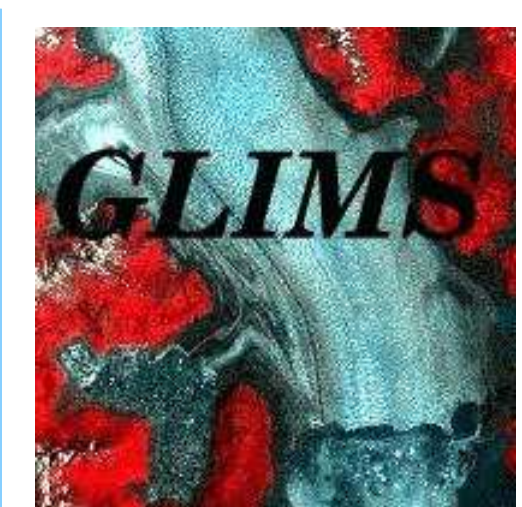


The GLIMS Geospatial Glacier Database

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

To construct a repository of geospatial information about the world's glaciers and to provide users with spatial query, access, and analysis operations on this information using Open Web Services. We expect the GLIMS database will be used by the earth science community for monitoring changes in glacier systems, as well as for understanding the cause and impacts of these changes as they relate to regional and global climate change.

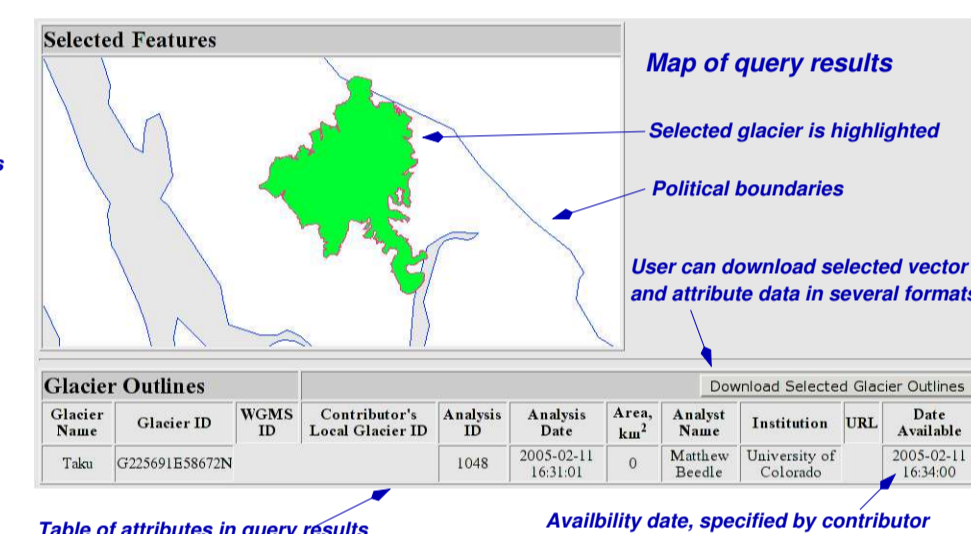
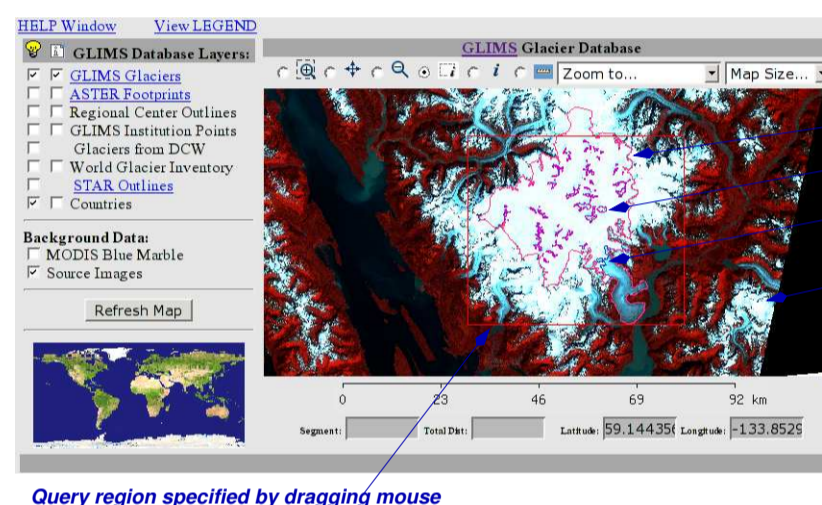
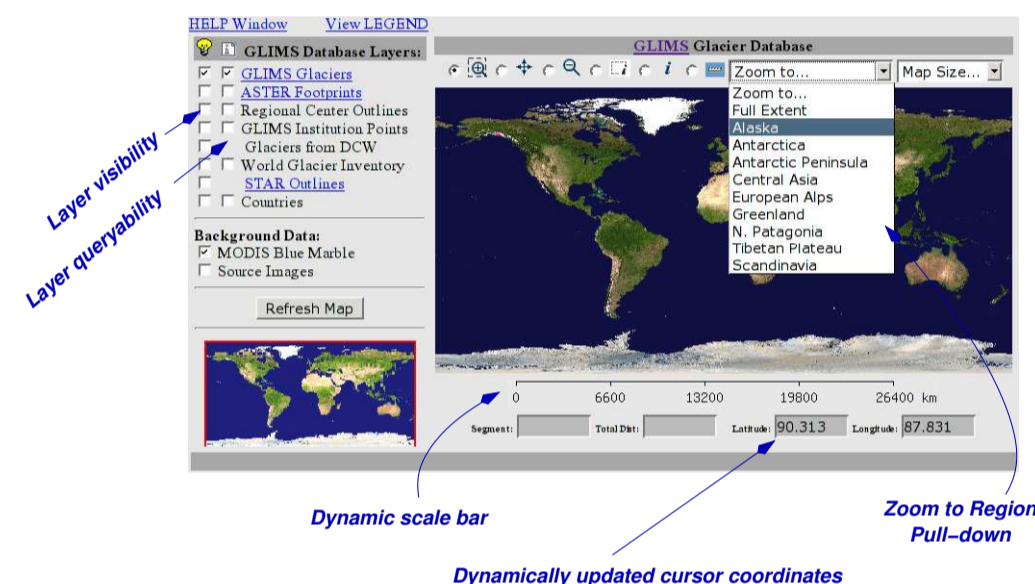
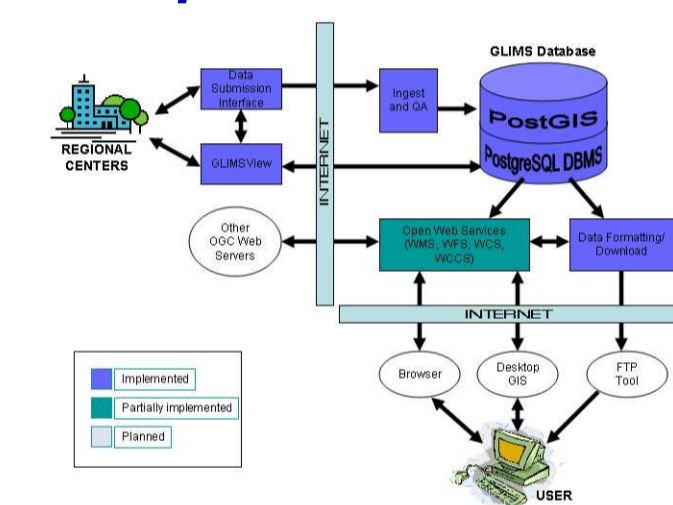
Summary

