GLIMS: Status Summary, end of 2016

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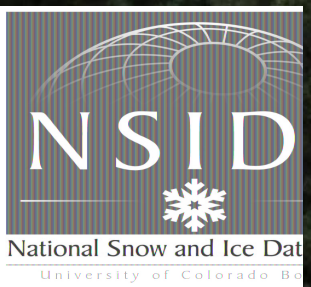
National Snow and Ice Data Center
University of Colorado
Boulder, Colorado, USA



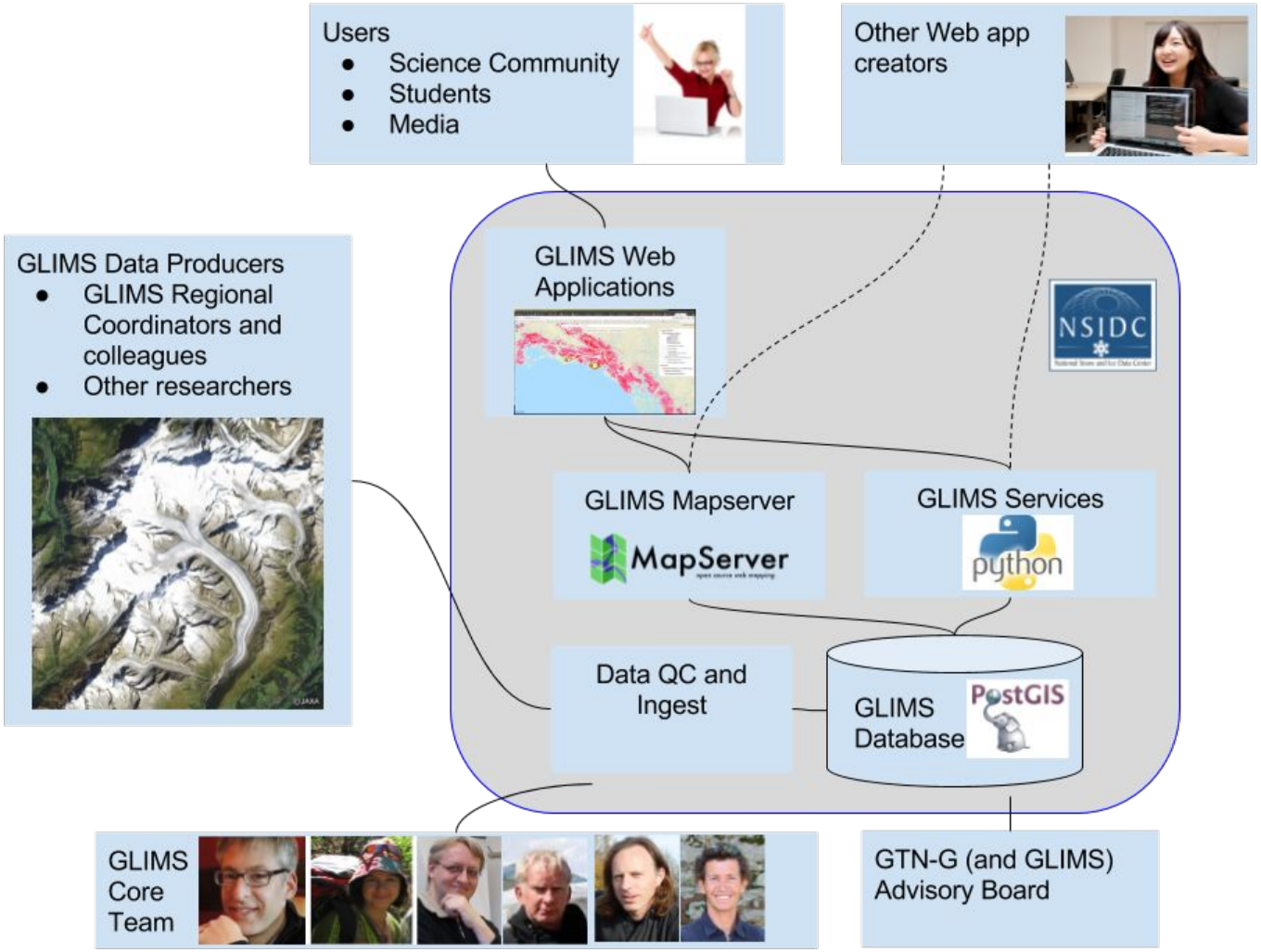
Talk Outline

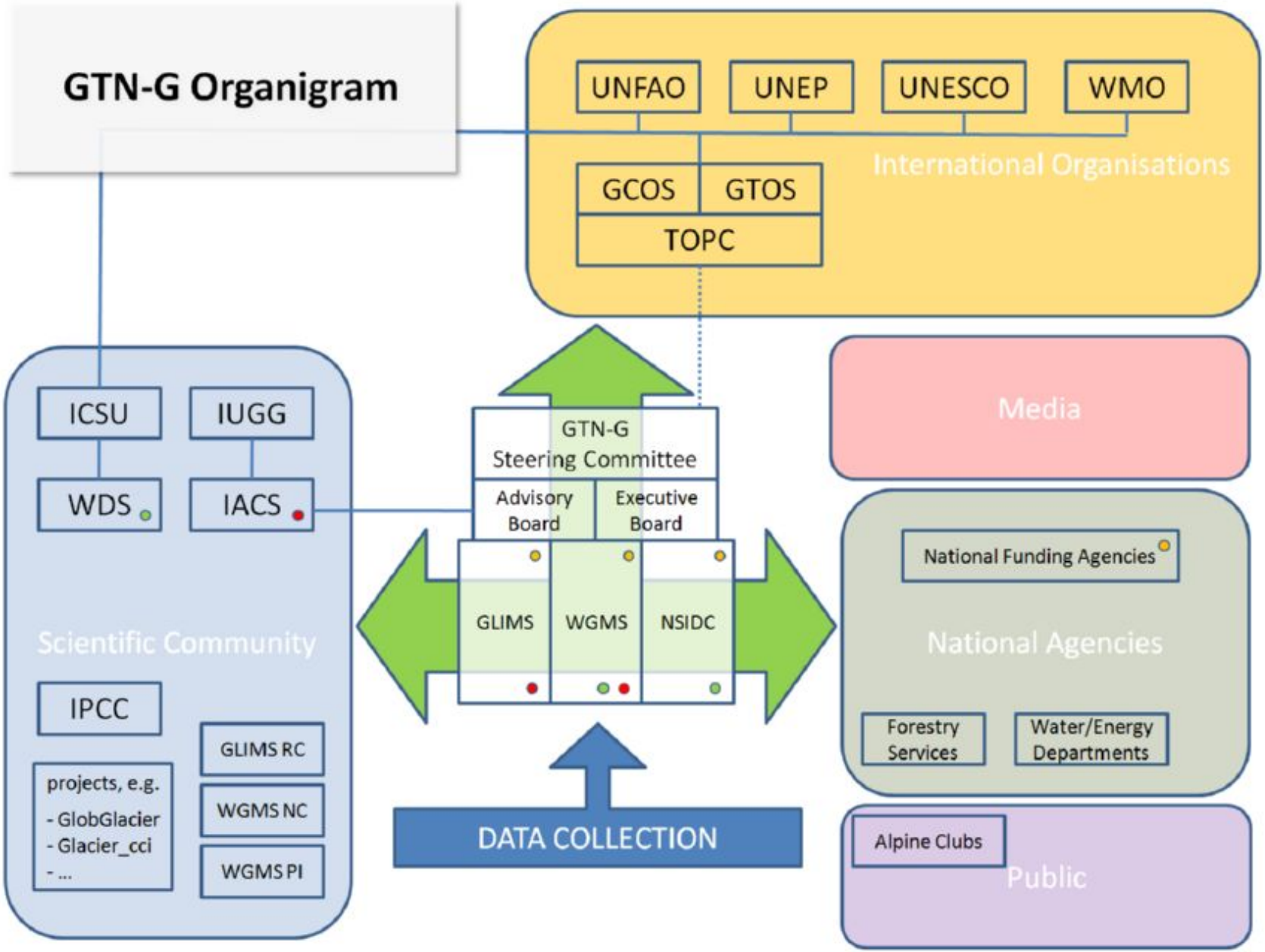
1. What is GLIMS?
2. New data in GLIMS
3. New map interfaces
4. Other recent activity
5. Summary

What is GLIMS?

- Global Land Ice Measurements from Space
- Began as ASTER Science Team project to map Earth's glaciers
- Is now a globally complete, multi-temporal database of glacier outlines and rich metadata
- This year is the 20th anniversary of GLIMS!

