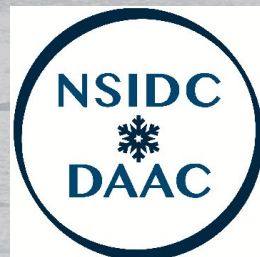


# GLIMS: Global Land Ice Measurements from Space

GLIMS Core Team Meeting  
Introduction and Status  
for Virtual EGU, 2020-05-05  
Bruce Raup





# GLIMS Core Team



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# A Quarter Century of GLIMS History

2012: Randolph Glacier Inventory (RGI) created; complements GLIMS

GLIMS is the go-to place for glacier information world-wide

Early 2020: RGI snapshots generated from GLIMS

2005: Database goes live at NSIDC

Ingest of many regional inventories

1995: ASTER Science Team goal: Map glaciers with ASTER (tasking)

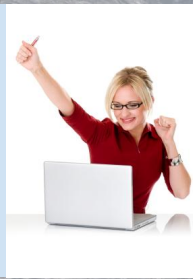
Formation of Regional Centers



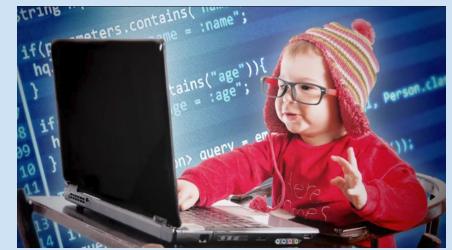
# GLIMS Structure

## GLIMS Data Users

- Science Community
- Students
- Media
- Commercial entities



Other Web app creators use GLIMS Web services



## GLIMS Activities With Entities Outside NSIDC

- GLIMS Regional Coordinators
- Influence on satellite observations
- Community-developed image processing algorithms



GLIMS Web Applications

Technology developed and maintained at NSIDC



GLIMS Mapserver



GLIMS Services

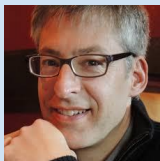


Data QC and Ingest

GLIMS Database



Guidance from:  
GLIMS Core Team



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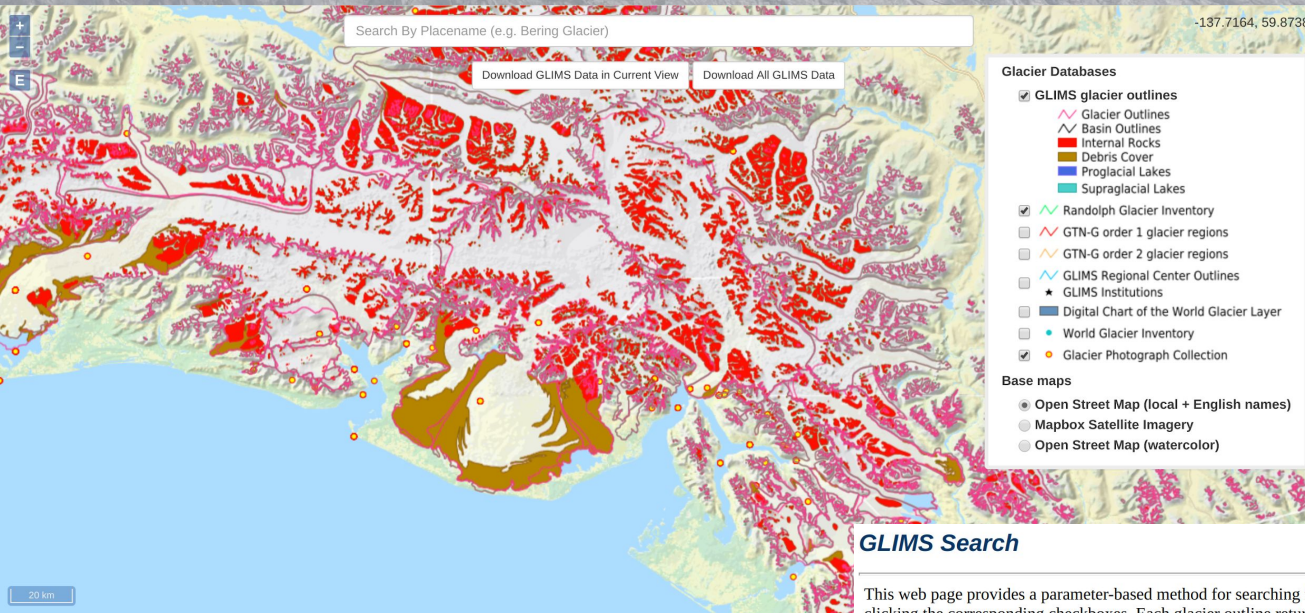
E. Berthier  
LEGOS,  
Toulouse, France

