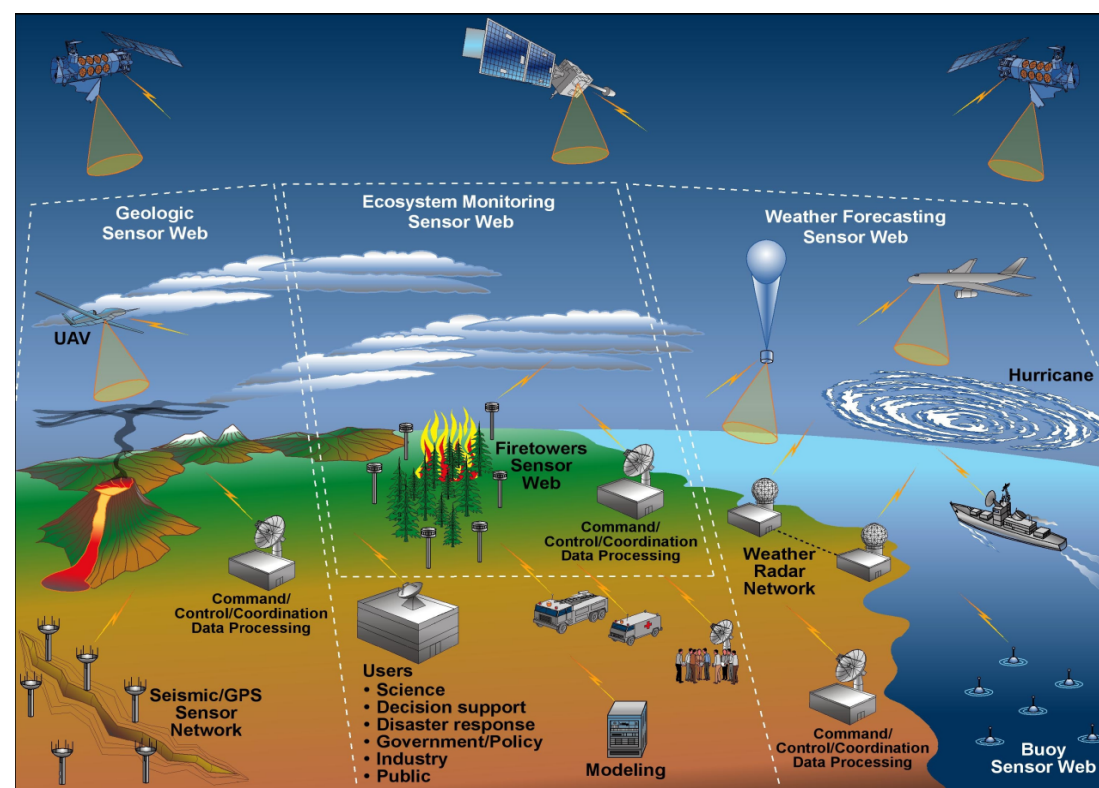


Sensor Webs and Virtual Globes: Enabling Understanding of Changes in a partially Glaciated Watershed

Sensor Web

A sensor web is the step beyond a sensor network. A distributed, heterogeneous set of sensors are a sensor network. The sensor web has autonomous reactivity based on the observations and "in-web" processing.



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<http://seamonsterak.com/>

<http://seamonster.jun.alaska.edu/websvn/>

Virtual Globe

A virtual representation of the planet. Primary examples are Google Earth, WorldWind, and Virtual Earth. Other virtual worlds such as Second Life also have potential use for Geosciences.

Creating the kml

The raw data, associated shape files, gridded model output, etc. are stored in the postGIS/ Geoserver described below.

We also create kml content related to this project using iphoto2kml (from a GPS enabled camera storing geospatial information in EXIF image headers), the matlab kml generation toolbox, and we produce "on-the-fly" graphics using scripted sql calls and google charts libraries.

Links from within the kml are made to munin/rrdtool system management software and to a php/java online databrowser.