GLIMS Structure



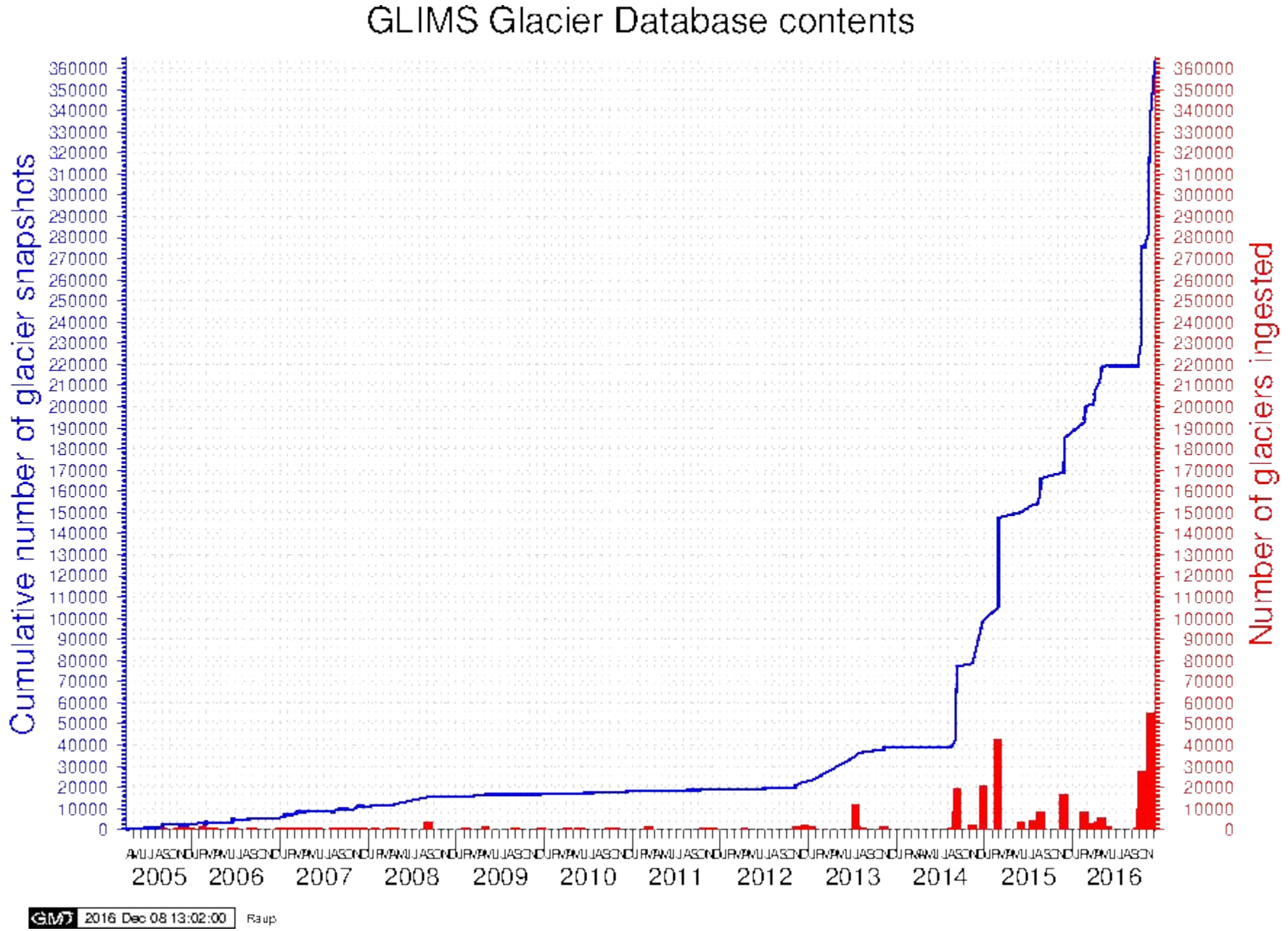

GTN-G Organigram
UNFAO
UNEP
UNESCO
WMO
International Organisations
GCOS
GTOS
TOPC
ICSU
IUGG
WDS
IACS
Scientific Community
IPCC
projects, e.g.
- GlobGlacier
- Glacier_cci
- ...
GLIMS RC
WGMS NC
WGMS PI
GTN-G
Steering Committee
Advisory Board
Executive Board
GLIMS
WGMS
NSIDC
DATA COLLECTION
Media
National Funding Agencies
National Agencies
Forestry Services
Water/Energy Departments
Alpine Clubs
Public

GLIMS works closely with:

- Randolph Glacier Inventory (RGI) group
- NASA's High Mountain Asia project
- USAID's Contributions to High Asia Runoff from Ice and Snow (CHARIS) project
- Other glacier databases at NSIDC and WGMS

New data in 2016

- All RGI (Randolph Glacier Inventory) data are now in GLIMS (including hypsometry)
- Individual data sets from
  - Austria
  - N. India
  - Pakistan
  - US Lower 48 (from 1:24000 maps)
  - Alaska
  - Italy
  - Antarctic Peninsula
  - Multi-temporal outlines for Rocky Mtn Nat'l Park


GLIMS Glacier Database contents
Cumulative number of glacier snapshots
Number of glaciers ingested
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10000
20000
30000
40000
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60000
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80000
90000
100000
110000
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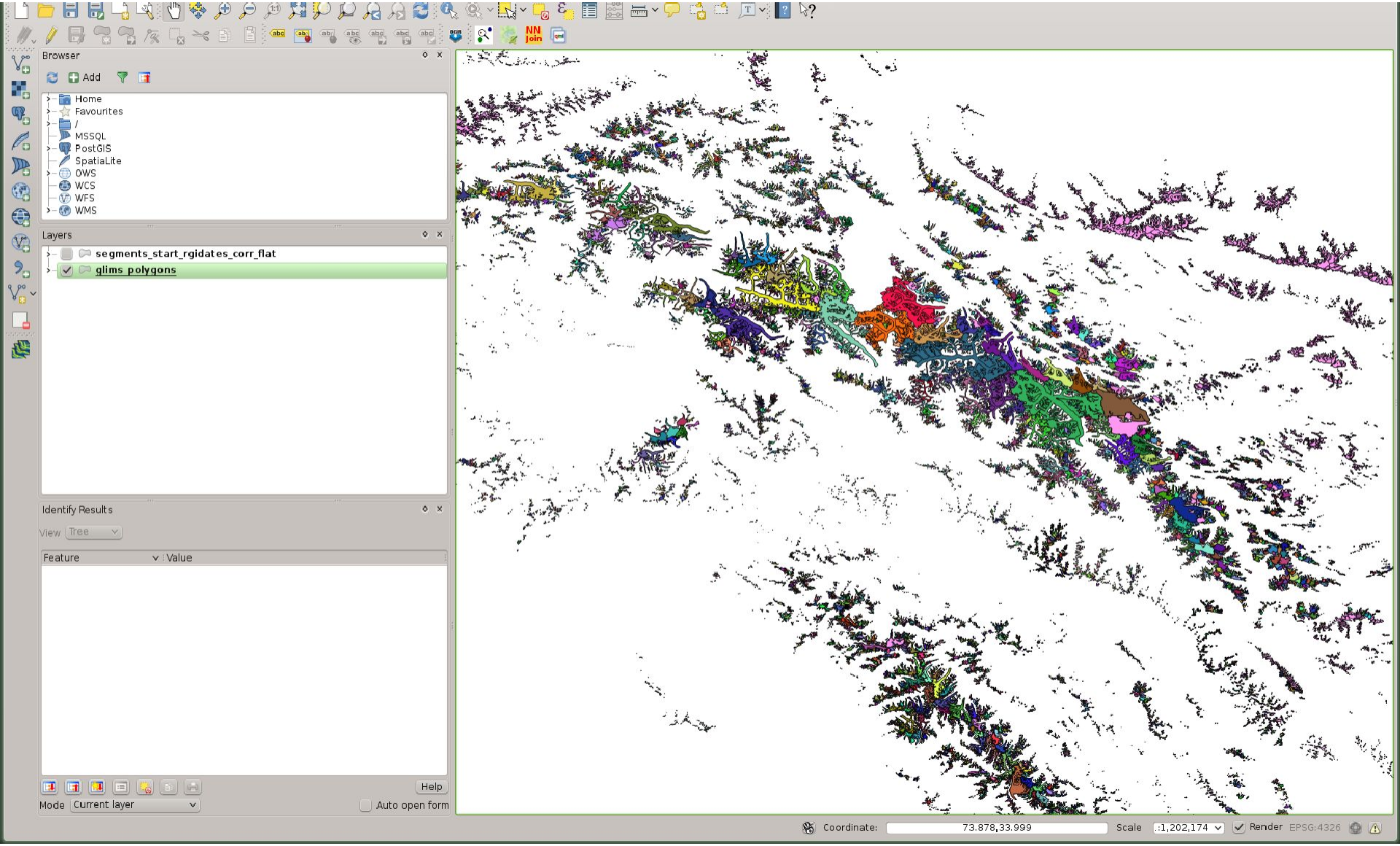
GMT 2016 Dec 08 13:02:00
Raup

Contributing to GLIMS is easy!

- Contact us at glacierdata@nsidc.org
- Required components:
  - Glacier outlines, plus optional snow lines, centerlines, debris cover map, lake outlines, etc.
  - Metadata on base imagery (IDs, dates, instrument)
  - Methods used
  - Analyst institution and contact info