Further guidance from:  
Advisory Board for the Global Terrestrial Network for Glaciers (GTN-G): <https://www.gtn-g.ch/contact/>



# GLIMS data are available from the NSIDC DAAC

<http://glims.colorado.edu/glacierdata/>



The GLIMS Glacier Viewer (left) includes other glacier databases (e.g. Glacier Photo Collection) for reference

## GLIMS Search

This web page provides a parameter-based method for searching for data in the GLIMS Glacier Database. Indicate what fields you want to constrain by clicking the corresponding checkboxes. Each glacier outline returned in a result set can be viewed or downloaded individually, or the whole result set can be downloaded as a set. You have a choice of several download formats. Data under embargo cannot be downloaded.

### SEARCH PARAMETERS:

Glacier Name	<input type="text"/>	Glacier ID	<input type="text"/>
Country	<input type="text" value="Select..."/>		
Glacier Area	min: <input type="text"/> km <sup>2</sup> max: <input type="text"/> km <sup>2</sup>	Glacier Elev	min: <input type="text"/> m max: <input type="text"/> m
Glacier Length	min: <input type="text"/> m max: <input type="text"/> m	Glacier Width	min: <input type="text"/> m max: <input type="text"/> m
Analysis ID	<input type="text"/>	WGMS ID	<input type="text"/>
WGMS Classification	<input type="text" value="Select..."/>		
Regional Center	<input type="text" value="Select..."/>		
Name of Data Submitter	<input type="text"/>	Name of Analyst(s)	<input type="text"/>
<input type="button" value="Search"/>		<input type="button" value="Reset"/>	

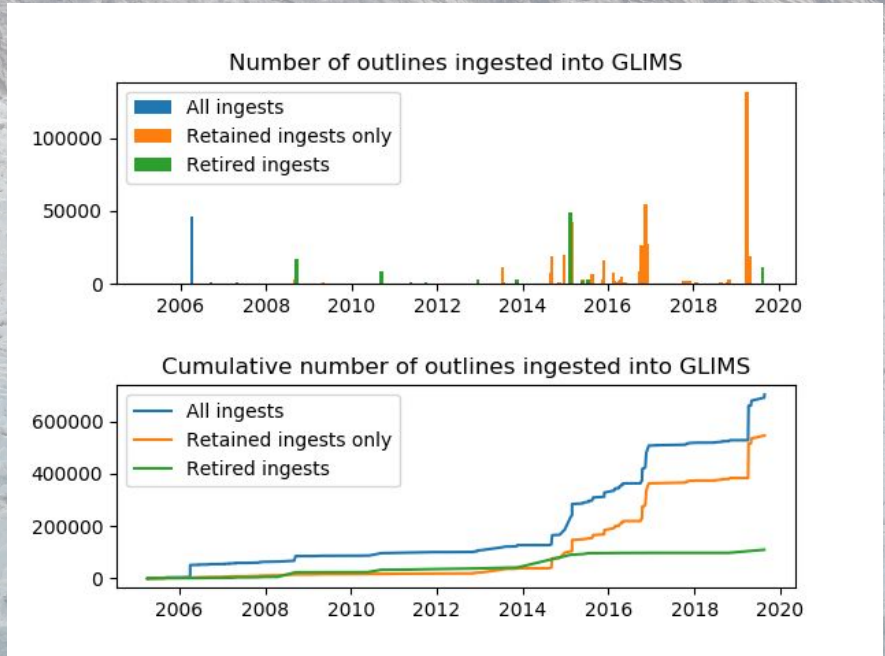
The parameter search interface (right) enables the user to search for glaciers by name, size, elevation, and other fields.



