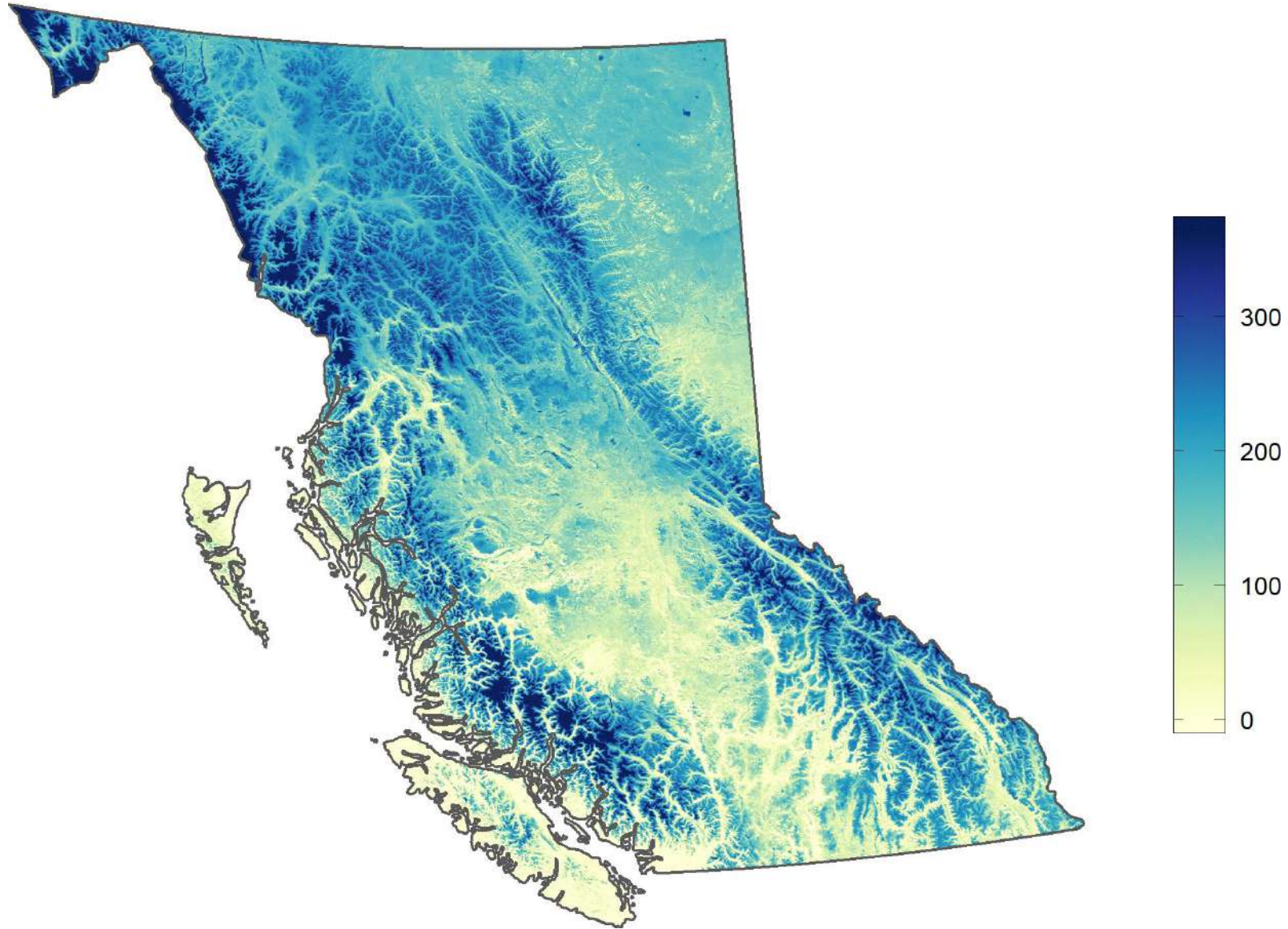
Elephant Hill Fire



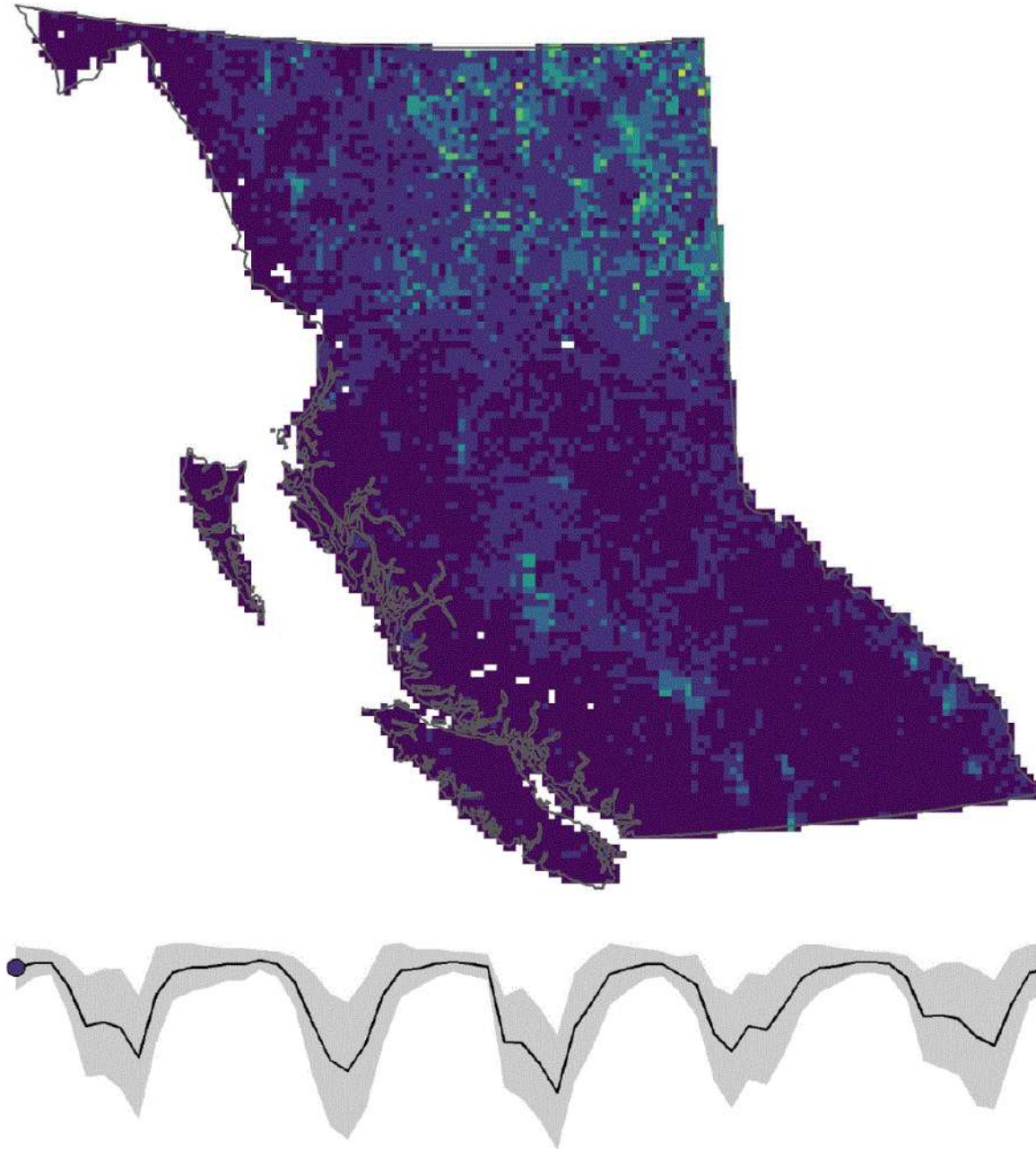
FFTW



2002



2016 January



Earth Engine service issues

Inbox x



@google.com>

Sun, 19 Feb 2017, 22:01



Reply



to me ▾

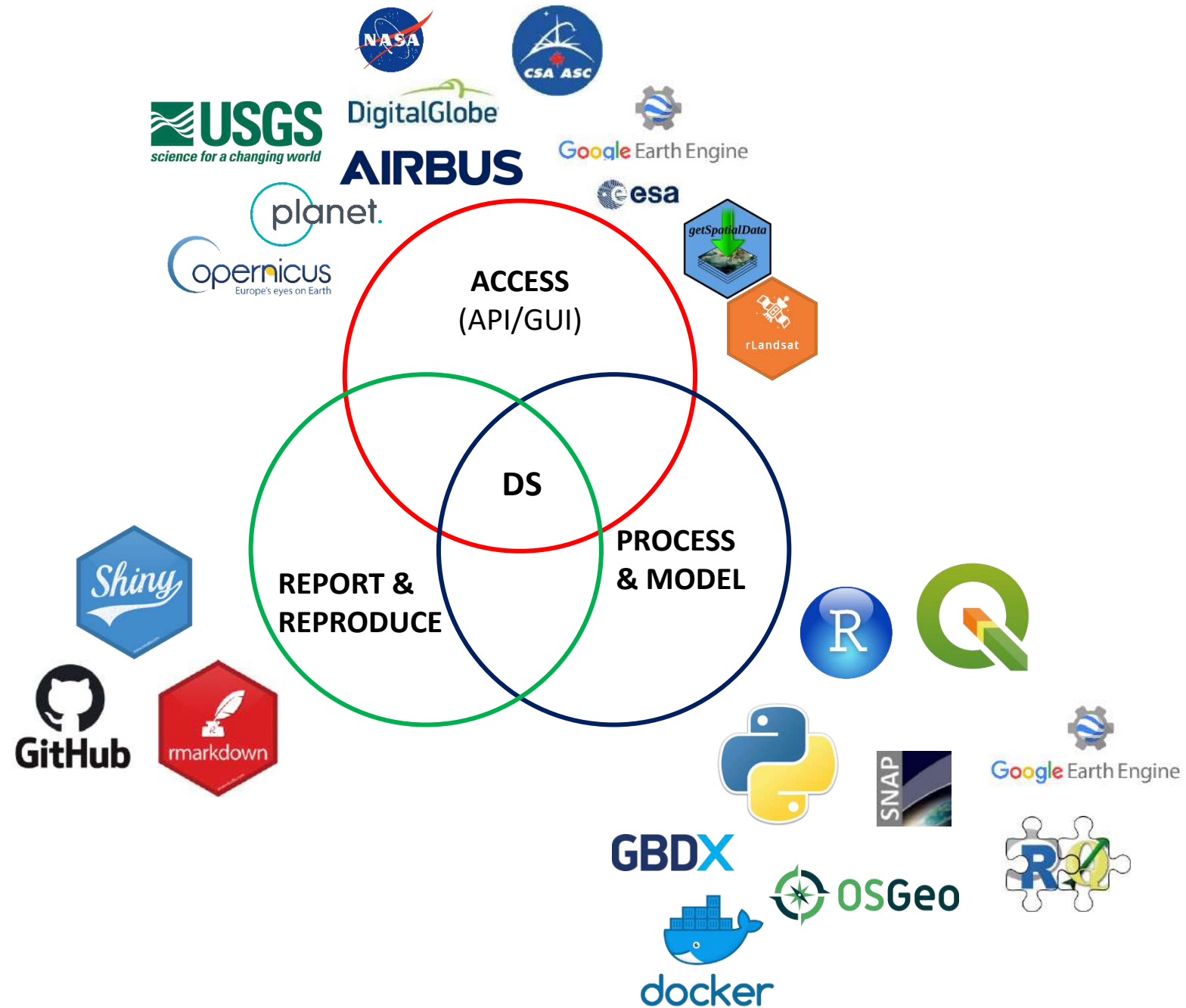
Greetings, I am monitoring some unusual activity on the **Earth Engine** backend that appears to be related to scripts you are running.