Besides new data: New technical enhancements

- New data model for handling multi-temporal data
  - Will allow download of glacier map near a given date
  - Will allow download of the most current glacier map
- RGI attributes
- Fixed data integrity issues in Alaska and Asia (corrected glacier IDs)
- Better merging of new data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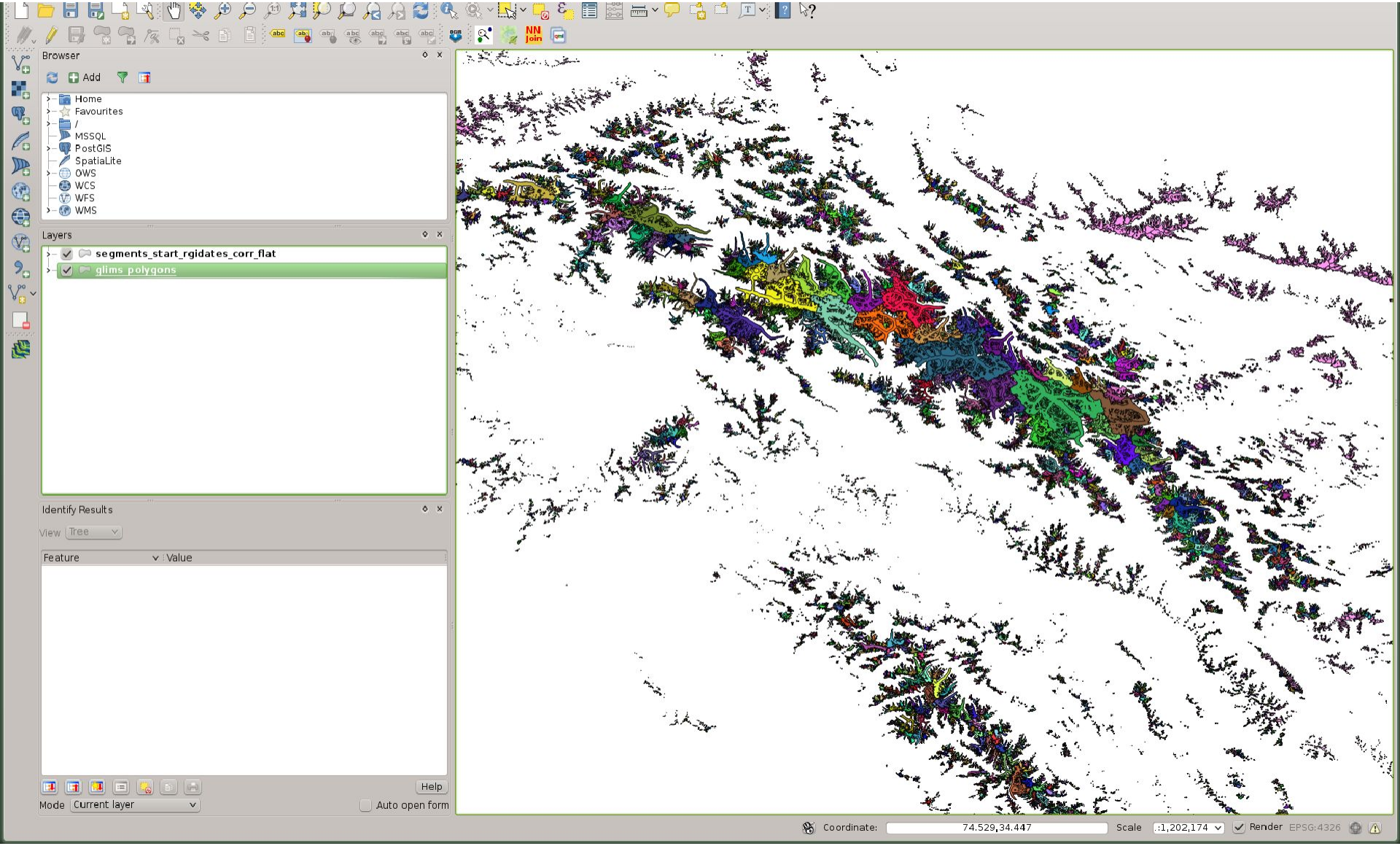
EPSG:4326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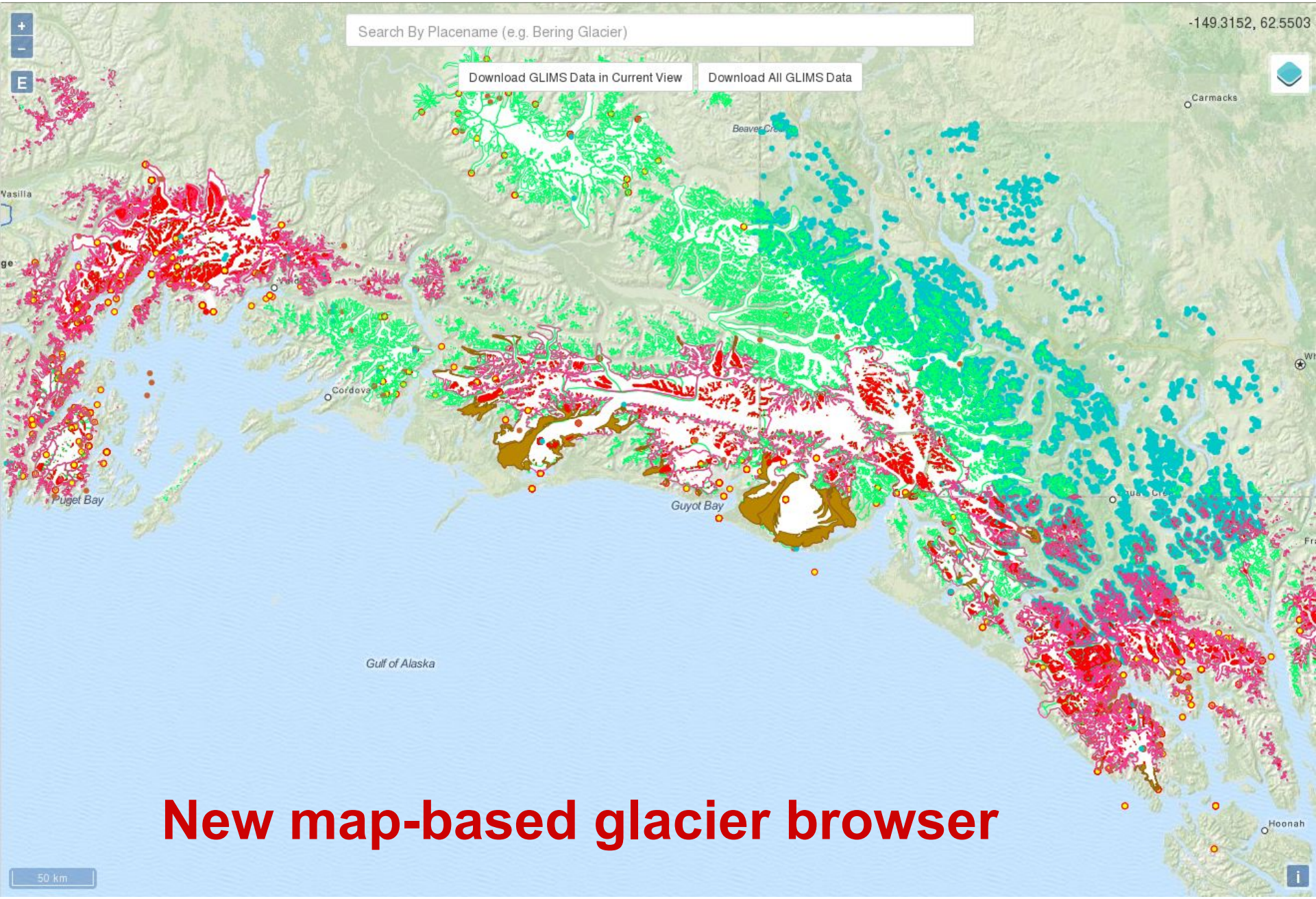
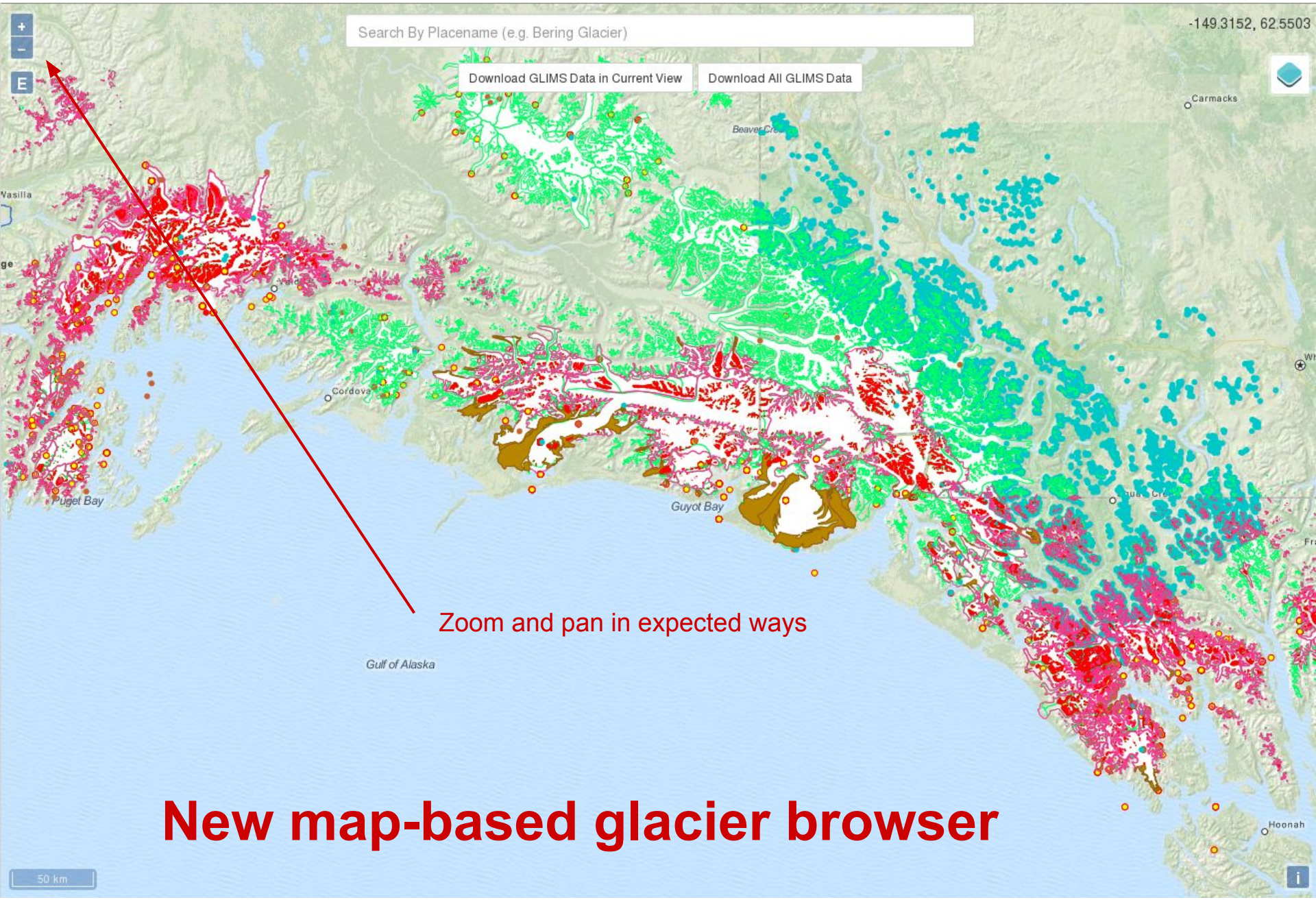
Web map browser and download: Brief tour