# GLIMS summary stats as of December, 2019

Number of glacier outlines total	546,300
Outlines ingest rate (last 4 years)	7529 / month, 90,348 / year
Unique web users (IP addresses) since 2019-01-01	64,538

## GLIMS Glacier Database Contents





# New Data Contributions

- Recently ingested: Argentine glaciers; West Greenland; southern Alaska; Eastern Siberia
- Recently received: Alaska; High Mountain Asia; new Chinese Glacier Inventory; Italy; Norway; Baffin Island

Ingests have been on hold in order to finish up RGI-on-demand feature.



# Upcoming Website Changes

- EarthData Login
  - Login will be required for data download (we'll make it as unobtrusive as possible)
- Integration of glims.org into nsidc.org site
  - URL glims.org will be retained





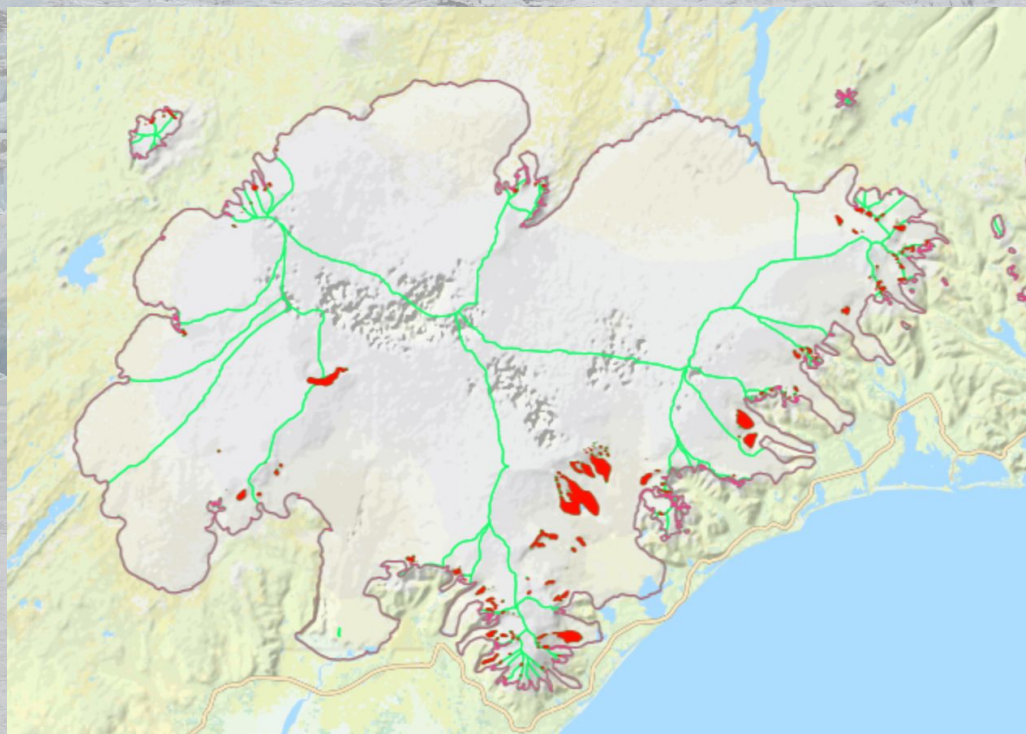
RGI-On-Demand





# RGI-On-Demand (Arbitrary GLIMS Snapshots)

- Allows a user to download GLIMS data as close as possible to an arbitrary date
- Data structures have been added to the GLIMS Glacier Database that group all outlines into those covering the same body of ice
- Each group is divided into separate “states”, each with a representative date
- The user interface extracts the state for each group that is closest to the input date

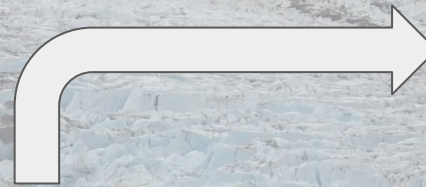




# Methods

## Outline group for one ice body

- With these structures in place, users can extract a glacier map that uses the layers (or states) from each group that are closest in time to the user-supplied date.