Would you mind stopping any running scripts or exports, until we can diagnose the precise cause of the issues? Something about your script is causing us issues.

Additionally, would you mind sharing your script? We can often help optimize quite substantially, and get everyone moving again in short order.

Best regards,





Cutting corners to meet arbitrary management deadlines

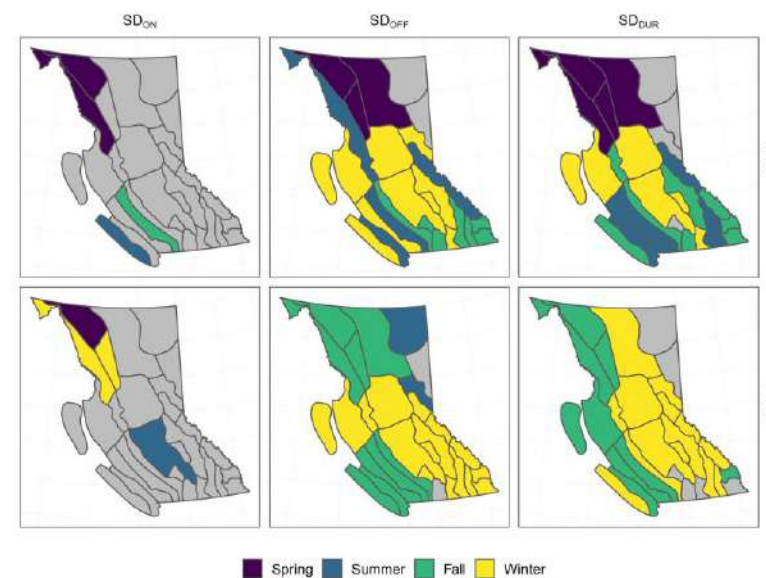
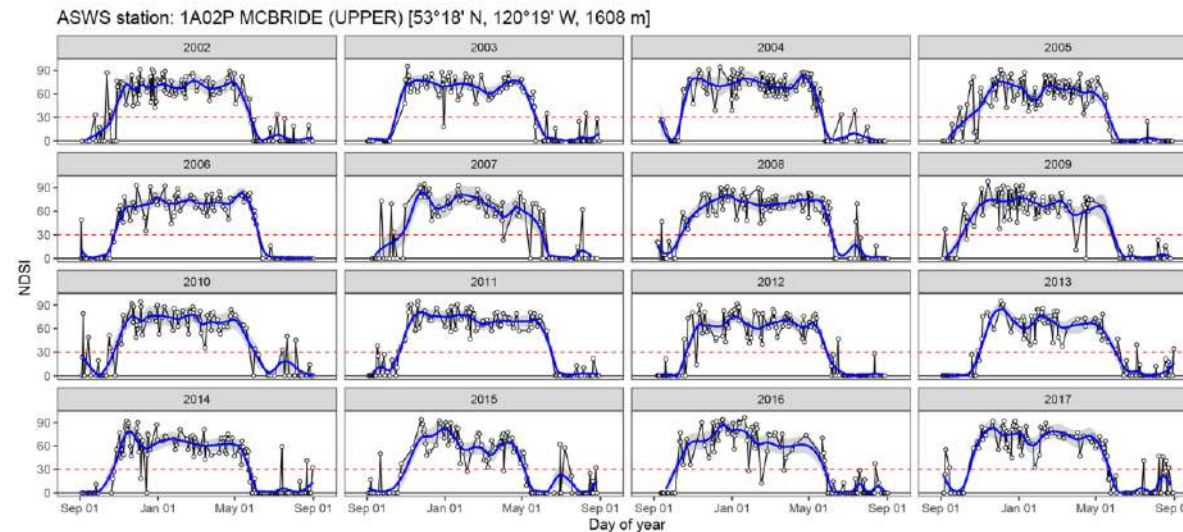
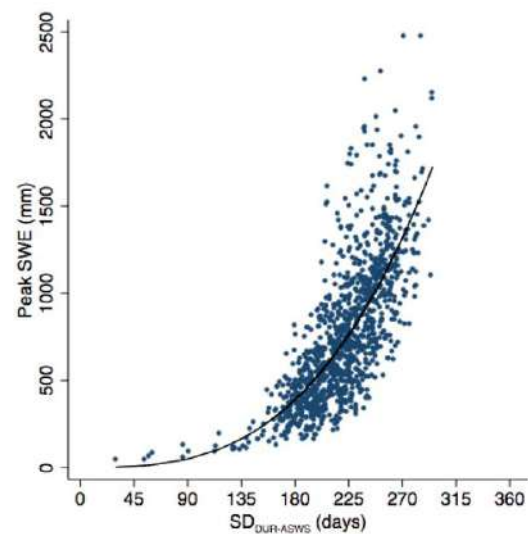
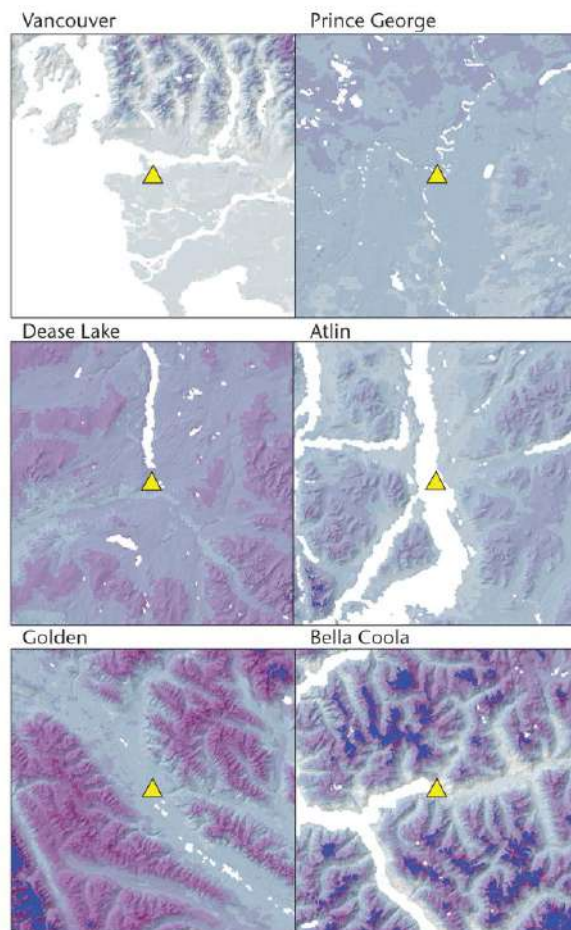


Essential

Copying and Pasting
from Stack Overflow

Regional influence of ocean–atmosphere teleconnections on the timing and duration of MODIS-derived snow cover in British Columbia, Canada