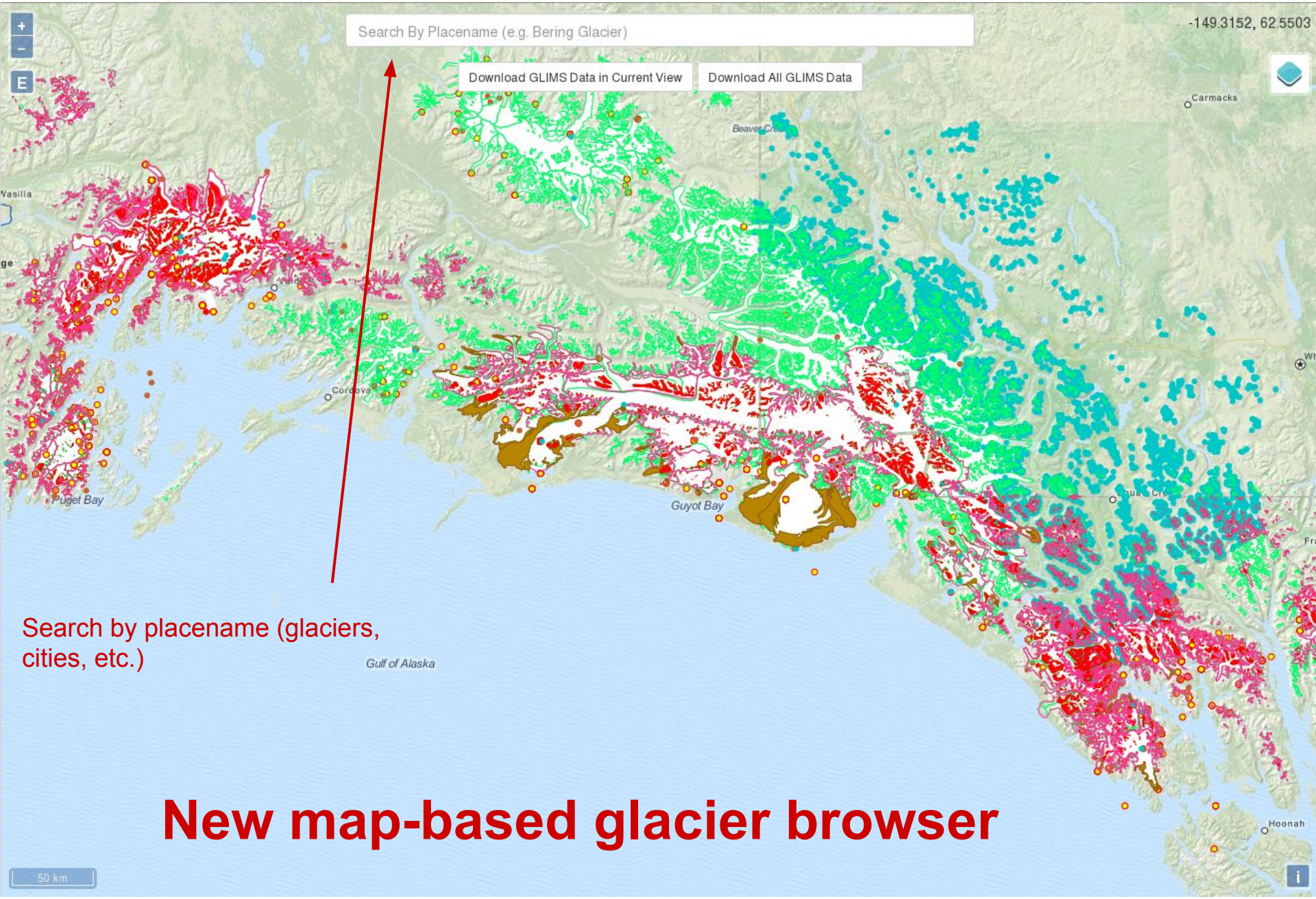
New interfaces (GLIMS, GTN-G)

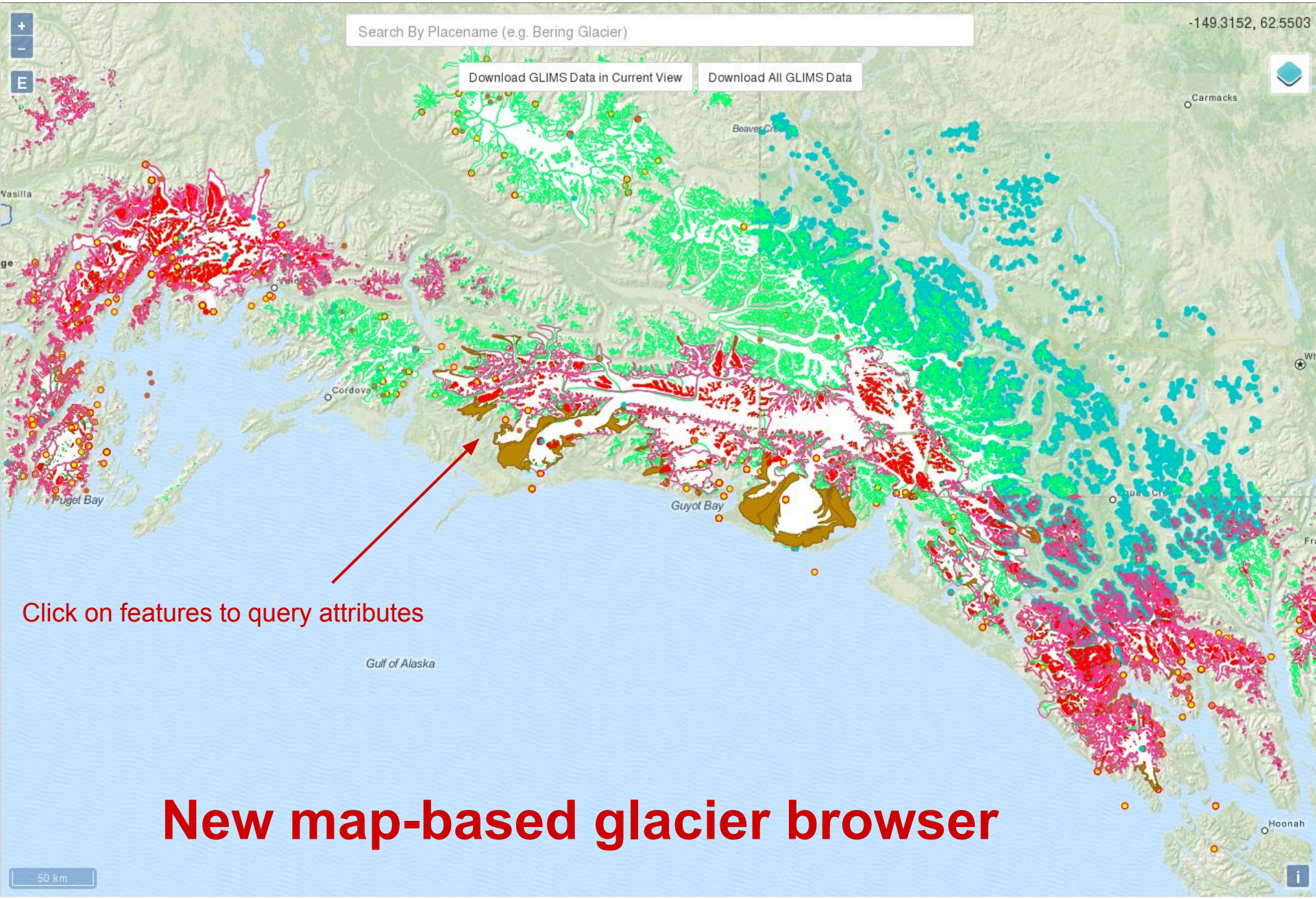
- Modern zoom/pan (like Google Maps)
- Query attributes from six glacier databases: GLIMS, RGI, WGI, FoG, Glacier Photos, Glacier Thickness Database (GlaThiDa)
- Go to placename
- Download GLIMS data in current view
- Links to more information


Search By Placename (e.g. Bering Glacier)
-149.3152, 62.5503
Download GLIMS Data in Current View
Download All GLIMS Data
Carmacks
Cordova
Puget Bay
Guyot Bay
Gulf of Alaska
Hoonah
50 km
New map-based glacier browser