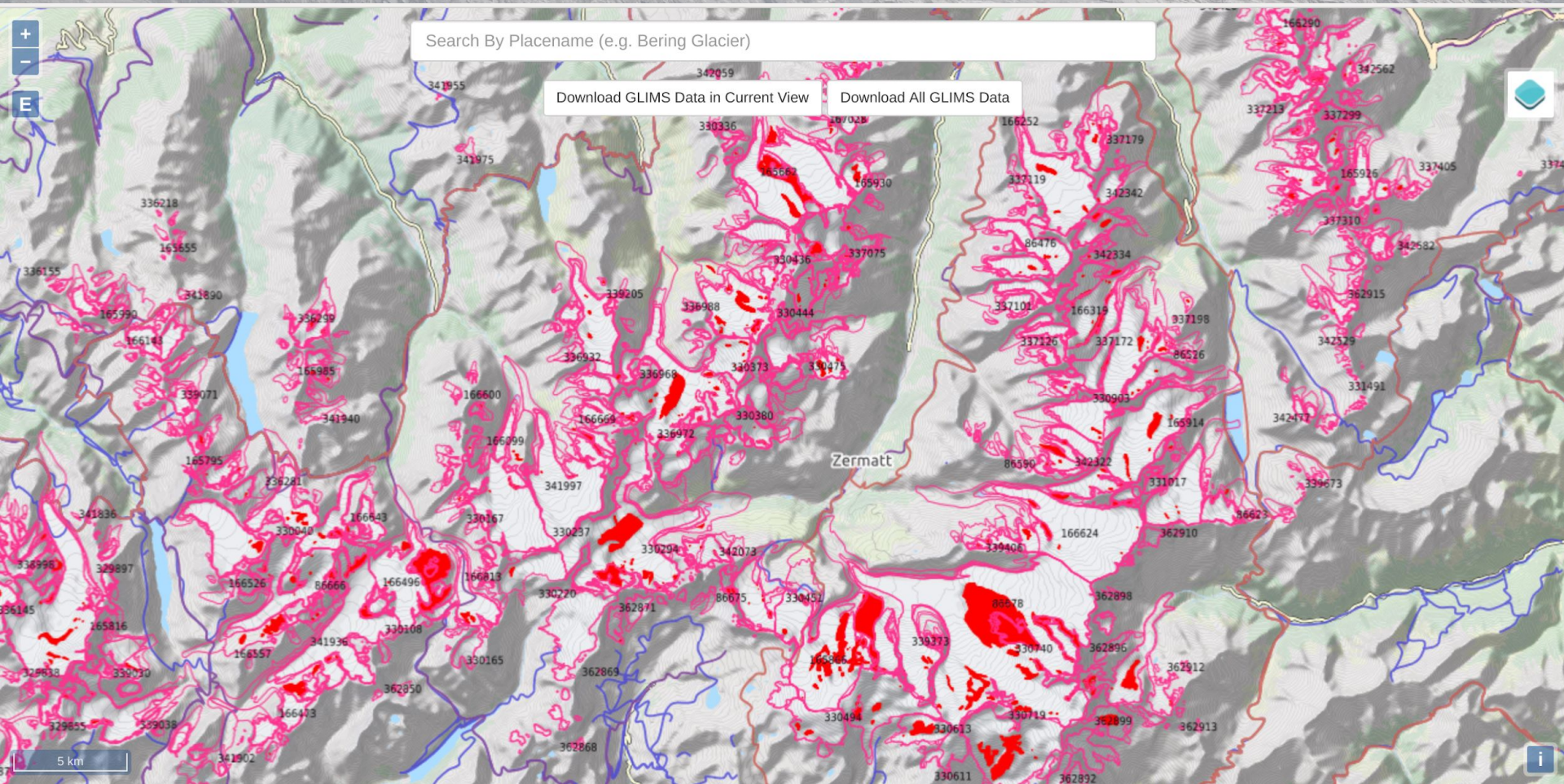
Example: User wants 2000 map

1995 outline is used for this group (closest in time)





# Example 1 (the good): Findelengletscher





# Query results: Six dates represented

## Map Selection Details

### GLIMS Glacier Outlines

Download these GLIMS Glacier Outlines

Glacier Name	Glacier ID	Analysis ID	Area, km <sup>2</sup>	As-of Date	Source	More Info
Findelengletscher	G007880E45990N	337161	21.86	1850-09-01	University of Zurich-Irchel	<a href="#">More...</a>
Findelengletscher	G007880E45990N	342320	18.61	1973-09-01	University of Zurich-Irchel	<a href="#">More...</a>
Findelengletscher	G007880E45990N	86640	13.34	1998-08-31	University of Zurich-Irchel	<a href="#">More...</a>
Findelengletscher	G007880E45990N	330861	14.31	2003-08-06	University of Zurich-Irchel	<a href="#">More...</a>
Findelengletscher	G007880E45990N	339494	13.71	2008-09-30	University of Fribourg	<a href="#">More...</a>
Findelengletscher	G007880E45990N	166624	14.19	2009-09-15	University of Fribourg	<a href="#">More...</a>



# Download latest RGI-like snapshot

Because the GLIMS Database is very extensive, a pre-defined set of attributes has been created to accompany the data. Not all fields are populated for all glaciers.