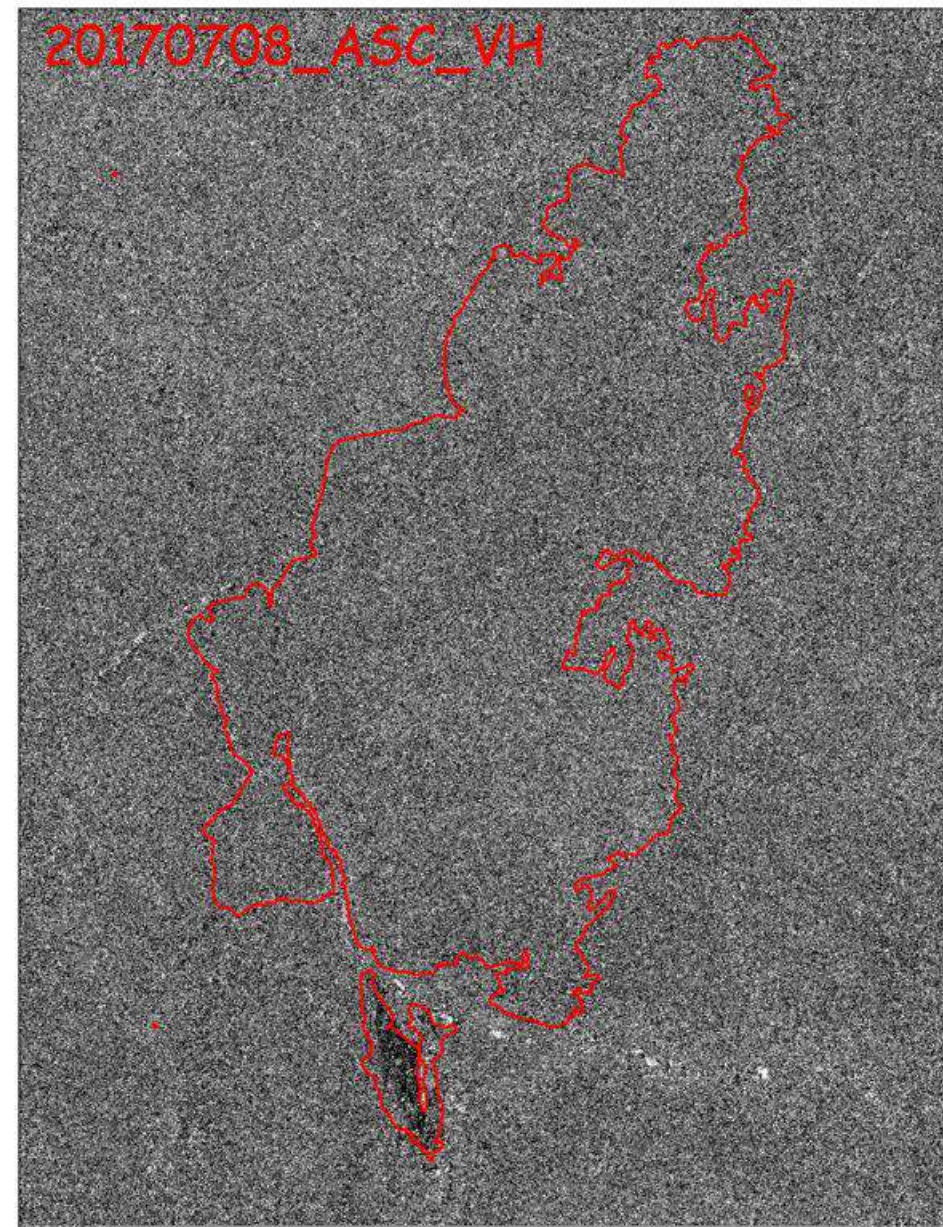
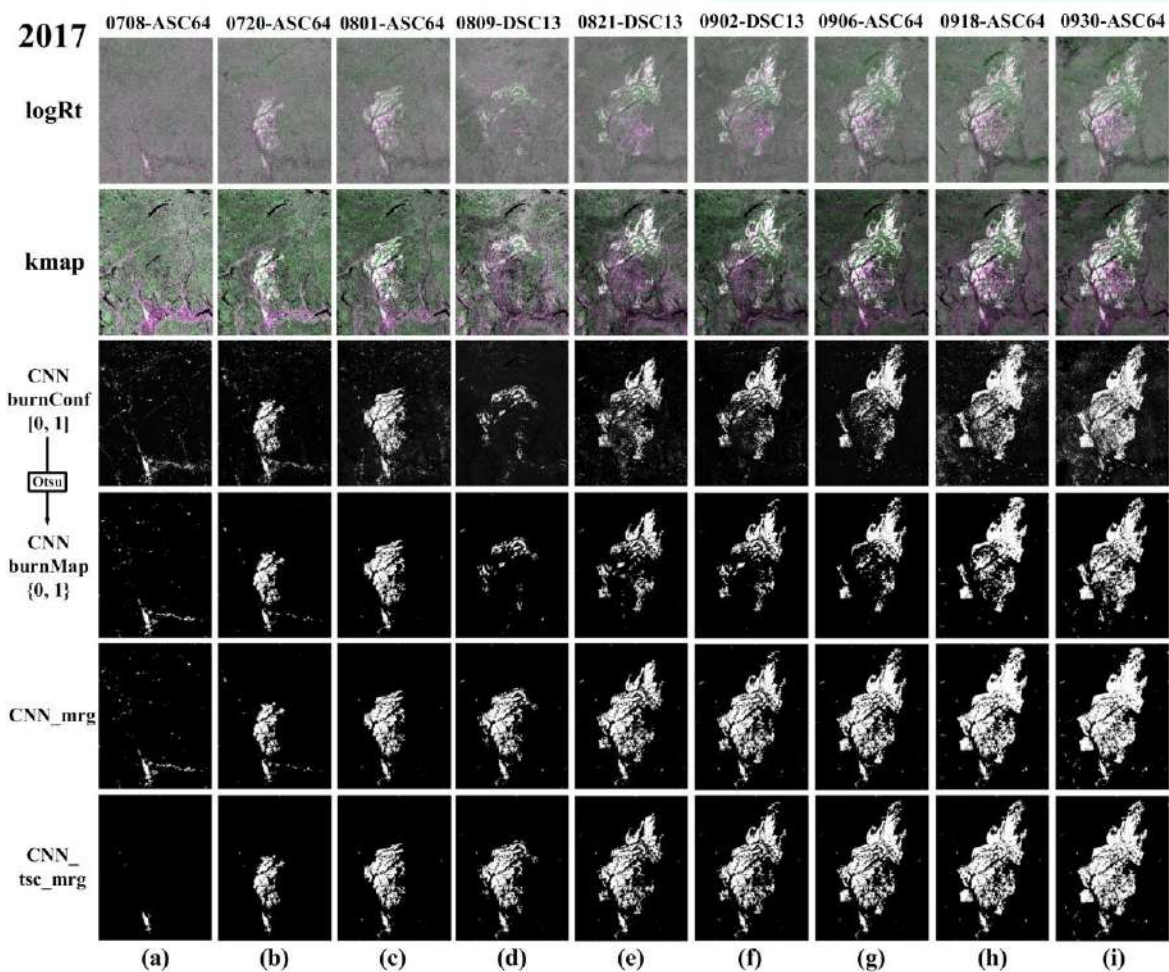
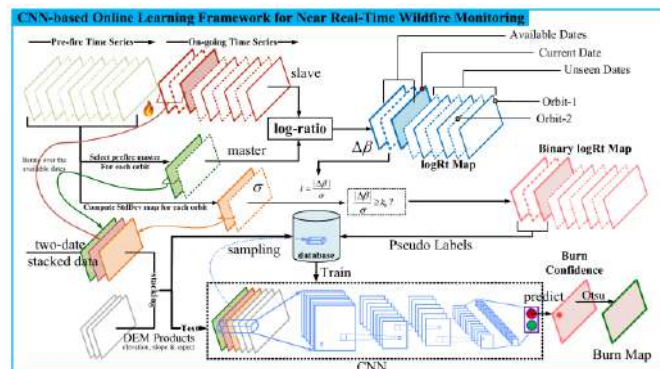
Alexandre R. Bevington^{1,2}, Hunter E. Gleason¹, Vanessa N. Foord¹, William C. Floyd^{3,4}, and Hardy P. Griesbauer¹



OPEN

Near Real-Time Wildfire Progression Monitoring with Sentinel-1 SAR Time Series and Deep Learning

Yifang Ban^{1,4*}, Puzhao Zhang^{1,4*}, Andrea Nascetti², Alexandre R. Bevington³ & Michael A. Wulder¹



Wildfire Monitor

This app allows you to monitor wildfire progressions with MODIS, VIIRS, Landsat-8, Sentinel-2, and Sentinel-1 collection.

1) Select filters

Region of Interest (not too large)

☐ Rectangle ☒ Polygon

Start date
2021-06-20

End date
2021-09-01

Max Cloud Rate in ROI (%)
20

☐ Filter by Cloud Rate

☒ Filter by drawn ROI

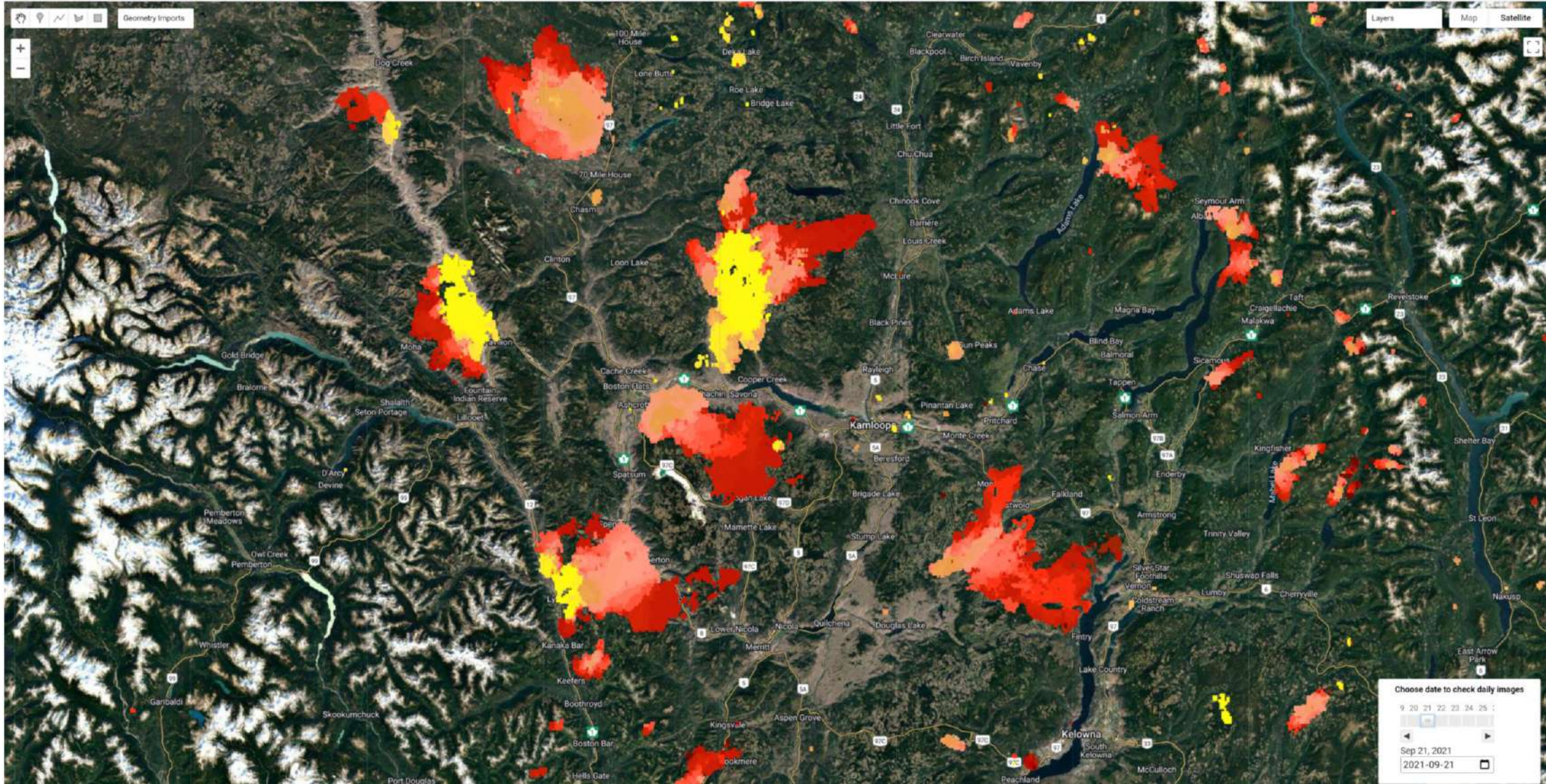
2) Select an image

3) Select a visualization

Select MSI for VIIRS, MODIS, L8, S2, and SAR for S1

Optical: False color (SWIR2/NIR/Red)

Burned areas are in red or dark red, and active fire in yellow, pink, or light red