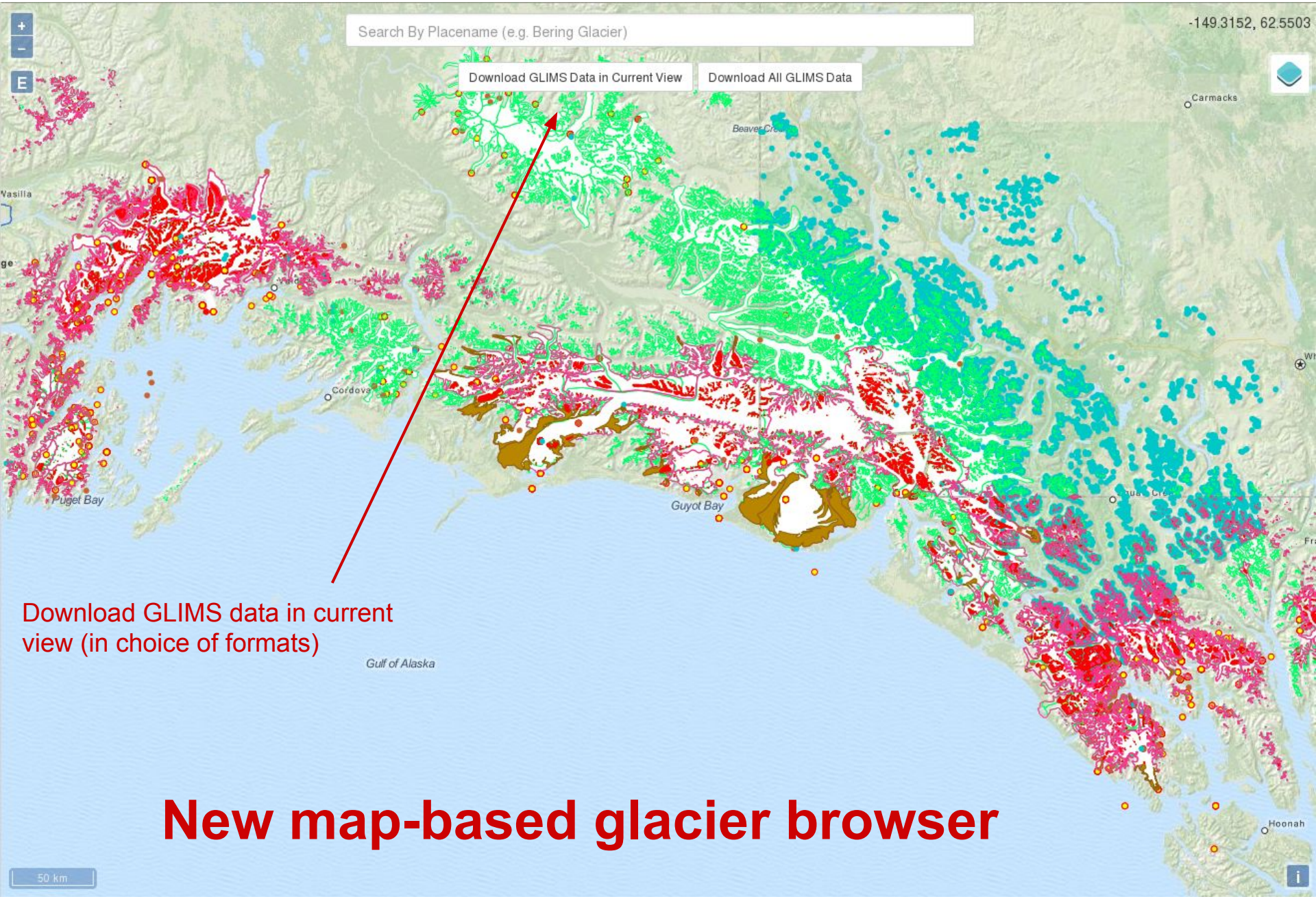


New map-based glacier browser


Search By Placename (e.g. Bering Glacier)
Download GLIMS Data in Current View
Download All GLIMS Data
-149.3152, 62.5503
Carmacks
Beaver Cre
Wasilla
Cordova
Puget Bay
Guyot Bay
Gulf of Alaska
Hoonah
50 km
Search by placename (glaciers, cities, etc.)
New map-based glacier browser



New map-based glacier browser



New map-based glacier browser

GLIMS Data Citation

When referring to the GLIMS Initiative in general, please cite

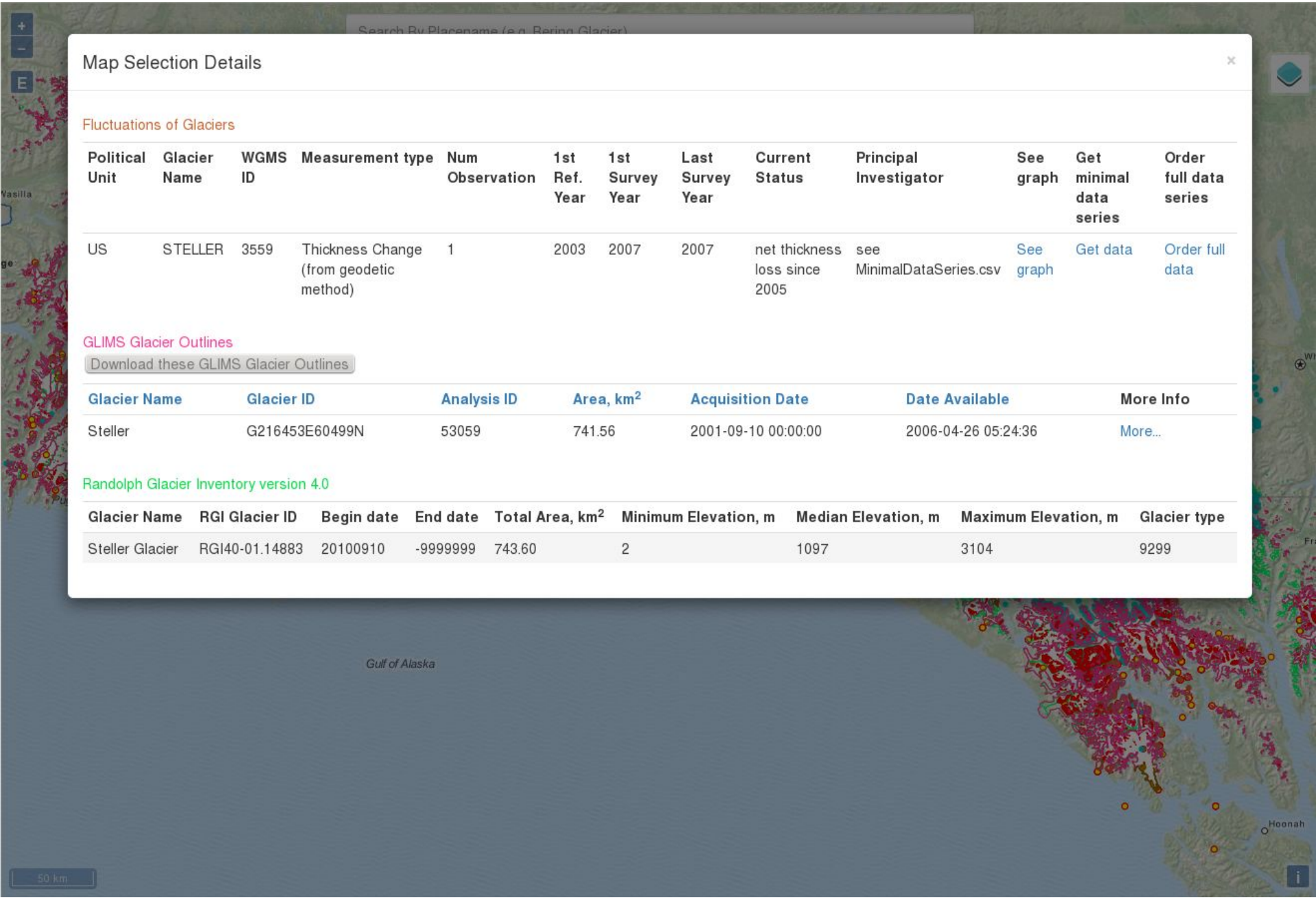
Raup, B.H.; A. Racoviteanu; S.J.S. Khalsa; C. Helm; R. Armstrong; Y. Arnaud (2007). "The GLIMS Geospatial Glacier Database: a New Tool for Studying Glacier Change". Global and Planetary Change 56:101--110. (doi:10.1016/j.gloplacha.2006.07.018)

For the complete set of GLIMS glacier data (when using it for a global study of glaciers, for example), please cite

GLIMS and NSIDC (2005, updated 2014): Global Land Ice Measurements from Space glacier database. Compiled and made available by the international GLIMS community and the National Snow and Ice Data Center, Boulder CO, U.S.A. DOI:10.7265/N5V98602

For Analysis_IDs in the range 60827--61235, the appropriate citation is

Racoviteanu, Adina (submitter); Racoviteanu, Adina (analyst(s)), 2007. GLIMS Glacier Database. Boulder, CO.
National Snow and Ice Data Center. http://dx.doi.org/10.7265/N5V98602



Map Selection Details

Fluctuations of Glaciers

Political Unit	Glacier Name	WGMS ID	Measurement type	Num Observation	1st Ref. Year	1st Survey Year	Last Survey Year	Current Status	Principal Investigator	See graph	Get minimal data series	Order full data series
US	STELLER	3559	Thickness Change (from geodetic method)	1	2003	2007	2007	net thickness loss since 2005	see MinimalDataSeries.csv	See graph	Get data	Order full data