The Global Land Ice Measurement from Space (GLIMS) project is a cooperative effort of over sixty institutions world-wide with the goal of inventorying a majority of the world's estimated 160,000 glaciers. Each institution (called a Regional Center, or RC) oversees the analysis of data for a particular region containing glacier ice. RCs are provided with "GLIMSView," a cross-platform computer application specifically developed to analyze satellite imagery such as from ASTER and Landsat, digitize glacier outlines, attach GLIMS-specific metadata, and package the data for import into the GLIMS database. Data received by the GLIMS team at the National Snow and Ice Data Center (NSIDC) in Boulder, Colorado are ingested into a spatially-enabled database (PostGIS) and made available via a Web-Mapping Service (WMS). The WMS, an Open Geospatial Consortium (OGC)-compliant web interface that acts as the visual front-end to the glacier database, is being developed at NSIDC and will provide users with the ability to view and access the datasets received by the project team.

The GLIMS Glacier Database is now accessible on the World Wide Web, at "http://glims.colorado.edu/glacierdata/". There, users can browse custom maps, display various layers, query information within the GLIMS database, and download original datasets in different GIS-compatible formats. Map layers include glacier outlines, footprints of ASTER images acquired over glaciers (pending data feed from EROS Data Center), background images, coastlines and political boundaries, and others. Glacier outlines from the Digital Chart of the World (DCW) are also included, and from this one can see the marked improvement that ASTER-derived GLIMS glacier outlines represent compared to DCW data. The database now contains GLIMS outlines and metadata on approximately 1500 glaciers, contributed from approximately eight GLIMS institutions. The glacier data layer is queryable, so that scalar attribute data, such as analyst name, date of contribution, etc. may be displayed. The website will soon be an Open Geospatial Consortium compliant Web Map Service and Web Feature Service. This means that other websites can display glacier layers from our site over the Internet, or retrieve glacier features in vector format. An interface is available through which users can download the original data for analysis in their own computer environments.

Data currently in the database cover glaciers in the European Alps, Patagonia, Chilean volcanoes, Caucasus, Tien Shan, Sweden, and Alaska. The database is already useful as a repository of information on climate-related changes in the cryosphere, and as the dataset becomes increasingly complete in the coming years, more complex spatial and temporal analysis will become easier.