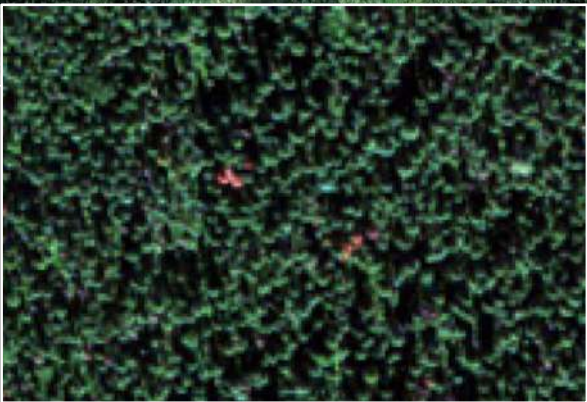


Choose date to check daily images

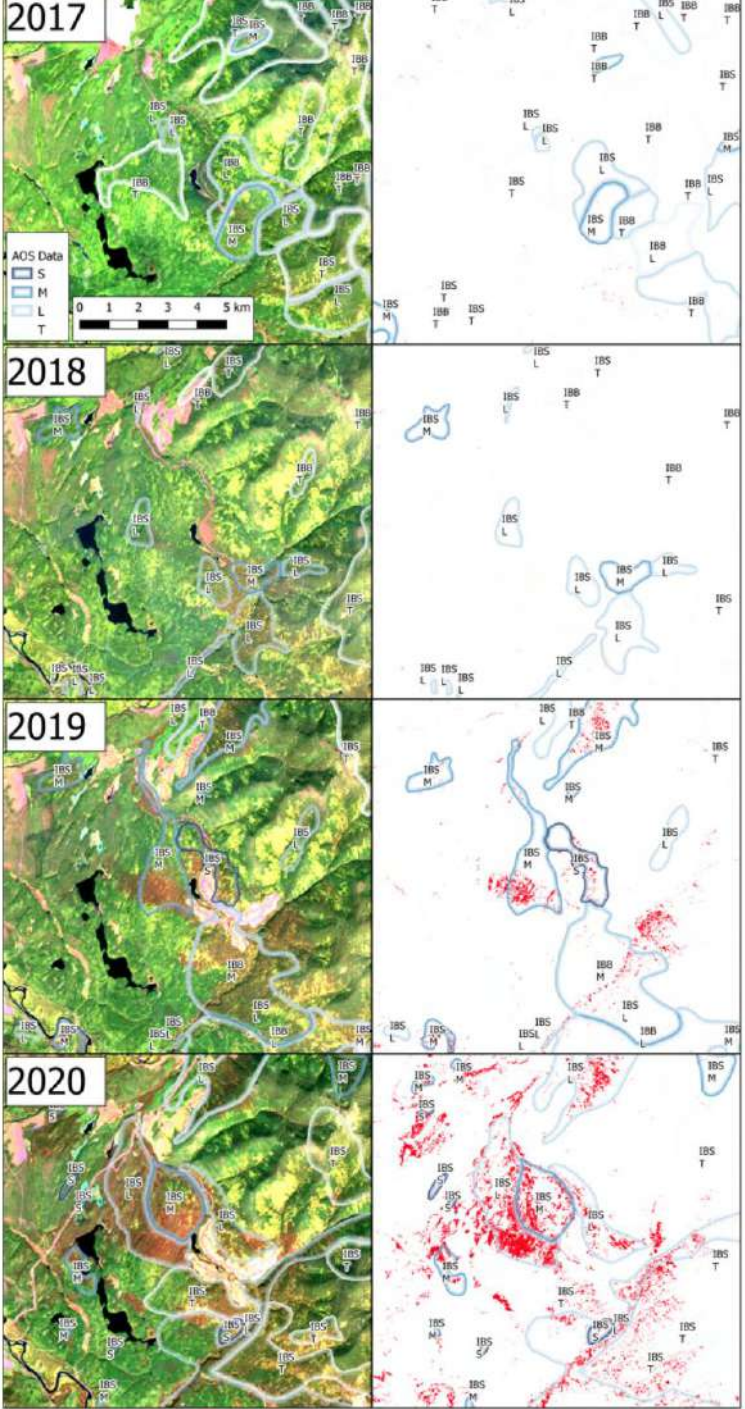
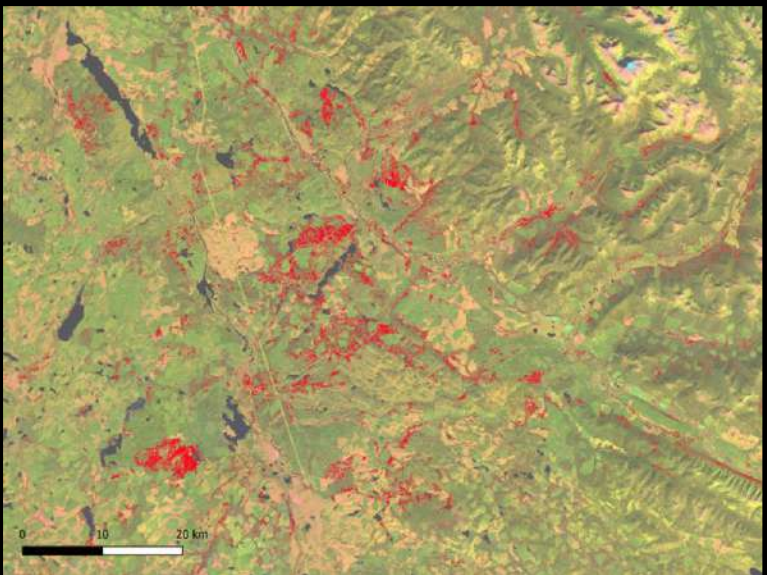
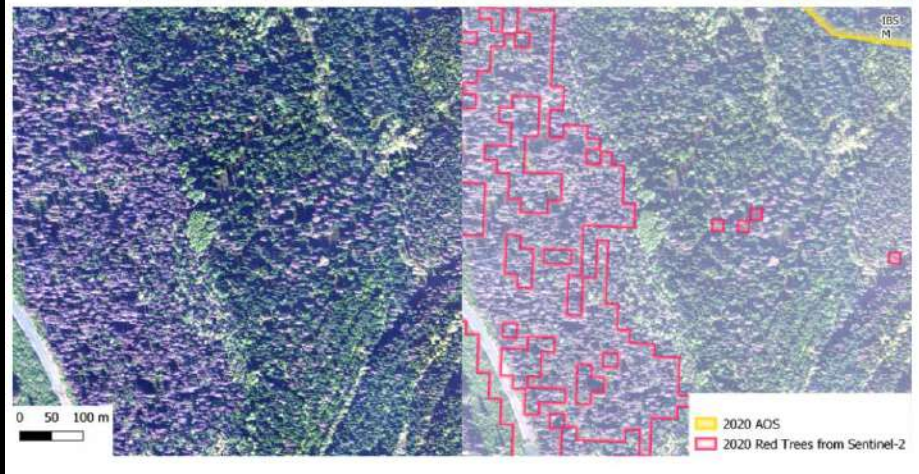
9 20 21 22 23 24 25

Sep 21, 2021

2021-09-21



WoldView-3 RGB 16AUG2018



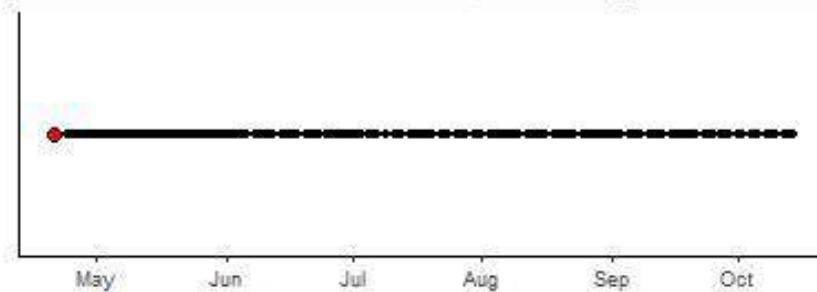
2016-08-18

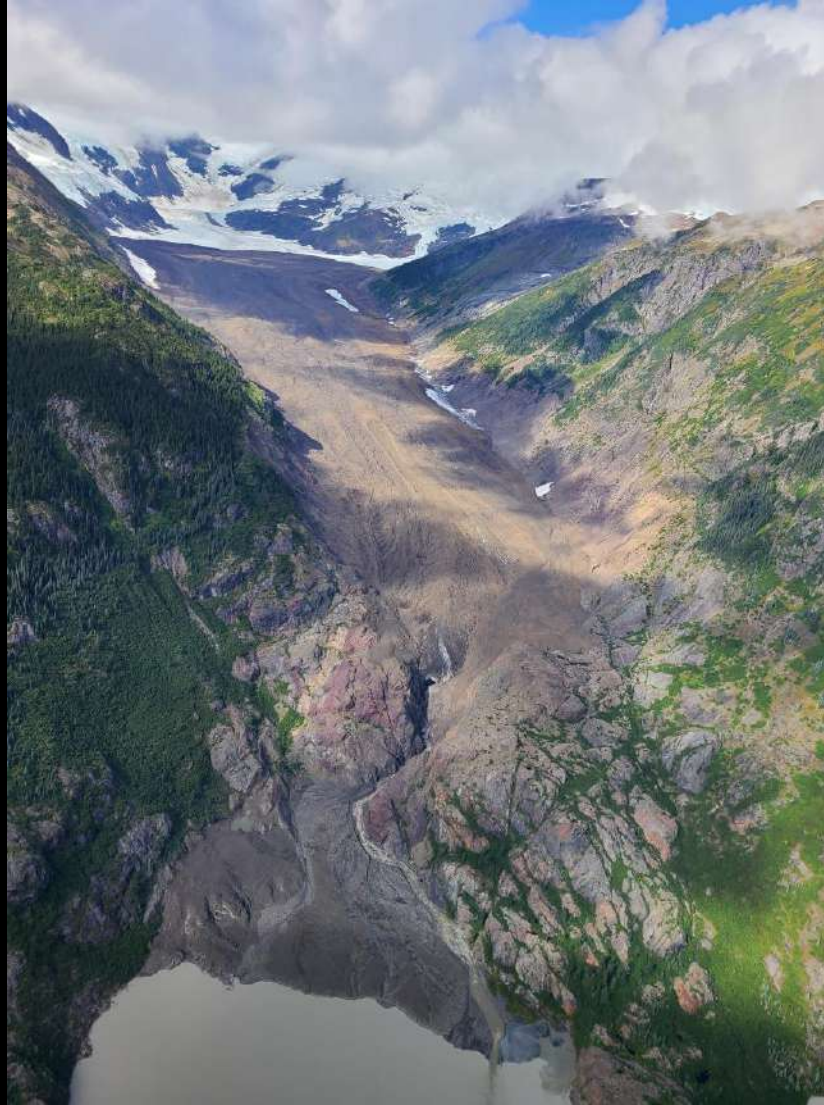


2020-04-21 12:10:50



04-21-2020 12:10 PM 12°C SPYPOINT FORCE-20





THE TYEE

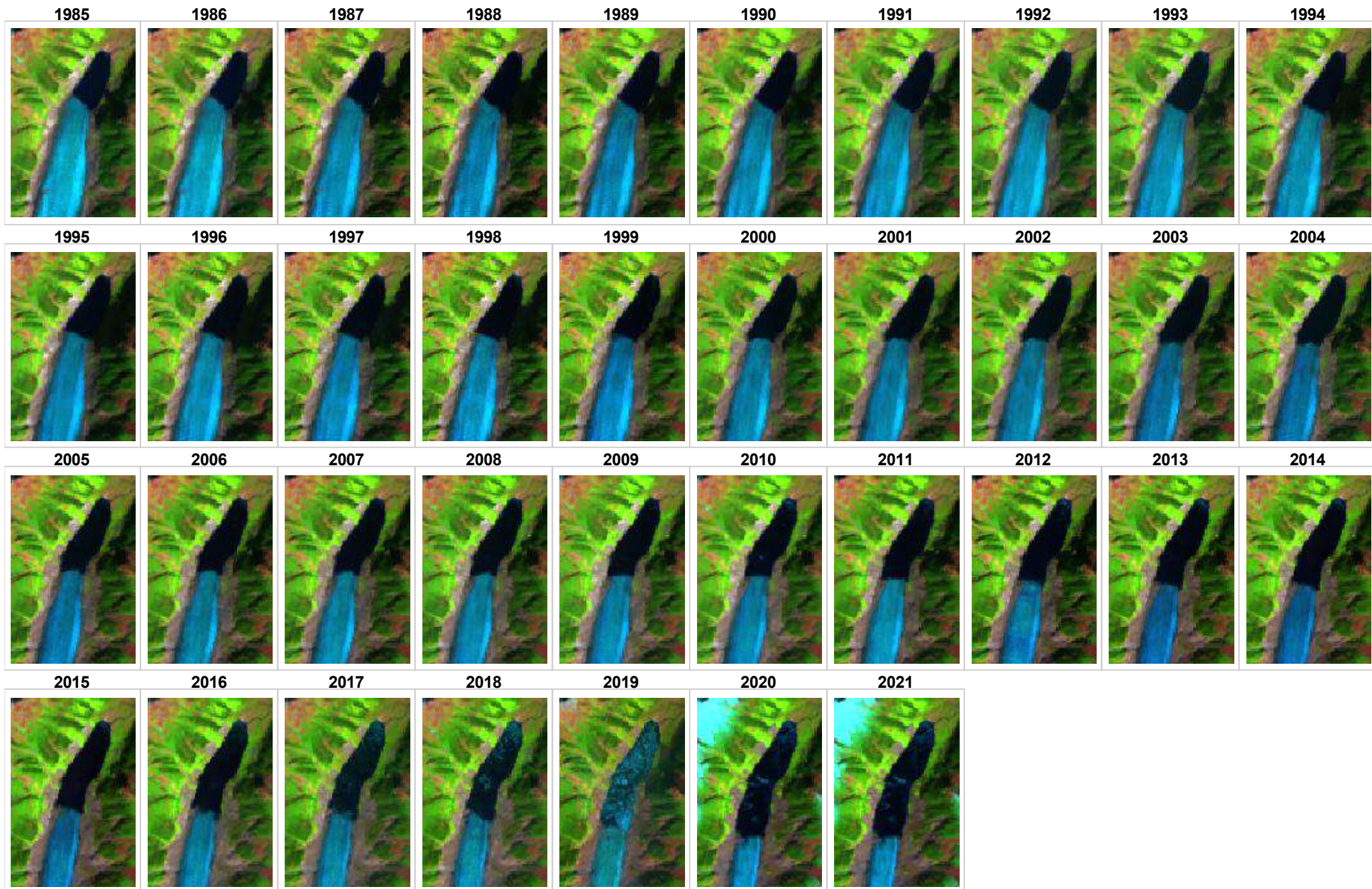
[NEWS](#) [ANALYSIS](#) [CULTURE](#) [SOLUTIONS](#) [MORE ▾](#) [SUPPORT US](#) [SEARCH 🔍](#)