Benefits of Sensor Web & Virtual Globe Combination

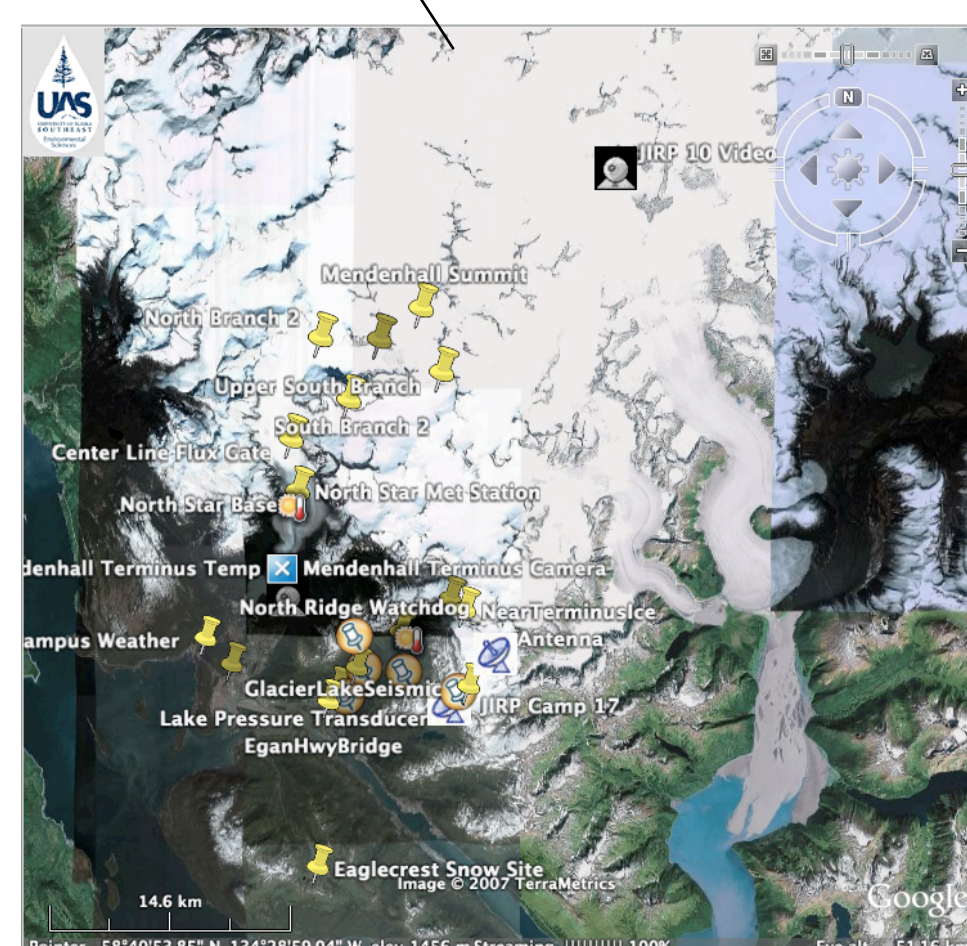
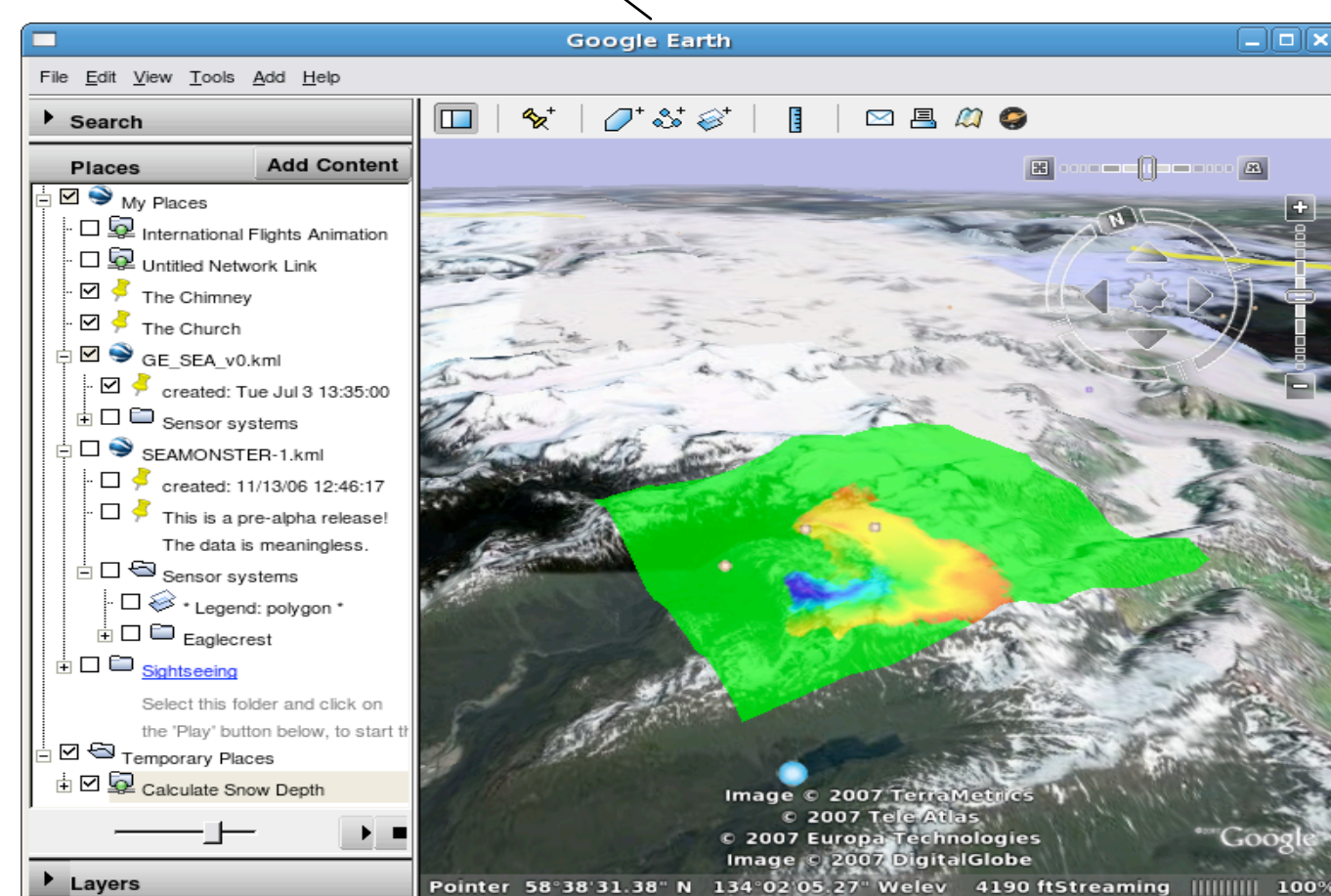