Components:



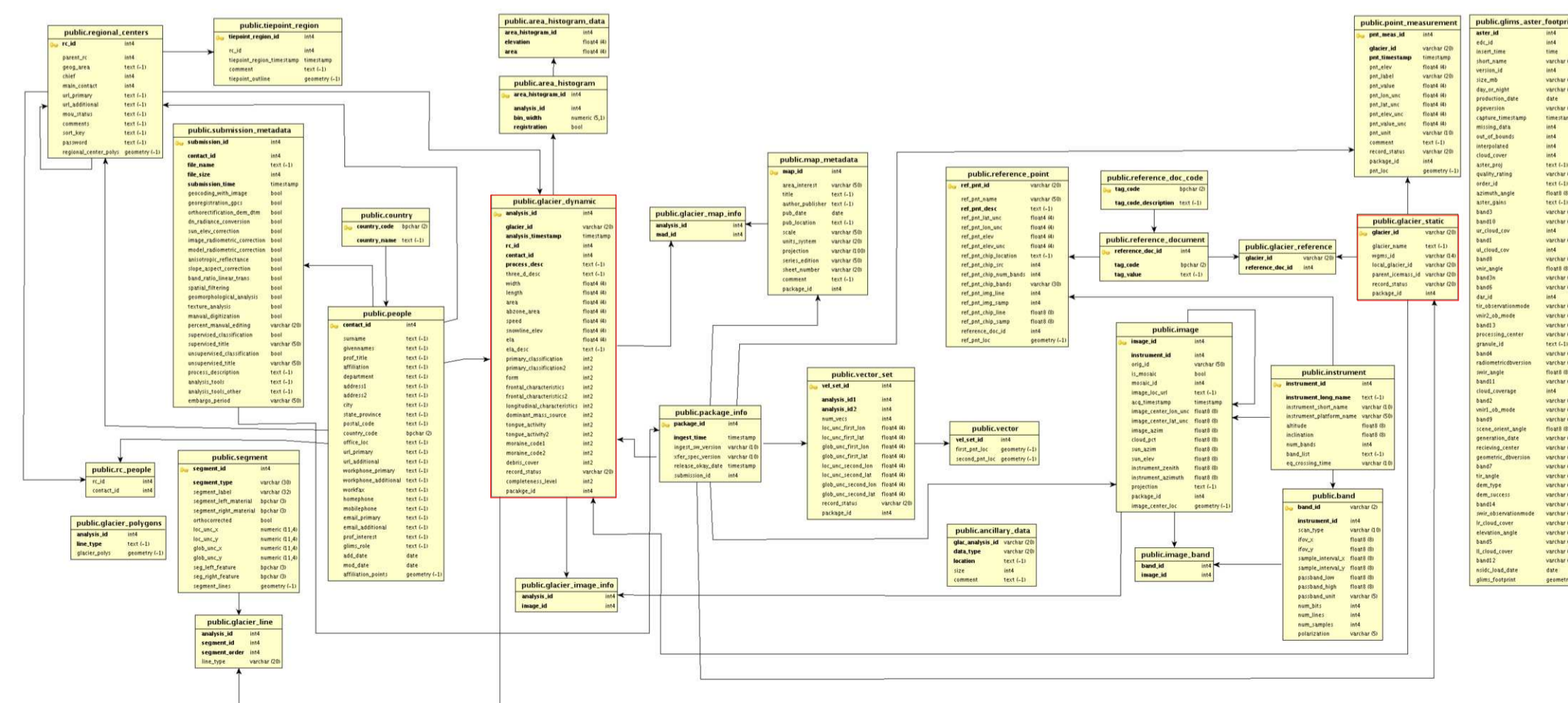
Data Elements

Major Tables in the GLIMS Database	
Table Name	Description
Glacier_Static	Non- or little-changing information about a glacier
Glacier_Dynamic	Snapshots of glacier state
Instrument_Image/Band	Information about images and sensors
Reference_Document	Links to journal articles, maps, etc.
Institution/Regional_Centers/People Segments	Information regarding data originator
Point_Measurement	Glacier outlines, centerlines, snowlines, etc.
Area_Histogram	Geolocated measurements such as debris thickness
	Area-elevation histogram data

Major Layers in Web Map Server	
Layer Name	Description
GLIMS Glaciers	Glacier outlines, centerlines, snowlines, etc.
ASTER Footprints	Footprints of ASTER images acquired over glaciers
Regional Center outlines	areas of responsibility of RCs
GLIMS Institution Points	locations of GLIMS institutions
Glaciers from DCW	Digital Chart of the World glacier layer
World Glacier Inventory	WGI data and metadata
STAR Outlines	Glacierized areas that guide GLIMS ASTER acquisitions
Source Images	Full resolution imagery analyzed for glacier outlines

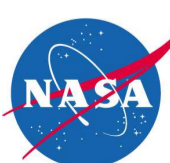
Entity Relationship Diagram

The main tables are highlighted in red.



Future Plans

Future enhancements to the the GLIMS database include the near-real-time population of the ASTER image metadata, the development of other OGC-compliant Web Services (WFS, WCS, etc), a choice of projections, better capability to constrain multi-temporal data, and the option to export custom-defined subsets of GLIMS data in a variety of GIS data formats. Planned enhancements to the database itself include increasing the volume of data, and the availability of pre-computed statistics from the glacier data.



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