NEWS [Energy](#) [Local Economy](#) [BC Politics](#) [Environment](#)

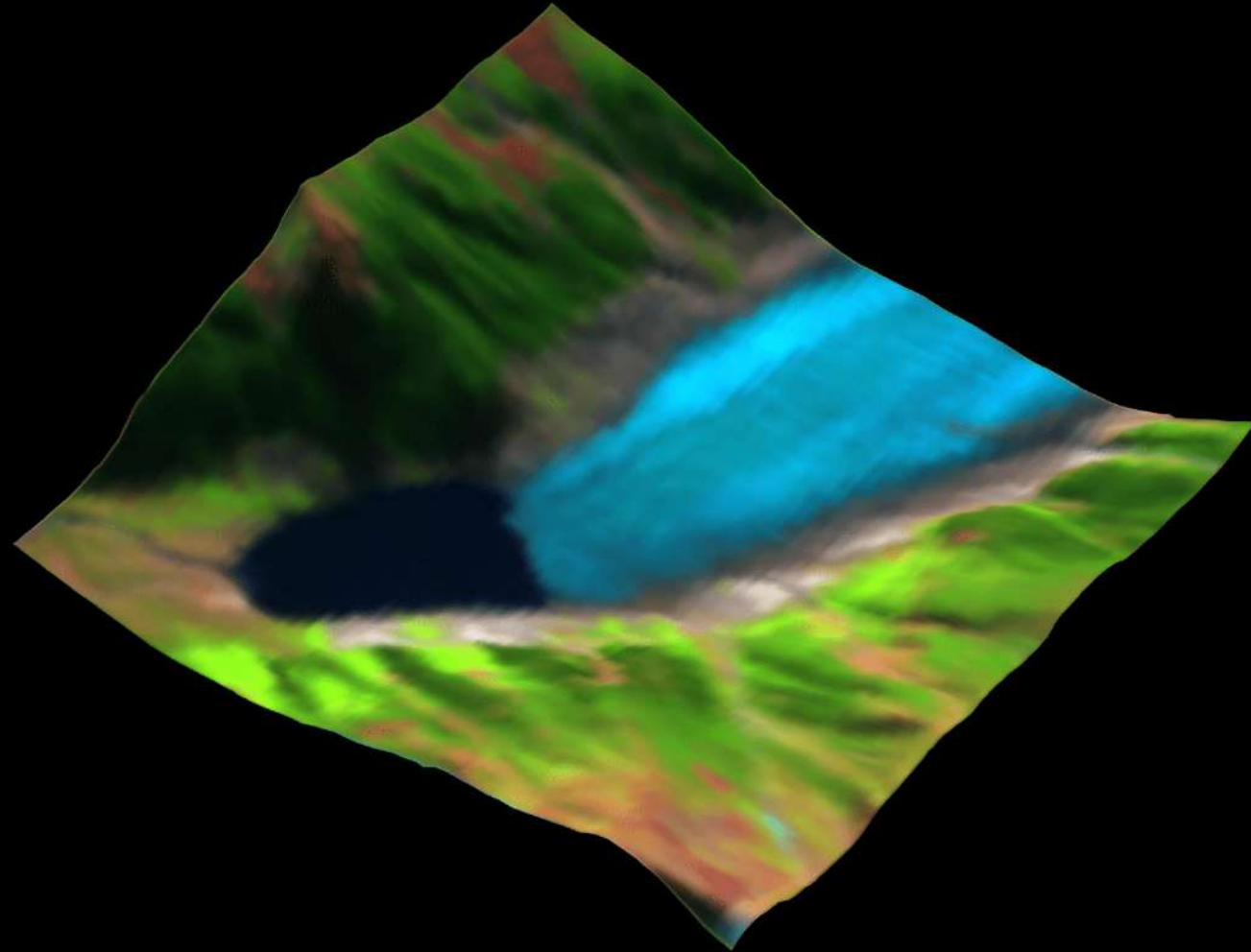
A Massive Landslide Sends a Wake-Up to BC's Mining Sector

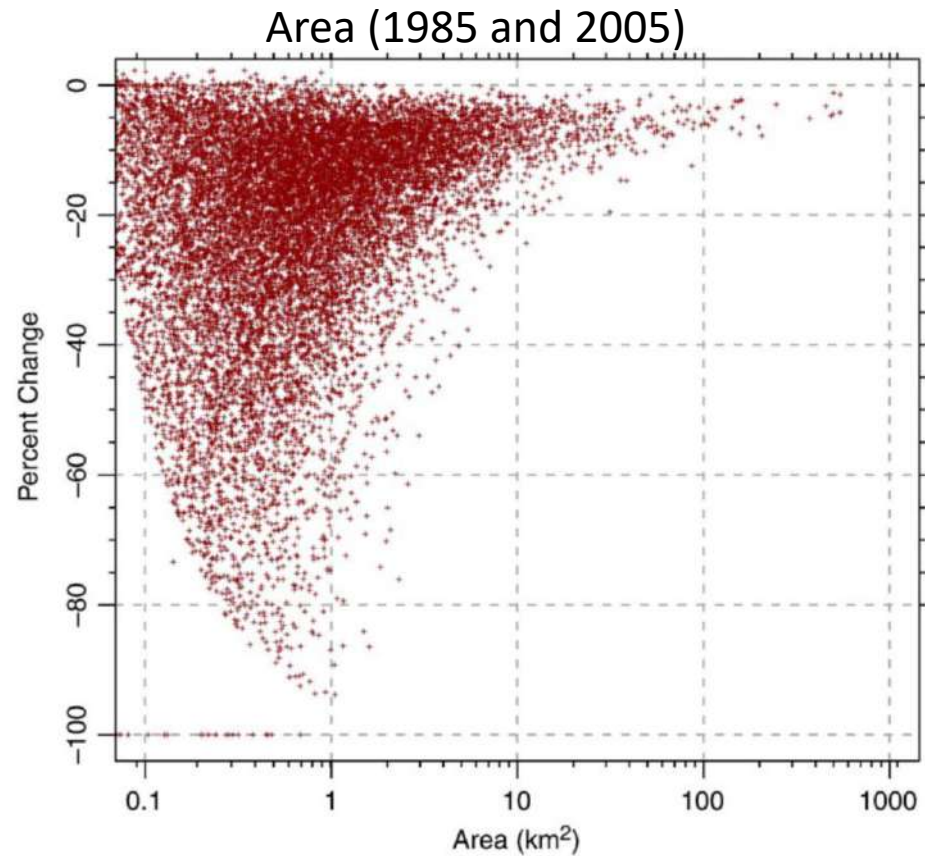
Melting glaciers in the 'Golden Triangle' expose new deposits. And pose huge risks.



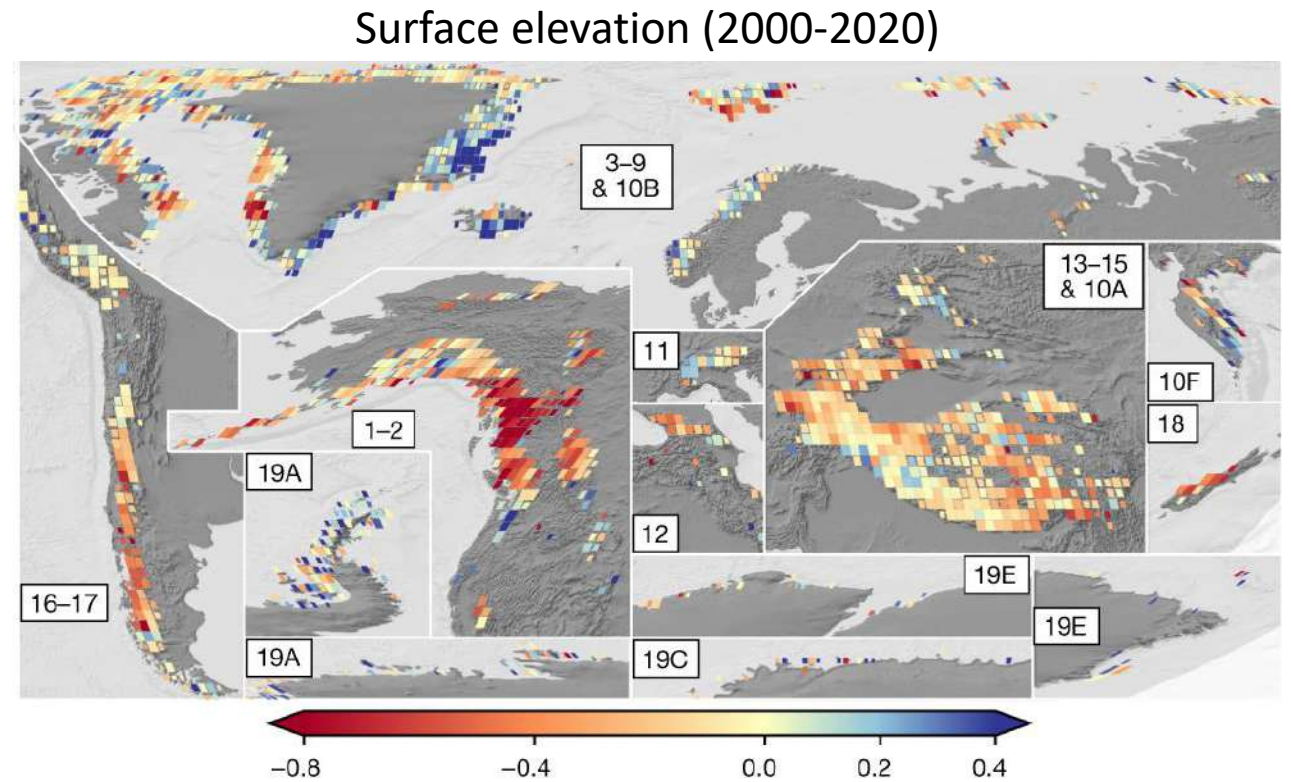


1986





Glacier area change from 1985 to 2005. Smaller glaciers see the greatest percent change. Total of -3056 ± 990 km² (-153 ± 41 km² yr⁻¹) (Bolch et al. 2010)