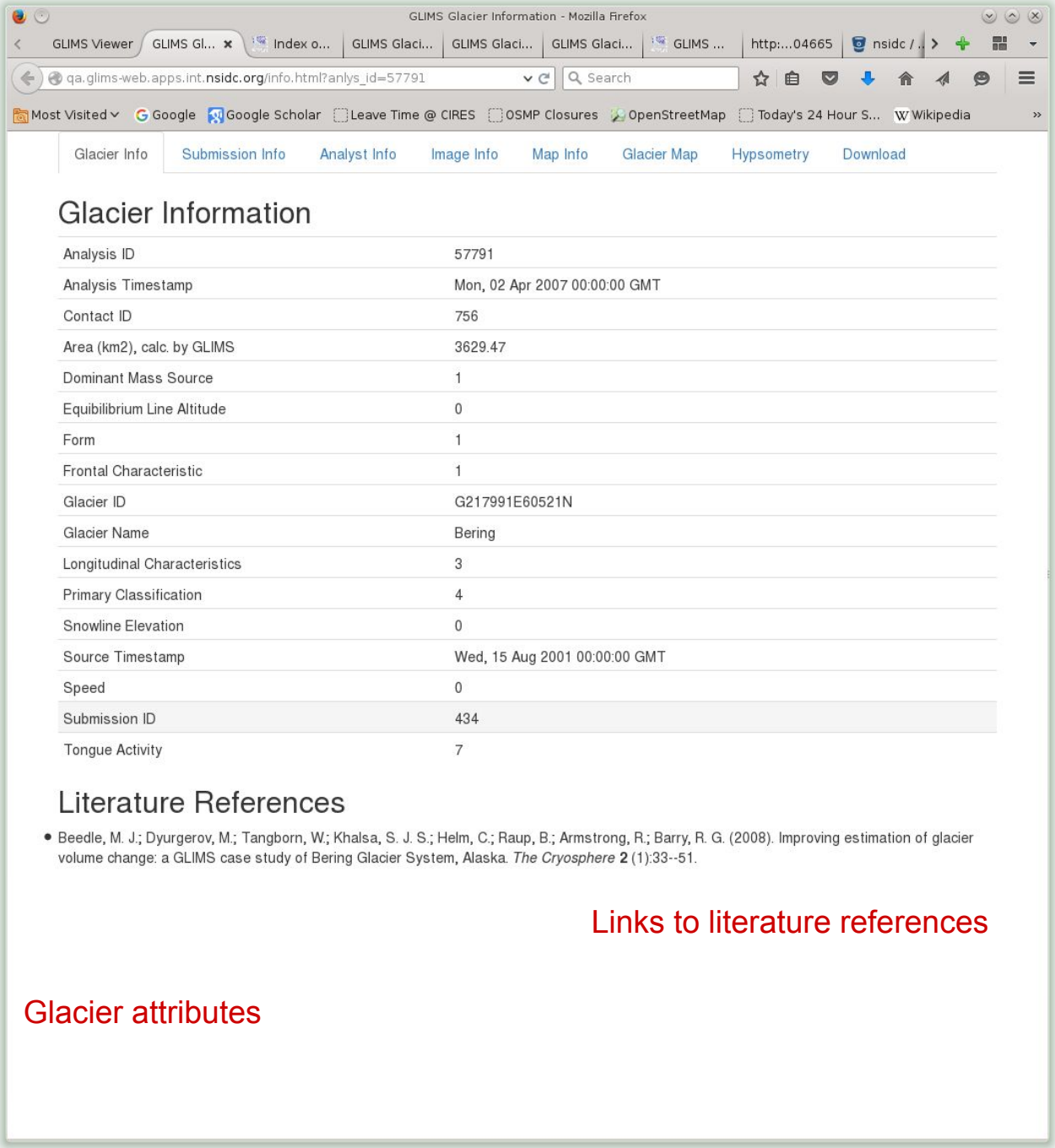
GLIMS Glacier Outlines

Download these GLIMS Glacier Outlines

Glacier Name	Glacier ID	Analysis ID	Area, km^2	Acquisition Date	Date Available	More Info
Steller	G216453E60499N	53059	741.56	2001-09-10 00:00:00	2006-04-26 05:24:36	More...

Randolph Glacier Inventory version 4.0

Glacier Name	RGI Glacier ID	Begin date	End date	Total Area, km^2	Minimum Elevation, m	Median Elevation, m	Maximum Elevation, m	Glacier type
Steller Glacier	RGI40-01.14883	20100910	-9999999	743.60	2	1097	3104	9299