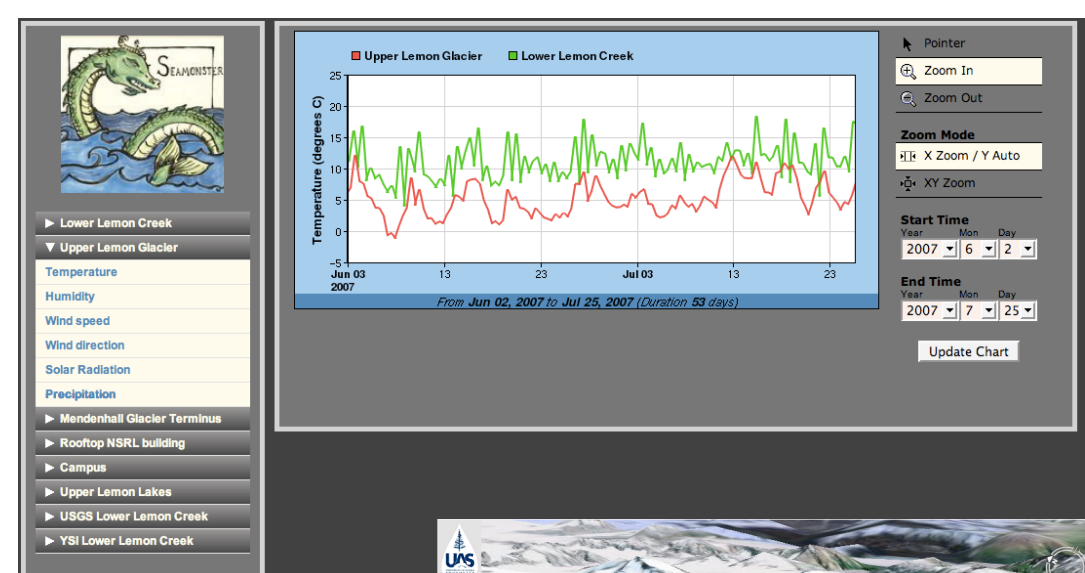
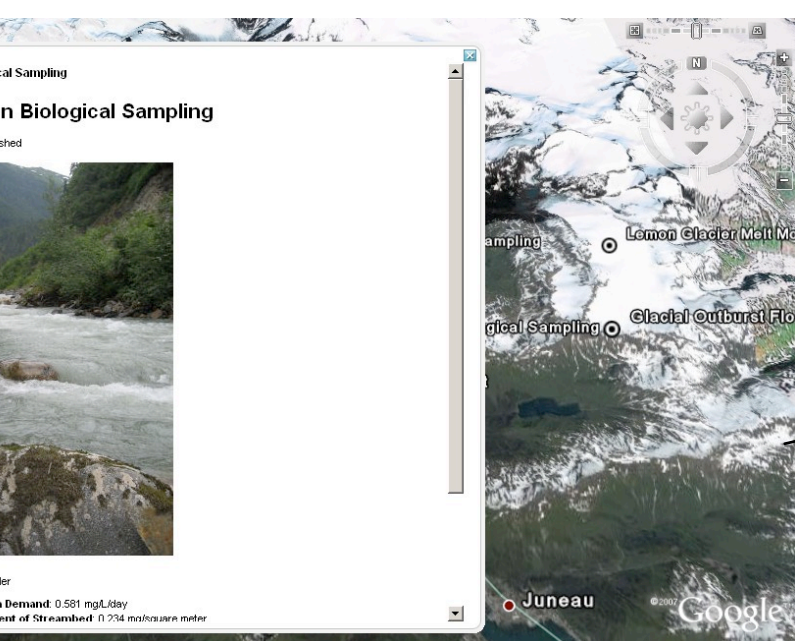
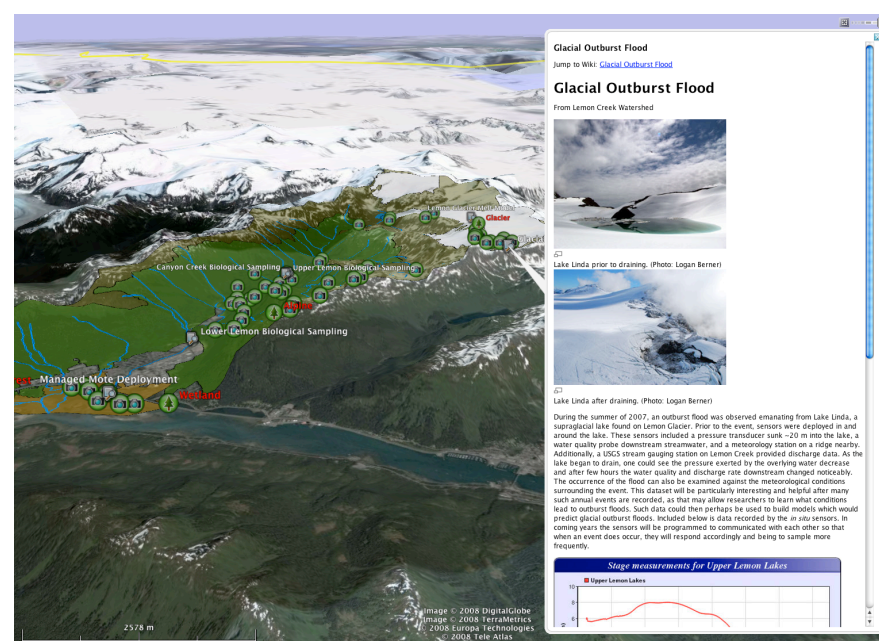
A sensor web coupled with a virtual globe addresses multiple sensor web specific and more general geoscience challenges. The tour portion illustrates these features:

(also at <http://seamonsterak.com/2008FAGU.kml>)

1. Education and Public Outreach

2. Scientific Understand of Complex Watershed

3. Management of Sensor Web

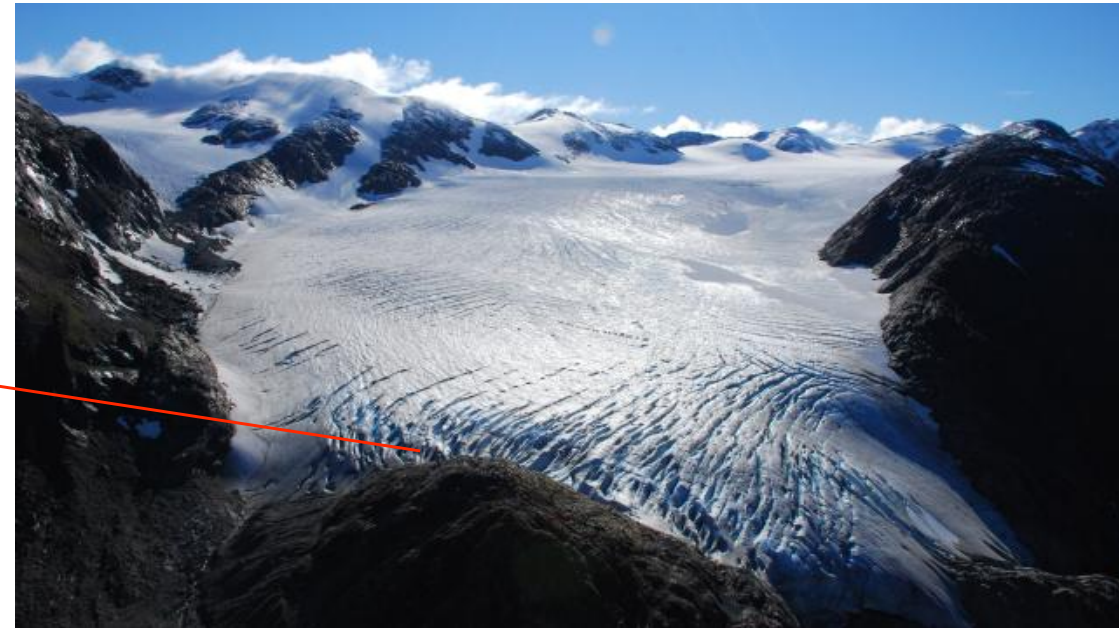
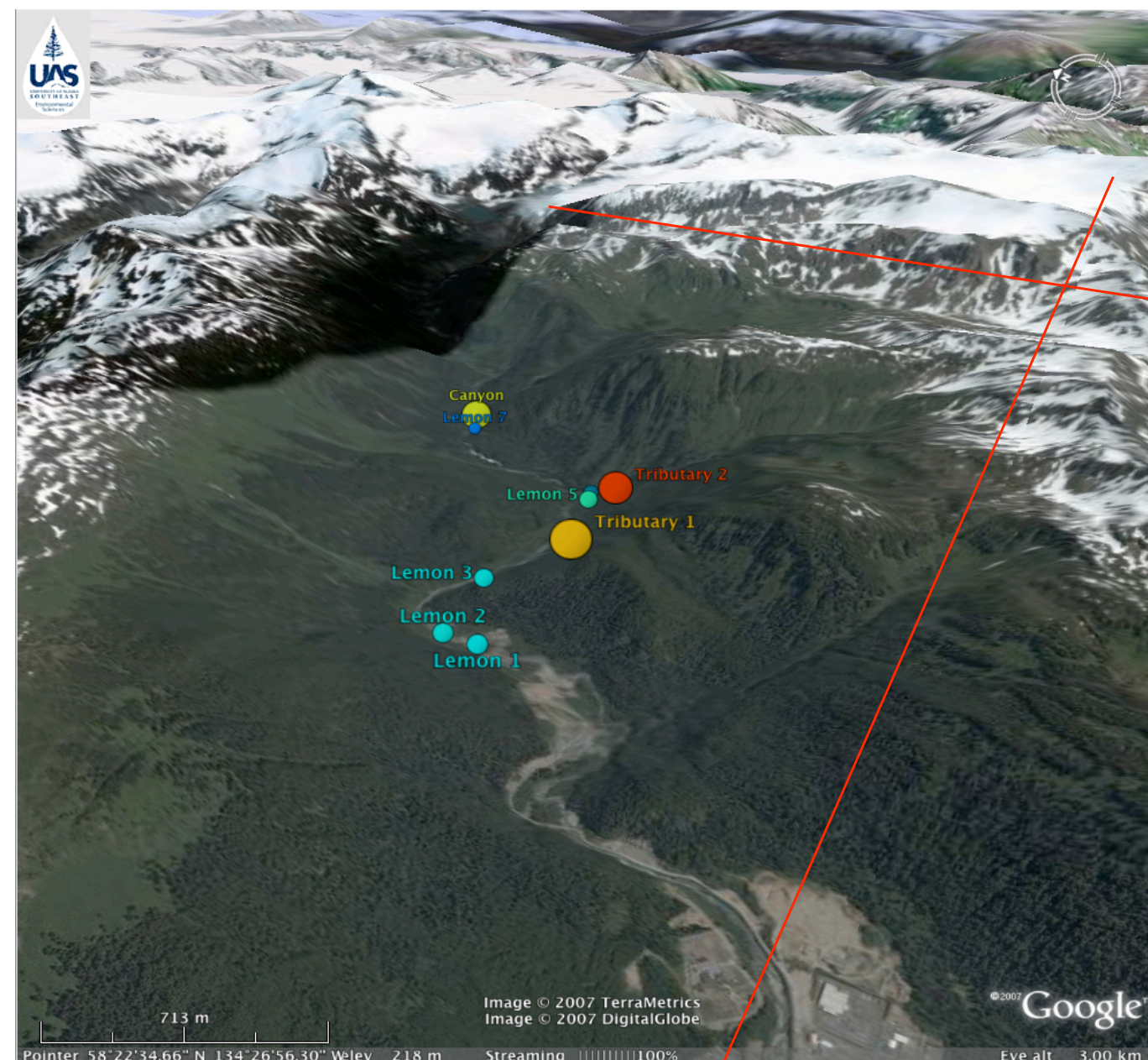