The downloaded data set consists primarily of polygons. For each glacier analysis there is a polygon that represents the glacier boundary and (where they are present) there are polygons representing the locations of internal rocks that are contained within the boundaries of the glacier. The internal rock polygons are attributed as 'intrnl\_rock' in the line\_type attribute field.

## Citing GLIMS Data:

- Citation guidance is included in the README text file that will accompany your downloaded dataset. This information includes data-specific citations grouped by the downloaded data's analysis\_ids.
- Before you download GLIMS data, please read the NSIDC [citation requirements](#).

### Please select the file format and archive type for your data:

File format:

ESRI Shapefile

Archive file format:

Zip Format  Tar Format

### Please select the data model for your data:

GLIMS (multi-temporal) data

[Internal rock representation:](#)

Holes (RGI-like)  Separate polygons (GLIMS-like)

OR

Snapshot (RGI) data set for date (Warning: experimental):  (yyyy-mm-dd)

May 2020

Mo	Tu	We	Th	Fr	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Download Data

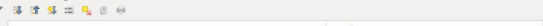




Layers Panel

- rgi\_map\_2020-05-05

Identify Results



Feature	Value
rgi_map_2020-05-05	
anal_id	166624
(Derived)	
(Actions)	
anal_id	166624
line_type	glac_bound
group_id	125804
state_id	5
src_time	2009-09-15 00:00:00
delta_days	3885