GLIMS Glacier Information - Mozilla Firefox
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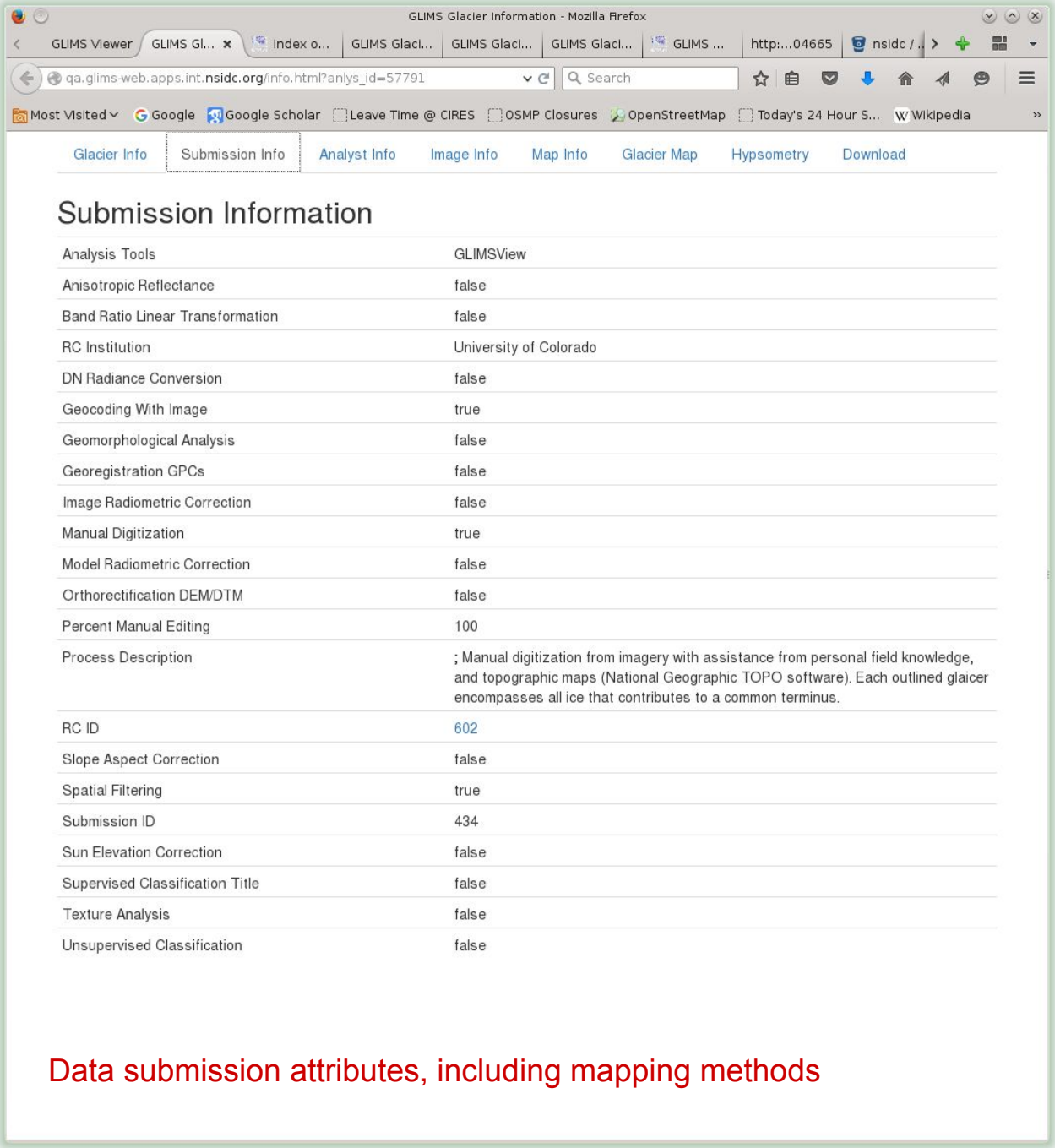
Most Visited
Google
Google Scholar
Leave Time @ CIRES
OSMP Closures
OpenStreetMap
Today's 24 Hour S...
Wikipedia
Glacier Info
Submission Info
Analyst Info
Image Info
Map Info
Glacier Map
Hypsometry
Download
Glacier Information
Analysis ID 57791
Analysis Timestamp Mon, 02 Apr 2007 00:00:00 GMT
Contact ID 756
Area (km2), calc. by GLIMS 3629.47
Dominant Mass Source 1
Equibilibrium Line Altitude 0
Form 1
Frontal Characteristic 1
Glacier ID G217991E60521N
Glacier Name Bering
Longitudinal Characteristics 3
Primary Classification 4
Snowline Elevation 0
Source Timestamp Wed, 15 Aug 2001 00:00:00 GMT
Speed 0
Submission ID 434
Tongue Activity 7
Literature References
Beedle, M. J.; Dyurgerov, M.; Tangborn, W.; Khalsa, S. J. S.; Helm, C.; Raup, B.; Armstrong, R.; Barry, R. G. (2008). Improving estimation of glacier volume change: a GLIMS case study of Bering Glacier System, Alaska. The Cryosphere 2 (1):33--51.
Links to literature references
Glacier attributes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OSMP Closures
OpenStreetMap
Today's 24 Hour S...
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Glacier Info
Submission Info
Analyst Info
Image Info
Map Info
Glacier Map
Hypsometry
Download
Submission Information
Analysis Tools GLIMSView
Anisotropic Reflectance false
Band Ratio Linear Transformation false
RC Institution University of Colorado
DN Radiance Conversion false
Geocoding With Image true
Geomorphological Analysis false
Georegistration GPCs false
Image Radiometric Correction false
Manual Digitization true
Model Radiometric Correction false
Orthorectification DEM/DTM false
Percent Manual Editing 100
Process Description ; Manual digitization from imagery with assistance from personal field knowledge, and topographic maps (National Geographic TOPO software). Each outlined glaicer encompasses all ice that contributes to a common terminus.
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Submission ID 434
Sun Elevation Correction false
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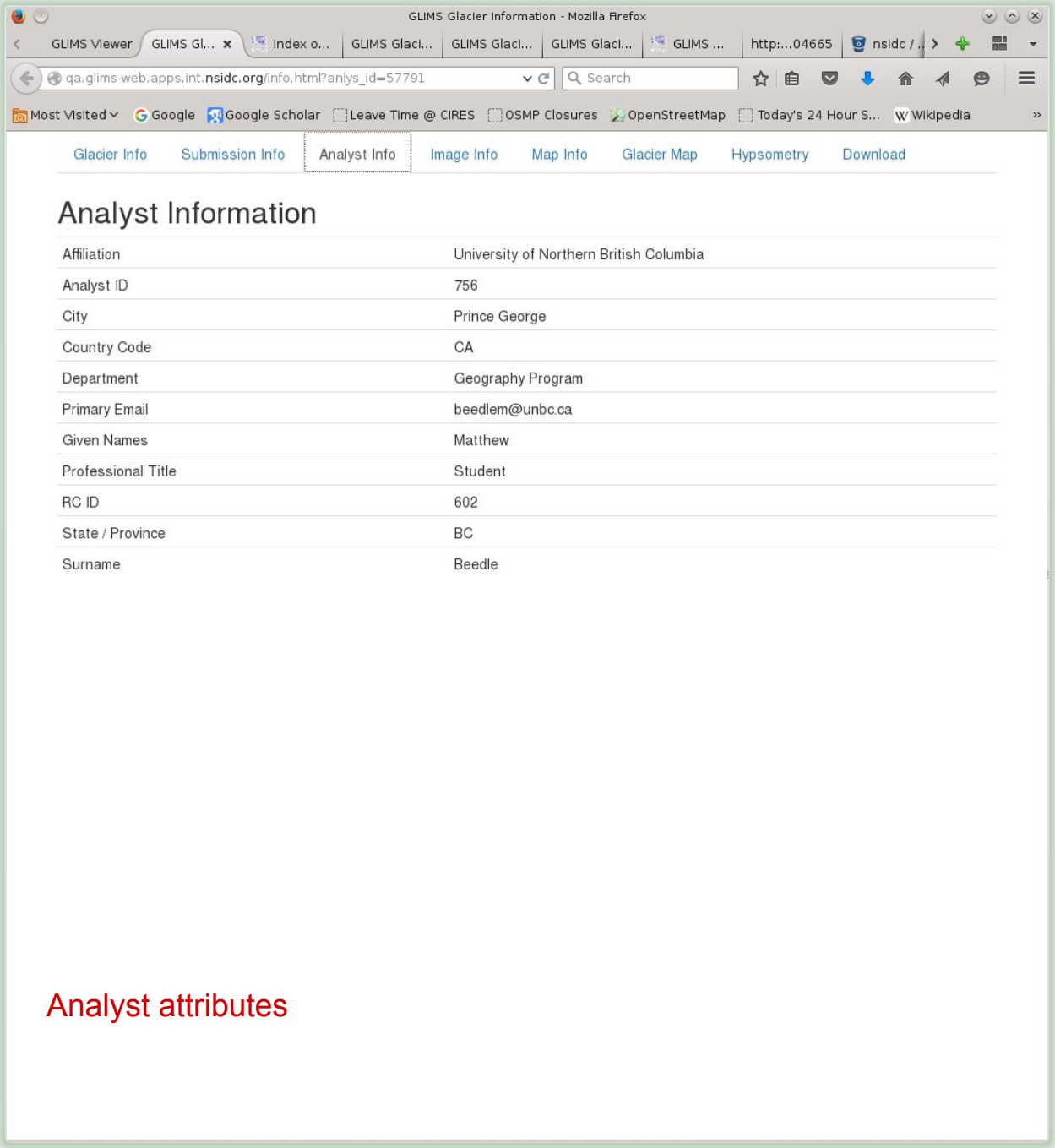
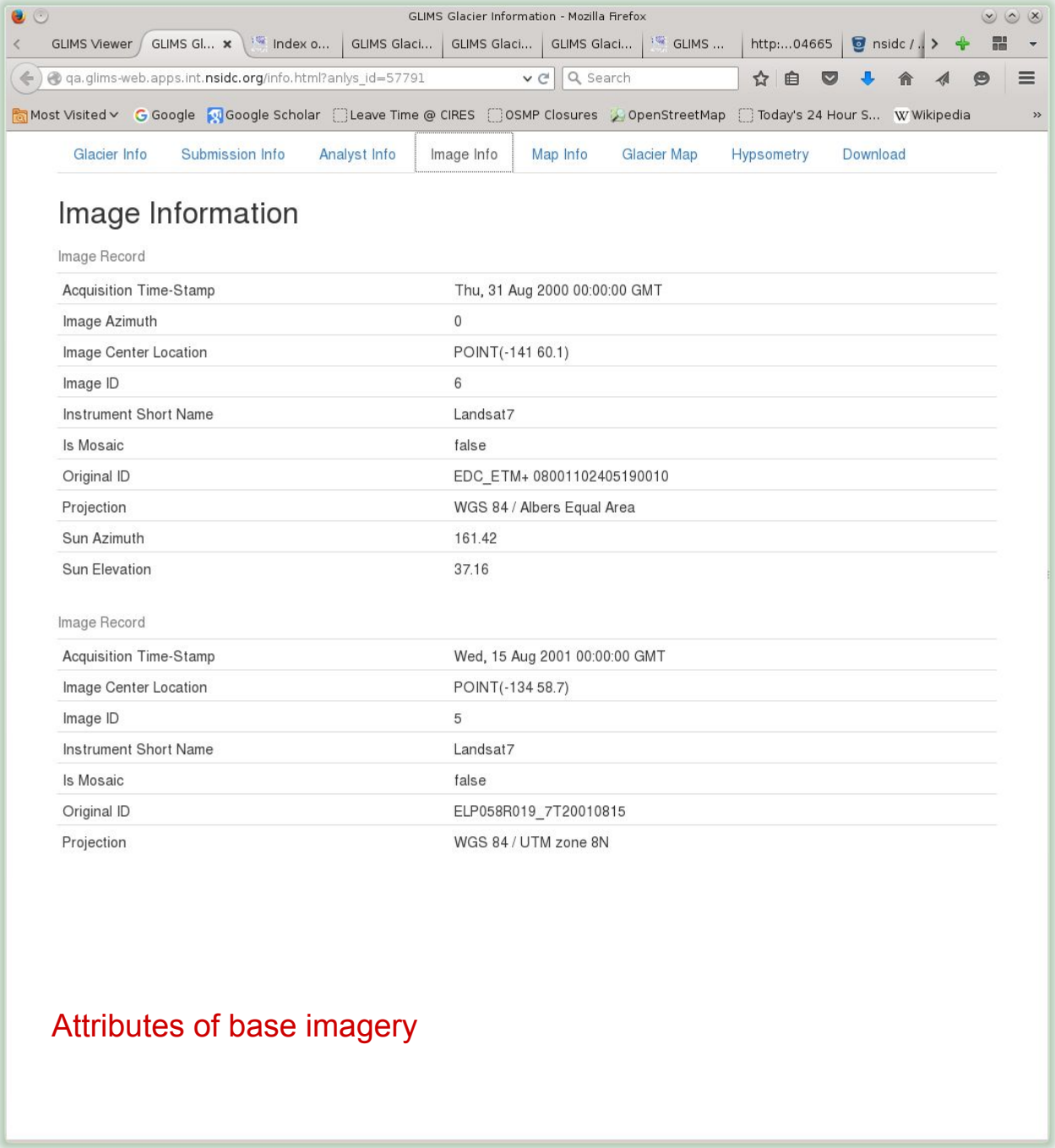
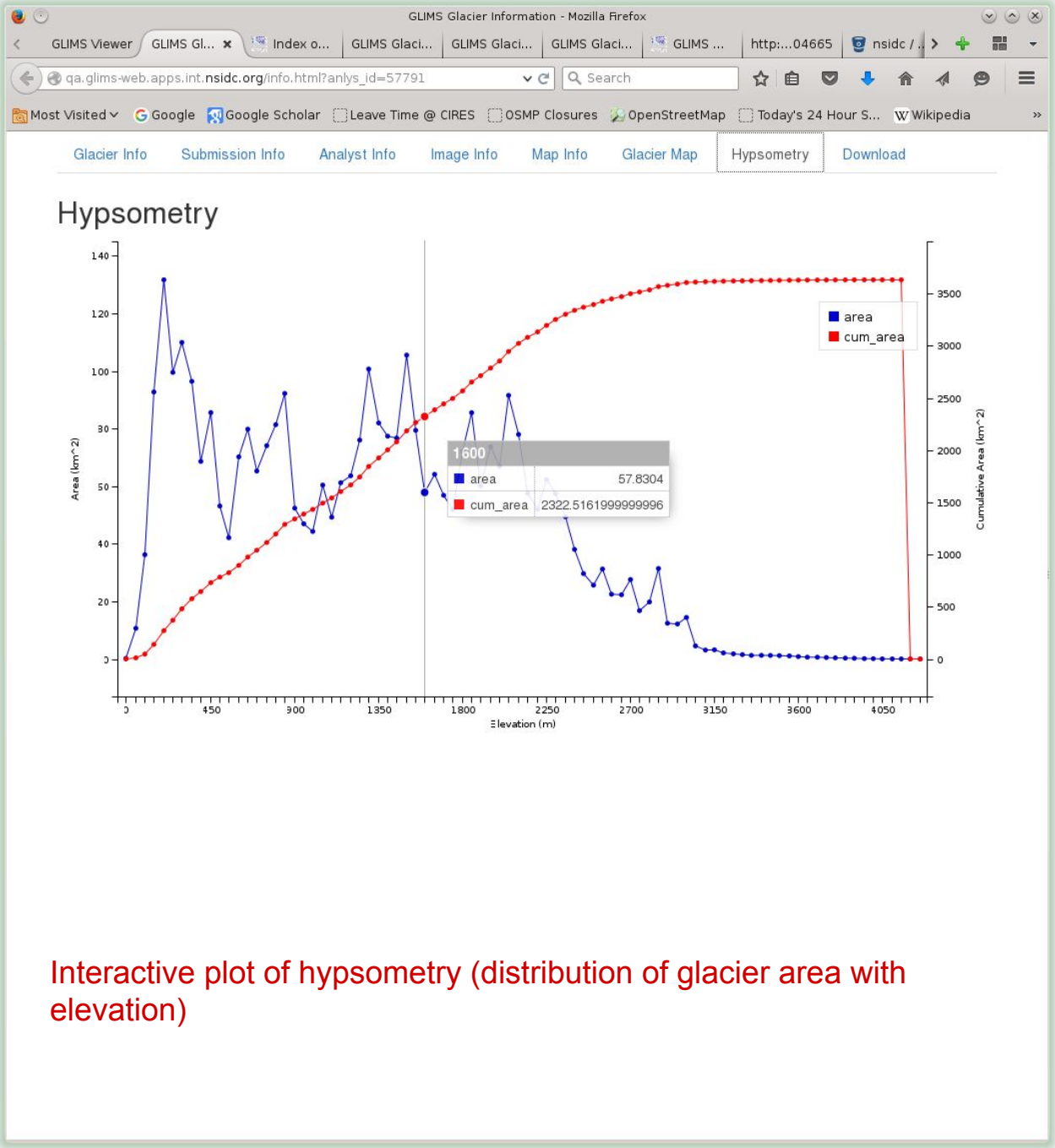
Unsupervised Classification false
Data submission attributes, including mapping methods