Background

SEAMONSTER is the SouthEast Alaska MOnitoring Network for Science, Technology, Education, and Research. The SEAMONSTER project focuses on implementing a sensor web in the partially glaciated Lemon Creek watershed in Juneau, Alaska.

The Lemon Creek Glacier has a supra-glacial lake that catastrophically drains underneath the glacier and down the watershed.

Instrumentation includes meteorologic stations, water quality sondes, differential GPS, web cameras, a pressure transducer to monitor lake level, and a stream discharge gauge.



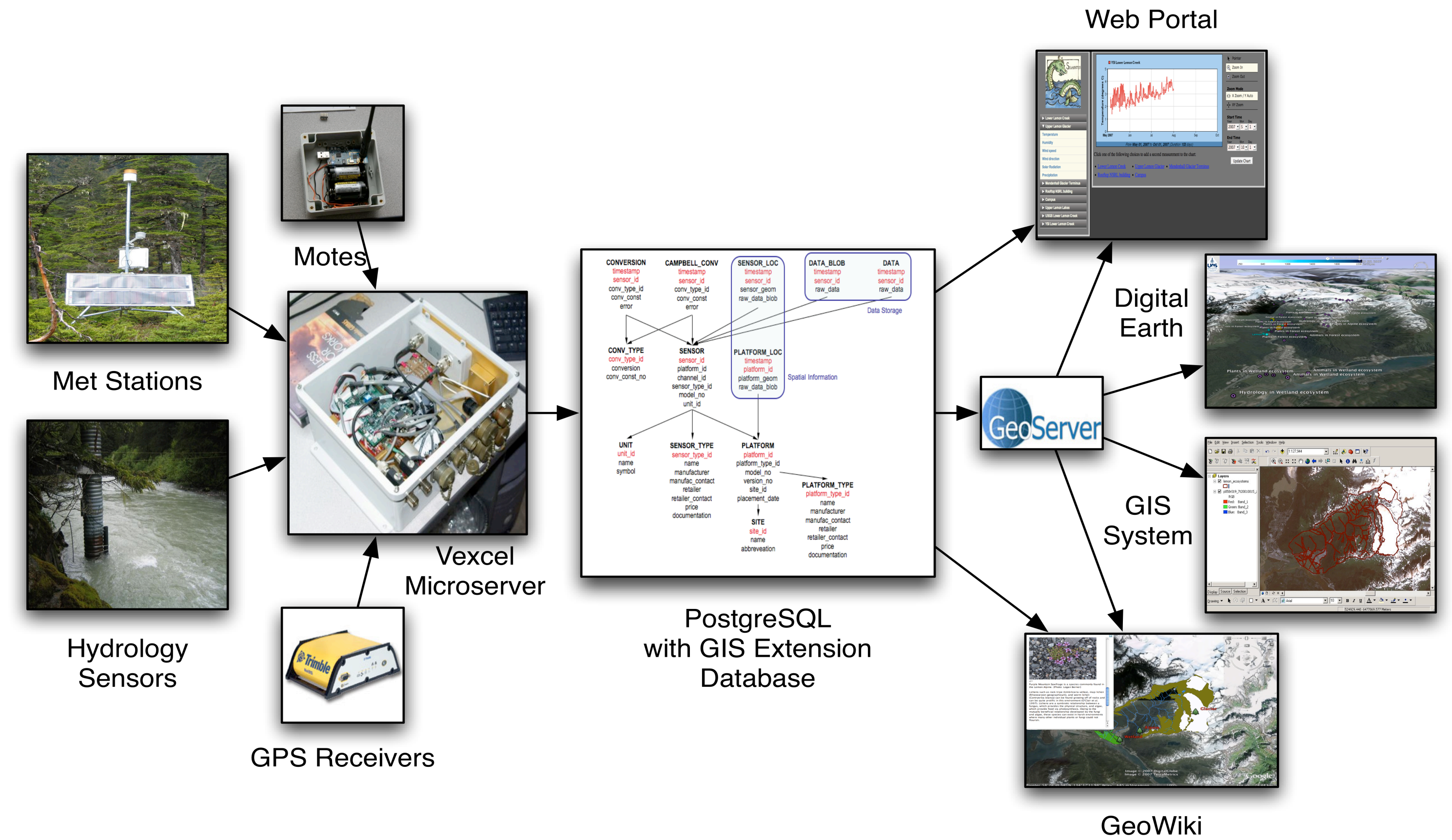
Total surface elevation change: 400 meters
Longitudinal reach: 7500 meters
Bathymetry (best guess, Marcus 1995)
200+ meters deepest (first 1/3)
150 meters (second 1/3)
Linear to terminus

Jokulhlaup Impact on Watershed
Drained Lake shown below



Database

A PostgreSQL database with GIS extensions (postGIS) is used in combination with an OGC GeoServer. This provides a database with geospatial information associated with every row and easy export in multiple formats through the GeoServer.



GeoWiki

The mediawiki engine uses a SQL database for storage. We use the same postGIS database, and therefore every wiki page has geospatial information.

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