Mode Current layer  Auto open form

View Tree

Value Tool

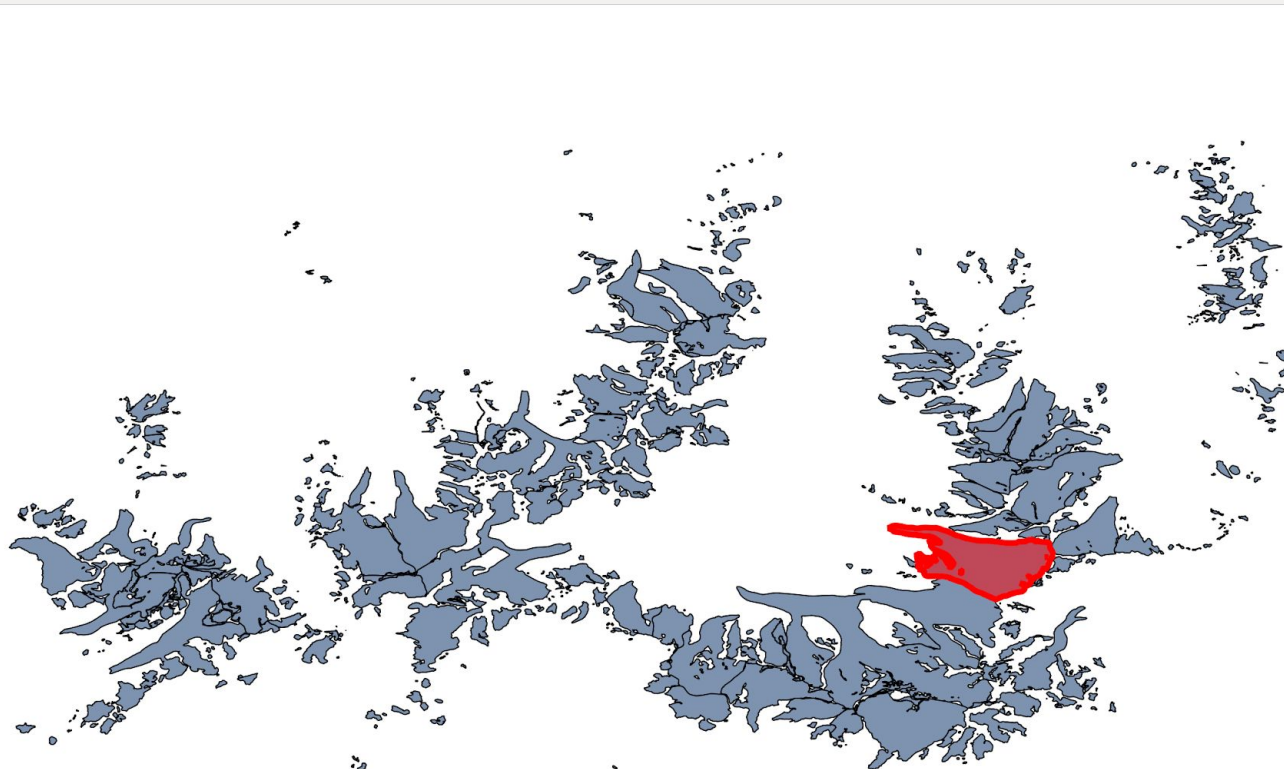
Enable

Table

Decimals 2

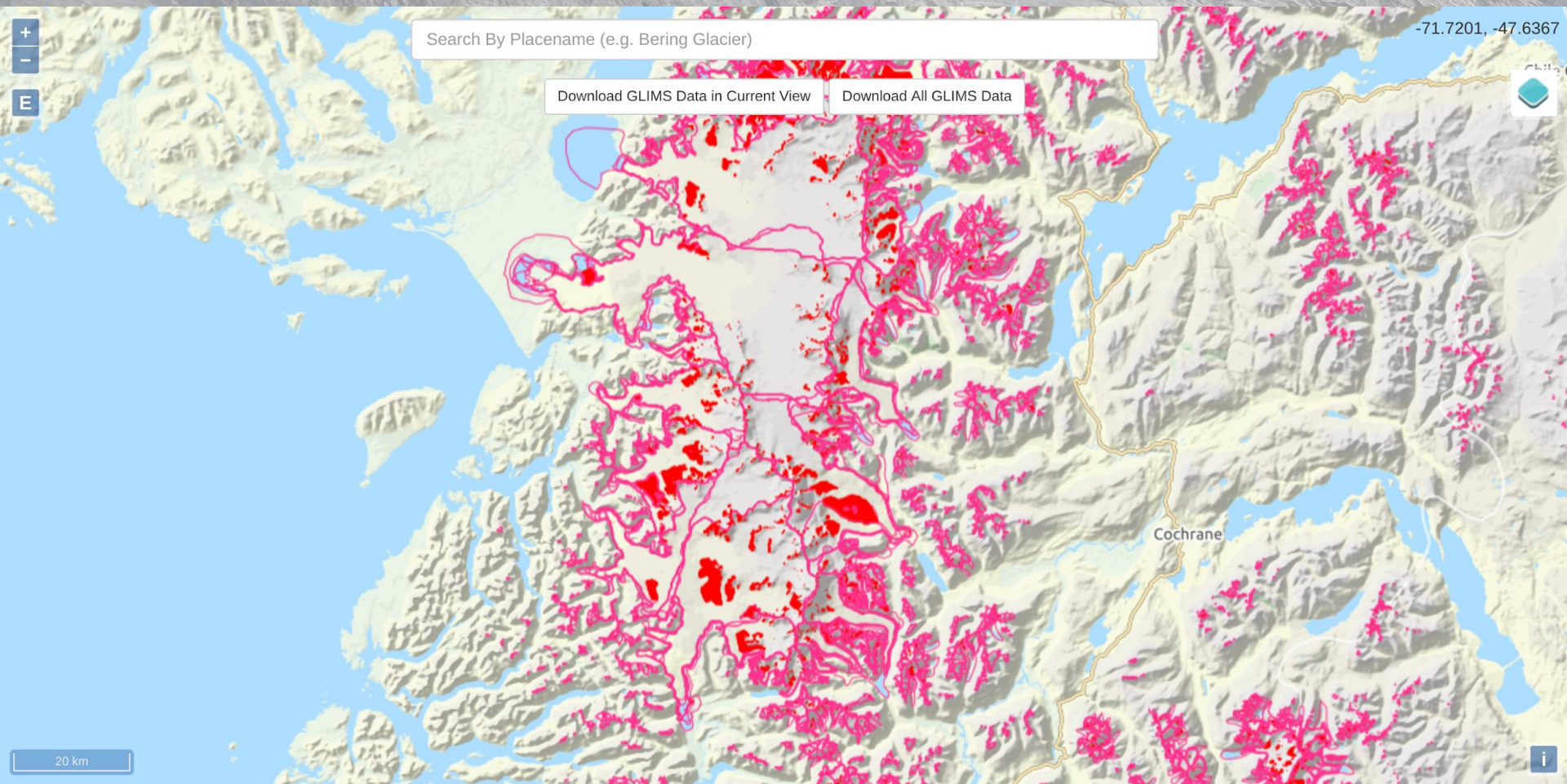
Layer Value

Layer	Value
-------	-------





# Example 2 (the bad): North Patagonia





# Correct outlines, but missing some

Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help



Layers Panel

- rgi\_map\_2020-05-05

Identify Results

Feature	Value
rgi_map_2020-05-05	
anal_id	693185
(Derived)	
(Actions)	
anal_id	693185
line_type	glac_bound
group_id	35081
state_id	7
src_time	2016-03-12 00:00:00
delta_days	1515

Mode Current layer Auto open form

View Tree Help

Value Tool

Enable

Table Graph Options

Decimals 2

Layer	Value
-------	-------



Coordinate -74.195,-47.054 Scale 1:473,298 Magnifier 100% Rotation 0.0 Render EPSG:4326



# Extinct Glaciers

- Field exists in GLIMS database to track “gone” glaciers
- Need to update map viewer to show extinct glaciers





# GLIMS Review Paper: timeline, topic brainstorm

What's a realistic timeline?

## Possible topics

- Major achievements of GLIMS
  - 20 years of ASTER imagery optimized for glaciers
  - global database of glacier data freely available to all
- Statistical summaries of the GLIMS Glacier Database
- Description of the contents of GLIMS and how to use them
-



## Next meetings of the GLIMS Core Team (proposed):

- August, 2020
- December, 2020 (AGU)