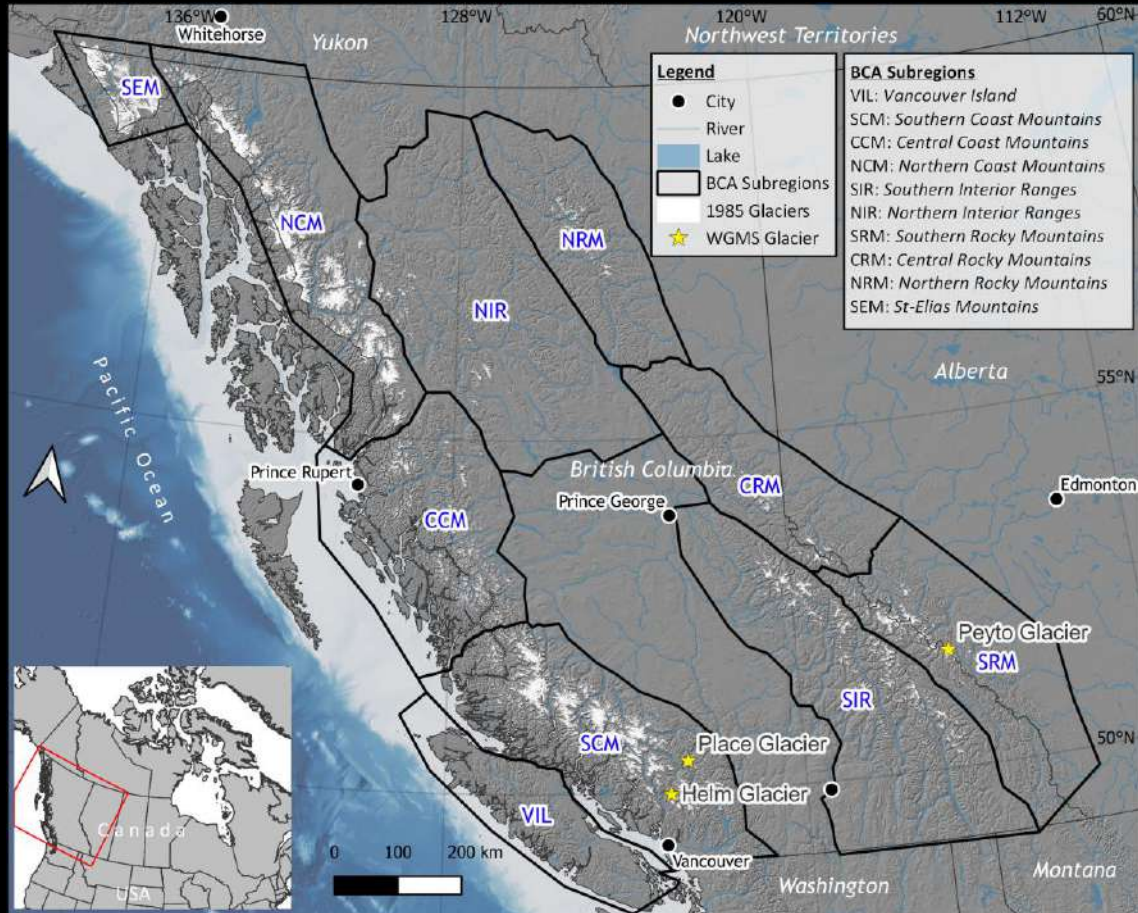
2000-2020 decadal difference in mean glacier surface elevation (m yr⁻¹) (Hugonnet et al. 2021)



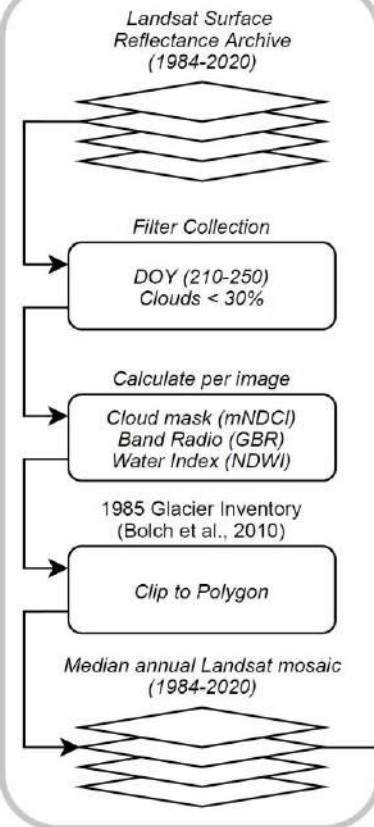
The motivation of our study is to:

- a) map glaciers automatically;
- b) update Bolch et al. (2010)
- c) assess drivers of glacier shrinkage

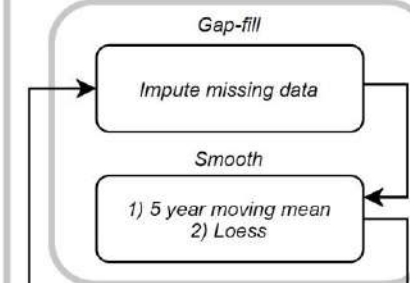
Brucejack



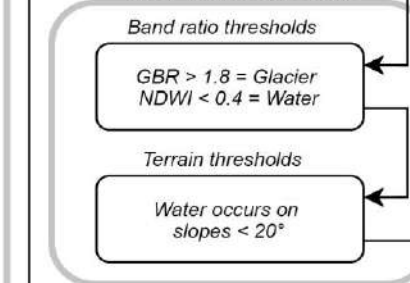
4.1: Annual mosaics



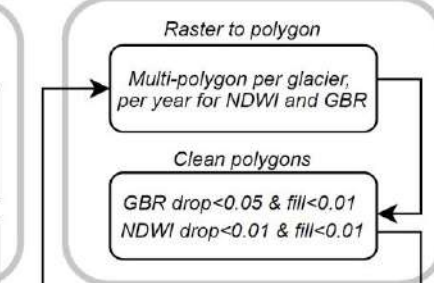
4.2: Gap-fill and smooth



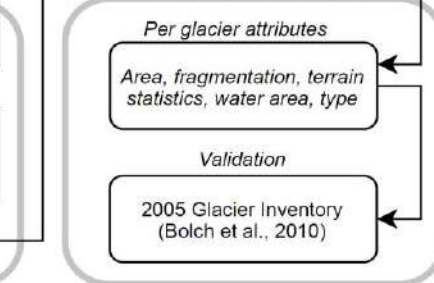
4.3: Thresholds



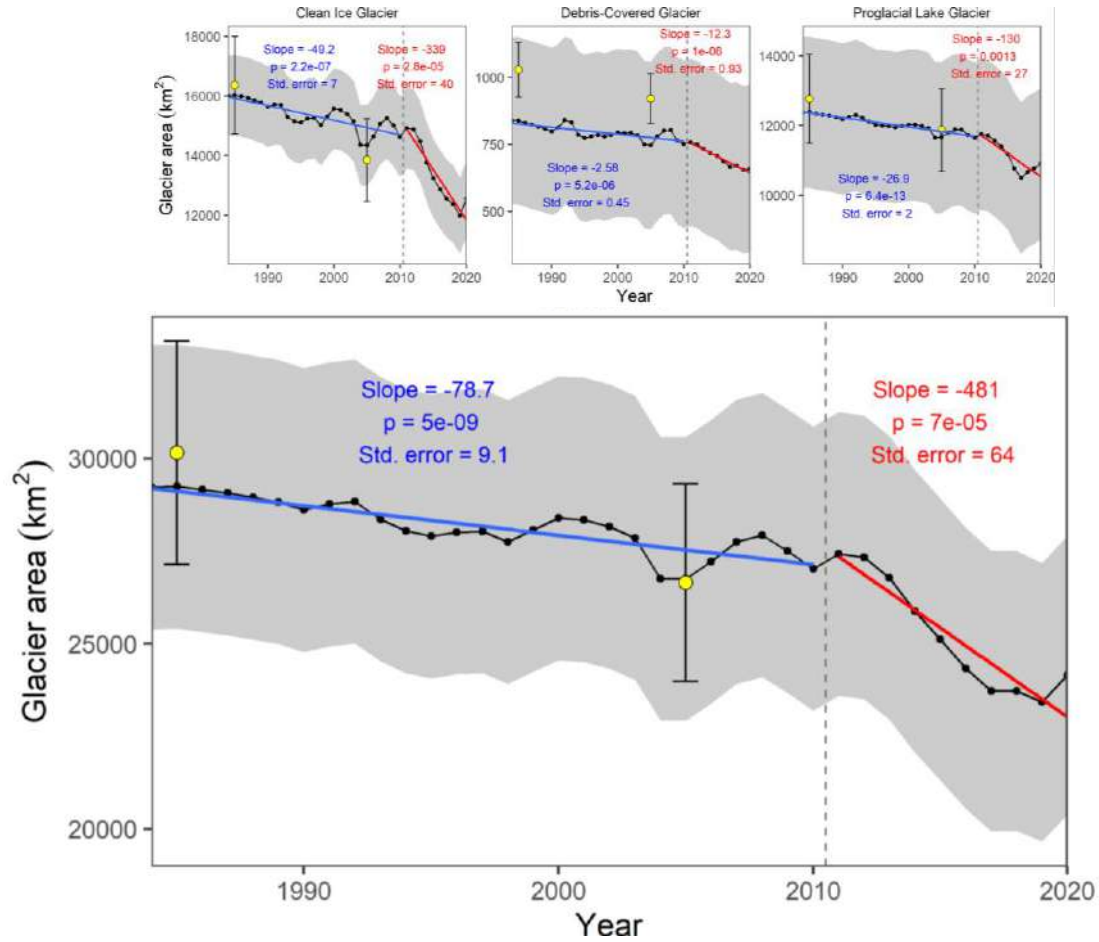
4.4: Clean and filter



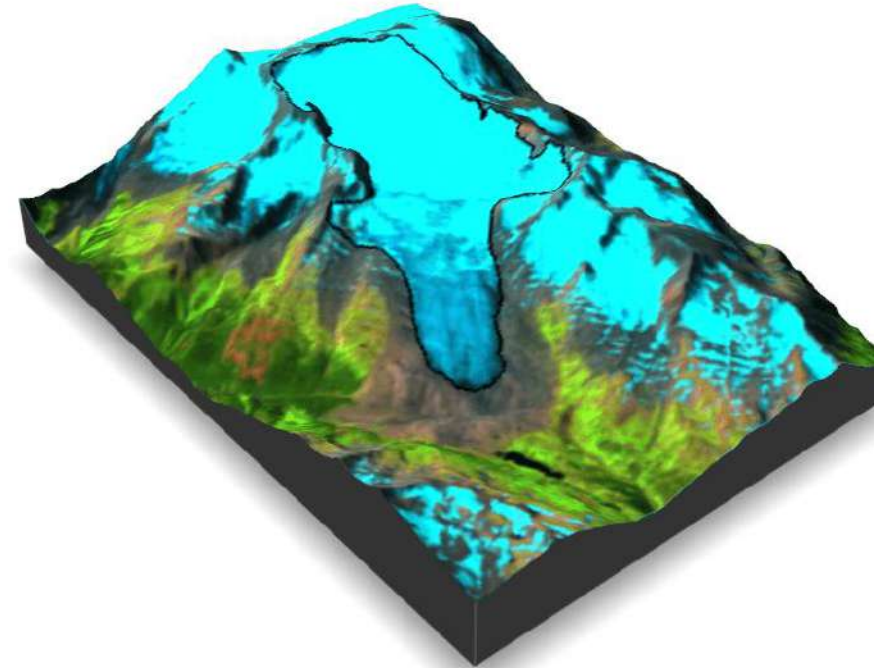
4.5: Attributes



Every glaciers in BC and Alberta is retreating
That retreat is accelerating (~7x)