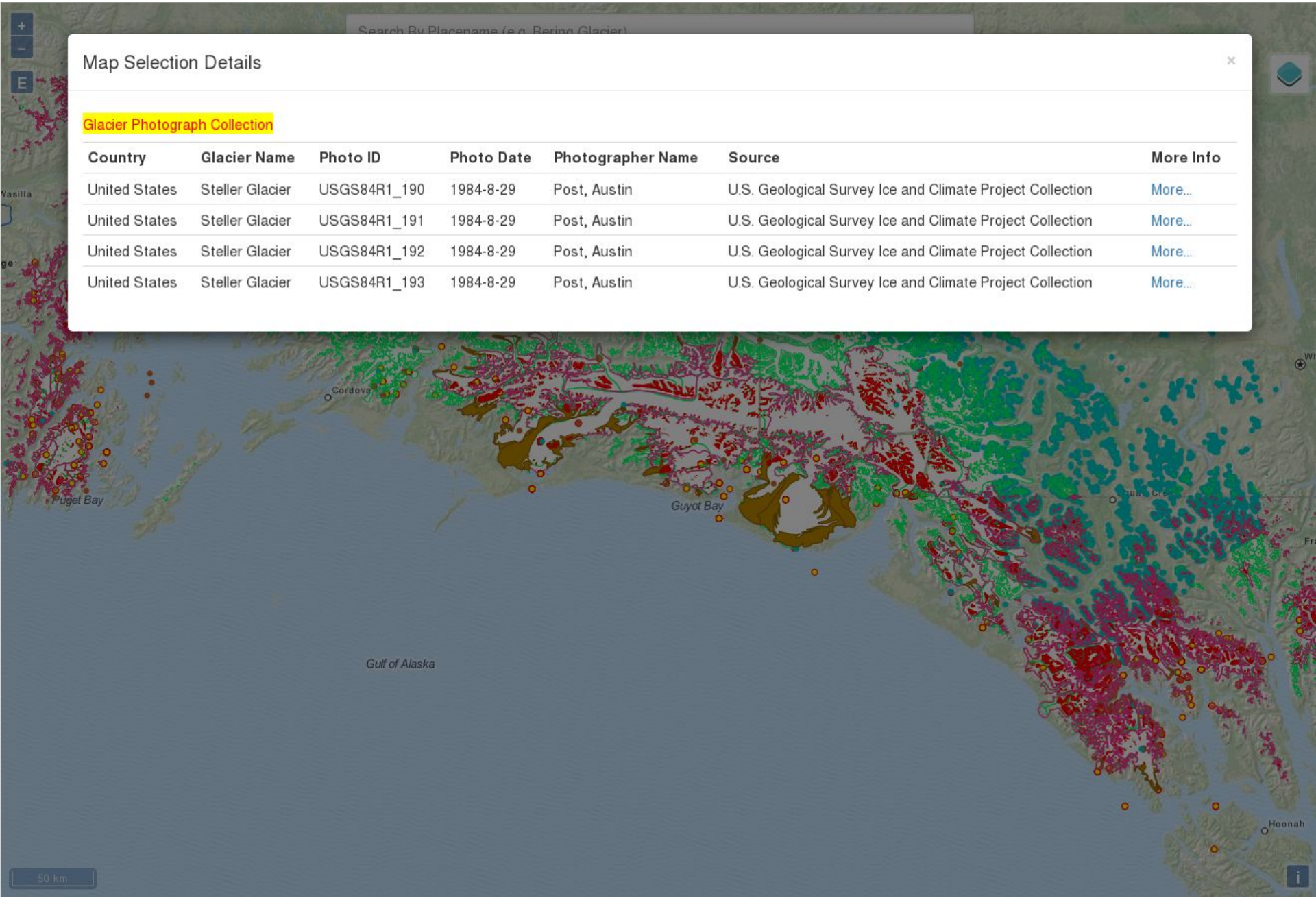
Analyst attributes



Attributes of base imagery



Interactive plot of hypsometry (distribution of glacier area with elevation)


Search By Placename (e.g. Bering Glacier)
Map Selection Details
Glacier Photograph Collection
Country | Glacier Name | Photo ID | Photo Date | Photographer Name | Source | More Info
United States | Steller Glacier | USGS84R1_190 | 1984-8-29 | Post, Austin | U.S. Geological Survey Ice and Climate Project Collection | More...
United States | Steller Glacier | USGS84R1_191 | 1984-8-29 | Post, Austin | U.S. Geological Survey Ice and Climate Project Collection | More...
United States | Steller Glacier | USGS84R1_192 | 1984-8-29 | Post, Austin | U.S. Geological Survey Ice and Climate Project Collection | More...
United States | Steller Glacier | USGS84R1_193 | 1984-8-29 | Post, Austin | U.S. Geological Survey Ice and Climate Project Collection | More...
Cordova
Puget Bay
Guyot Bay
Gulf of Alaska
Hoonah
50 km

NSIDC National Snow & Ice Data Center | DATA | RESEARCH | NEWS | ABOUT | SEARCH | Web pages

Glacier Photograph Collection

Photo ID : USGS84R1_191
Glacier Name : Steller Glacier
Country : United States
State/Province : Alaska
Coordinates - Latitude : 60.41750
Coordinates - Longitude: -143.80300
Date of Original Media : 29 Aug 1984
Photographer Name : Post, Austin
Image Dimensions (pixels) : 3859 x 3468
Image Type : TIFF
High Resolution Image Size : 13092 (KB)
Original Media : Microfilm
Description : 35mm microfilm
Photograph Number : 84R1_191
Documentation : http://nsidc.org/data/docs/noaa/g00472_glacier_photos/index.html
Source : U.S. Geological Survey Ice and Climate Project Collection
Notes : 84R1_191; AUG 29 '84; Steller Gl.-Berg Lk.
Publisher : National Snow and Ice Data Center
Rights : Photograph held by the National Snow and Ice Data Center, Boulder. May be used freely if properly cited.
Citation: Post, Austin. 1984 Steller Glacier: From the Glacier Photograph Collection. Boulder, Colorado USA: National Snow and Ice Data Center. Digital media.

Links to more information: Glacier photos

Plans for 2017

- Ingest many new glacier data sets
- Improve download capability: more complete, and better performance
- GLIMS Workshop in Boulder in August
- Officially retire GLIMSView software
- Expand monitoring to more kinds of measurements (next slide)
- Allow download of glacier maps representative of a give time, or most current
- Modernize the glims.org website

Expanded monitoring and expected new data types this year

- More velocity data!
- Centerlines for all glaciers
- Add mapping of glacial lakes to workflow (to better understand lakes' role in ablation).
- Systematically map snow lines.
- Systematically extract topographic parameters such as centerlines, elevation statistics, area-elevation distributions.
- Systematically map debris cover.

The GLIMS Glacier Database can already accommodate all these data types. Need to build workflow.

GLIMS Workshop, 11-13 August 2017
Boulder, Colorado, USA

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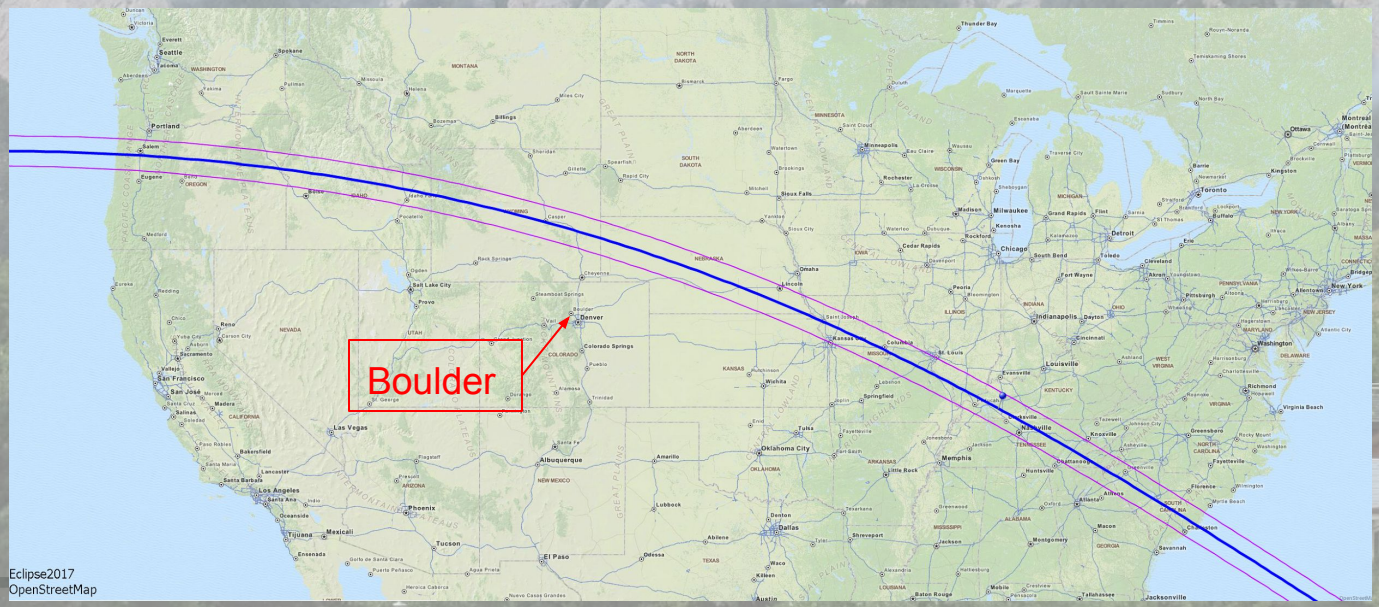
Boulder, Colorado, USA

- IGS Symposium on Remote sensing and modeling advances in understanding the cryosphere is 14-19 August
- 21 August: Total solar eclipse



Summary

- GLIMS (http://www.glims.org) is the go-to place for glacier outline (plus supporting) data.
- RGI has been merged into GLIMS. It is still being updated.
- The GLIMS database continues to grow.
- GLIMS Web apps to visualize and get glacier data continue to improve.

Thank you

And from the greater GLIMS/GTN-G community:
धन्यवाद, Спасибо, ありがとう, Tak, Takk, Gracias, Merci, Danke, متشكرم, 谢谢, Þakka þér, Terima kasih, Grazie, Рақмет сізге, сипос, rahmat