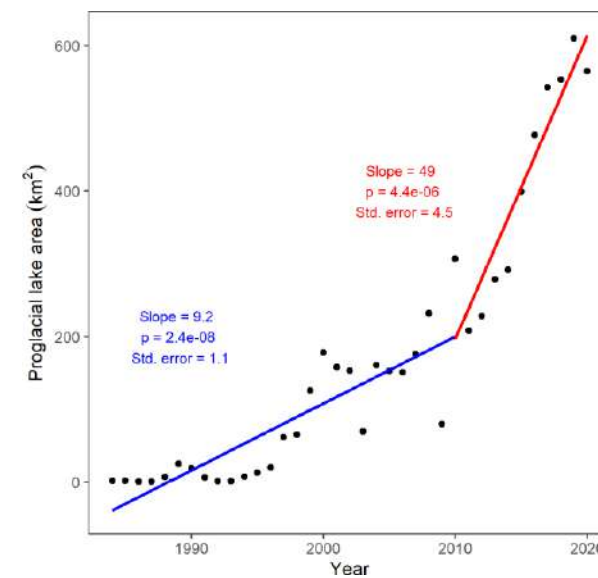
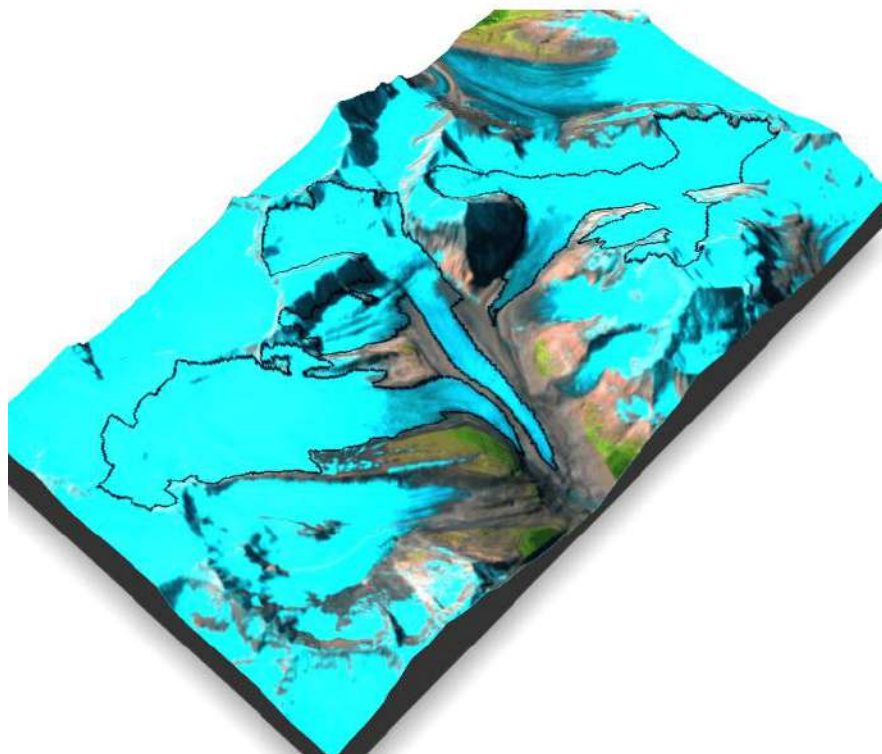
1985

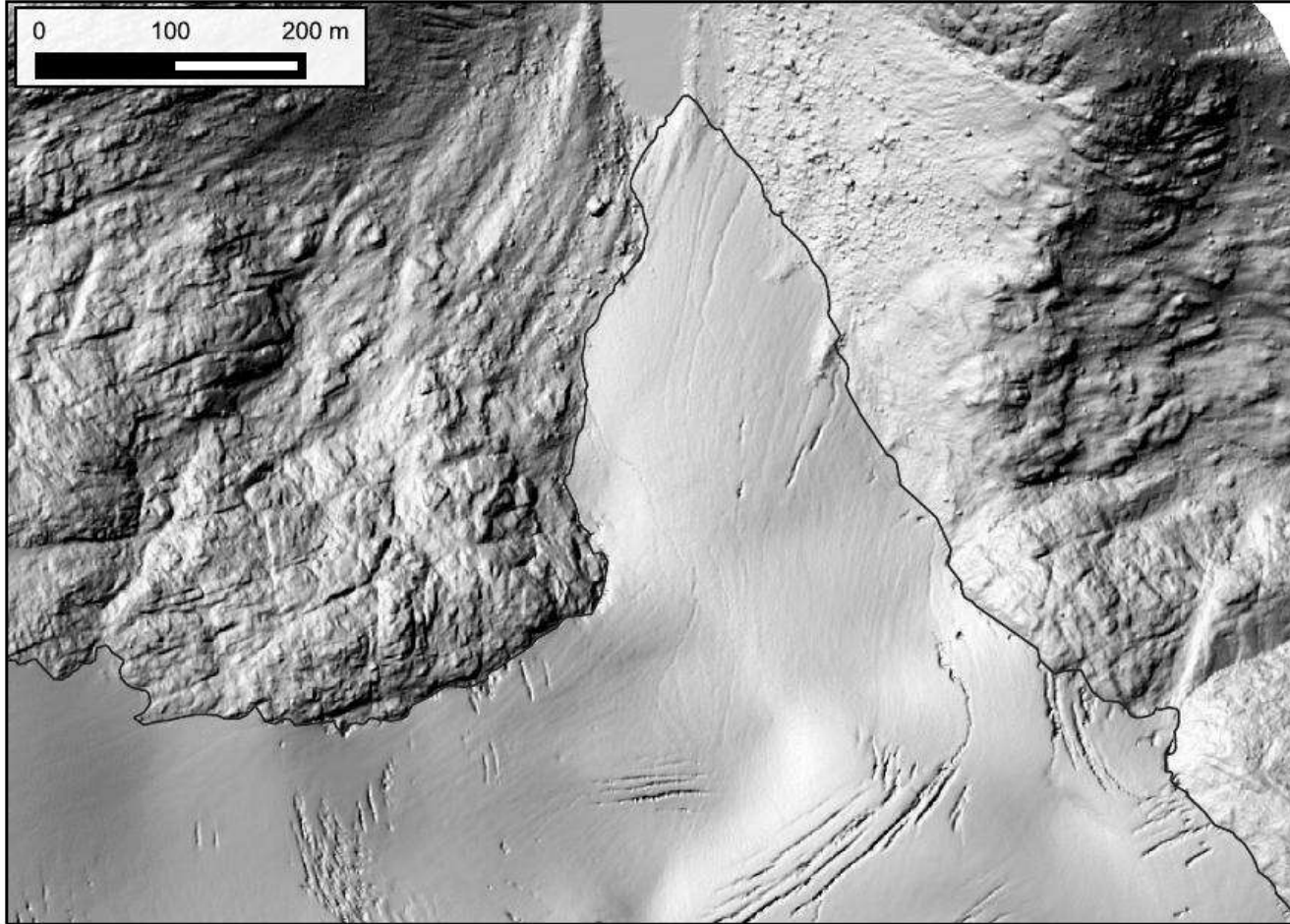


Proglacial lakes are growing 49 km² per year



1985

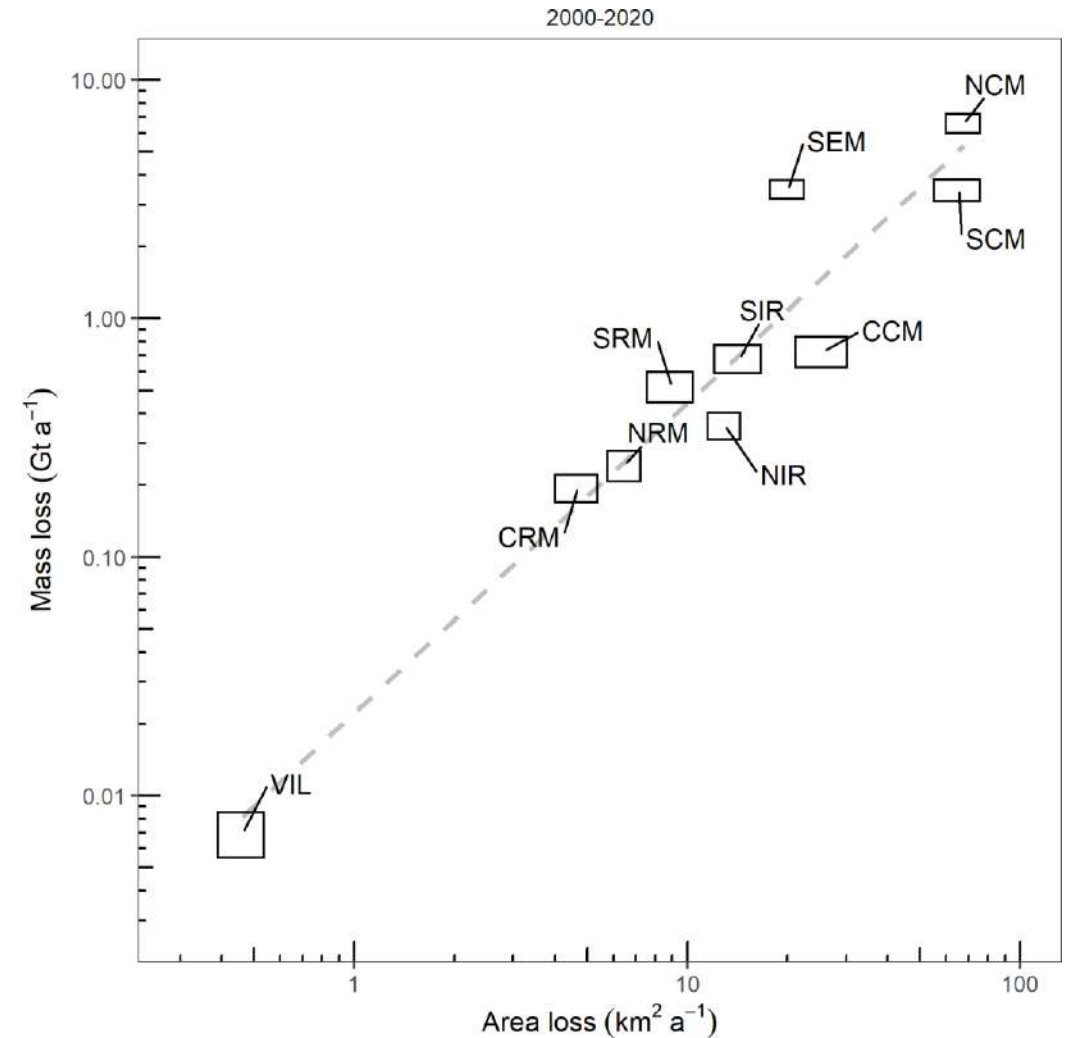


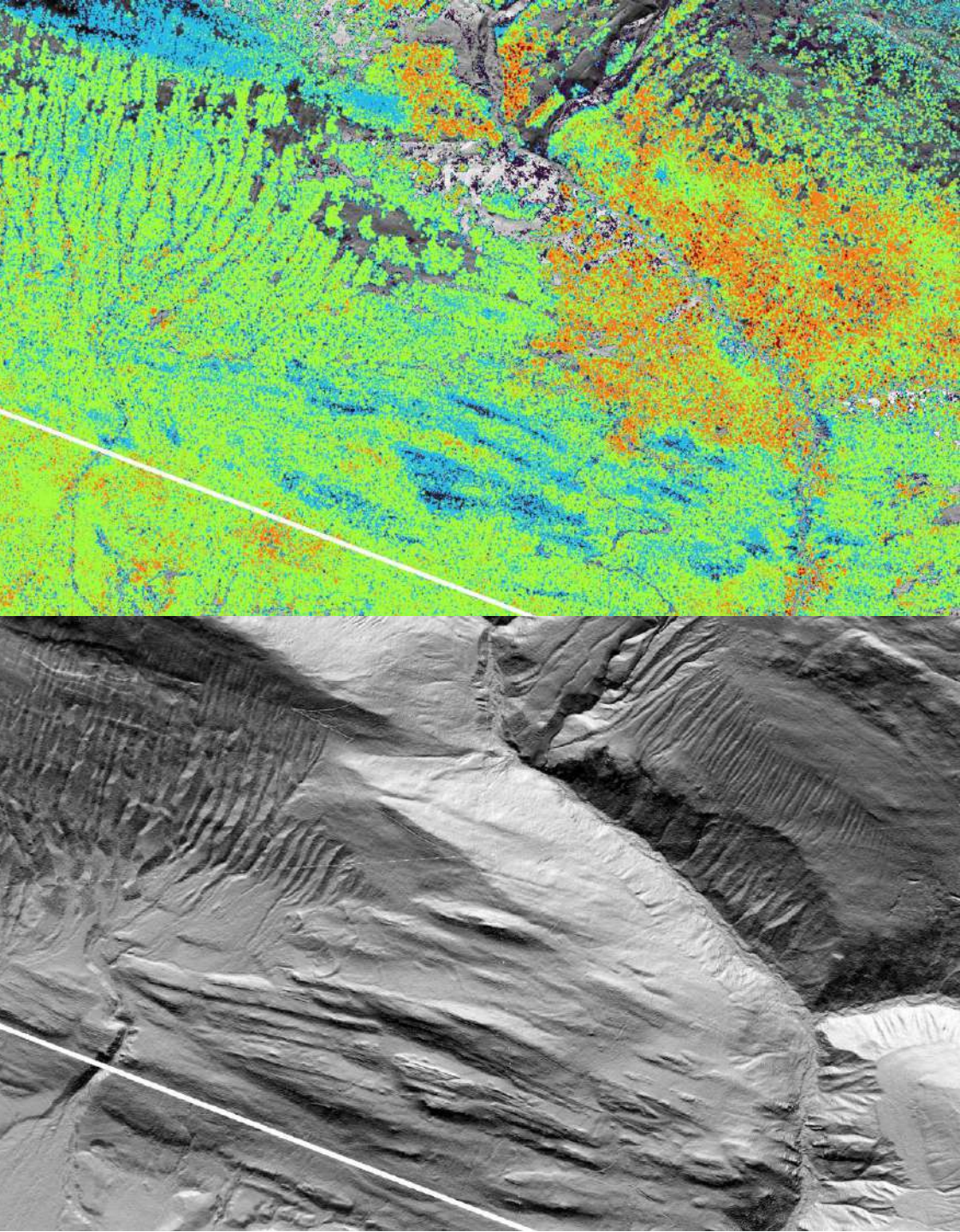


Kokanee Glacier terminus from 2015 to 2021. 140 meters of retreat for 23 m/yr. Data in the GIF are from Hakai Institute and Brian Menounos of UNBC ACO glacier surveys.

<https://blogs.agu.org/fromaglaciersperspective/2021/09/28/kokanee-glacier-2021-slash-and-burn/>

**Glacier area can be measured every year,
Agrees well with mass change which cannot
be measured every year**





LidarBC - Open LiDAR Data Portal

Home

Discovery and Download



Search Map Tile or Place



200km
-126.923 57.241 Degrees

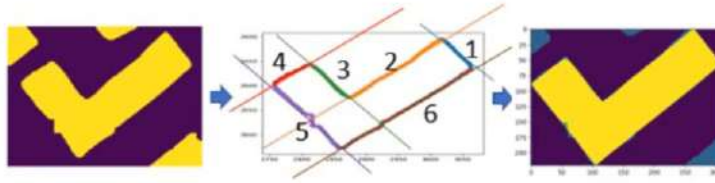




First Stage - Semantic Segmentation

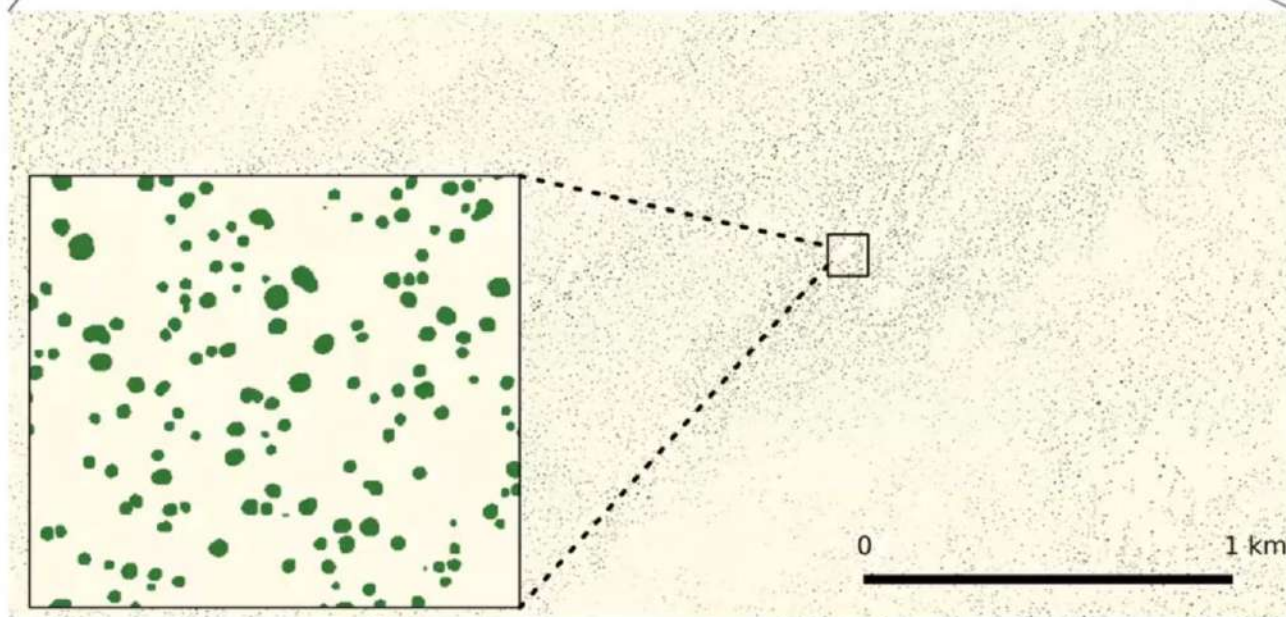


Second stage - Polygonization



Province/Territory	Number of Buildings
Alberta	1,777,439
British Columbia	1,359,628
Manitoba	632,982
New Brunswick	350,989
Newfoundland and Labrador	255,568
Northwest Territories	13,161
Nova Scotia	402,358
Nunavut	2,875
Ontario	3,781,847
Prince Edward Island	76,590
Quebec	2,495,801
Saskatchewan	681,553
Yukon	11,395





Article | Published: 14 October 2020

An unexpectedly large count of trees in the West African Sahara and Sahel

Martin Brandt , Compton J. Tucker , Ankit Kariryaa, Kjeld Rasmussen, Christin Abel, Jennifer Small, Jerome Chave, Laura Vang Rasmussen, Pierre Hiernaux, Abdoul Aziz Diouf, Laurent Kerqat, Ole Mertz, Christian Igel, Fabian Gieseke, Johannes Schöning, Sizhuo Li, Katherine Melocik, Jesse Meyer, Scott Sinno, Eric Romero, Erin Glennie, Amandine Montagu, Morgane Dendoncker & Rasmus Fensholt

Nature **587**, 78–82 (2020) | [Cite this article](#)

18k Accesses | **62** Citations | **921** Altmetric | [Metrics](#)

Abstract

A large proportion of dryland trees and shrubs (hereafter referred to collectively as trees) grow in isolation, without canopy closure. These non-forest trees have a crucial role in biodiversity, and provide ecosystem services such as carbon storage, food resources and shelter for humans and animals^{1,2}. However, most public interest relating to trees is devoted to forests, and trees outside of forests are not well-documented³. Here we map the crown size of each tree more than 3 m² in size over a land area that spans 1.3 million km² in the West African Sahara, Sahel and sub-humid zone, using submetre-resolution satellite imagery and deep learning⁴. We detected over 1.8 billion individual trees (13.4 trees per hectare), with a median crown size of 12 m², along a rainfall gradient from 0 to 1,000 mm per year. The canopy cover increases from 0.1% (0.7 trees per hectare) in hyper-arid areas, through 1.6% (9.9 trees per hectare) in arid and 5.6% (30.1 trees per hectare) in semi-arid zones, to 13.3% (47 trees per hectare) in sub-humid areas. Although the overall canopy cover is low, the relatively high density of isolated trees challenges prevailing narratives about dryland desertification^{5,6,7}, and even the desert shows a surprisingly high tree density. Our assessment suggests a way to monitor trees outside of forests globally, and to explore their role in mitigating degradation, climate change and poverty.



The Future of Remote Sensing

- More, faster, better
- Useful, helpful, good
- Incredibly fast-moving field
- Register for **GEOG 457!!** and learn how to do all this cool stuff!!



pucallpa is located along the
ucalayi river in peru

what would you say is the
greatest change in this time lapse
from the 80s to today?