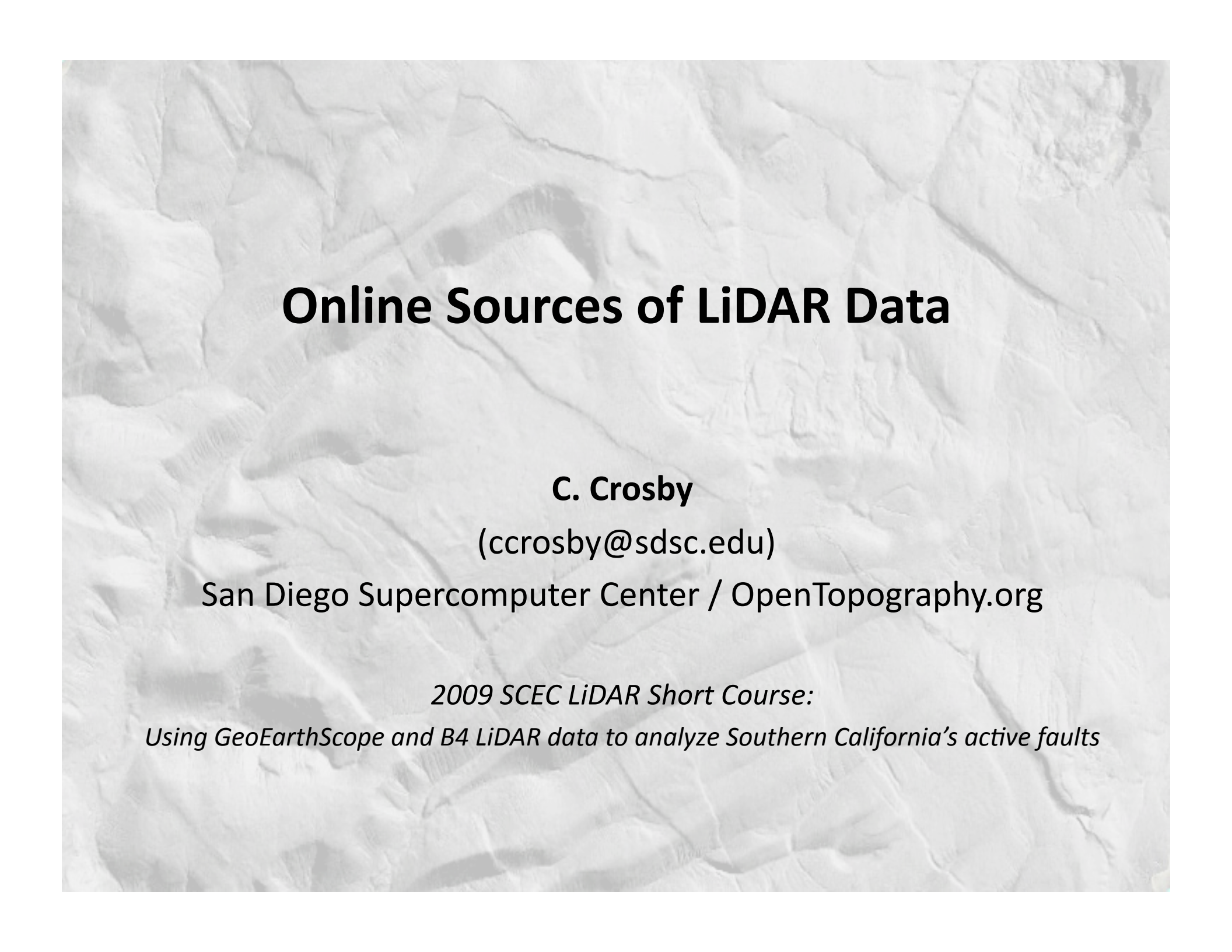


The background of the slide is a grayscale topographic map showing a rugged, mountainous terrain with numerous ridges and valleys. The map is oriented horizontally, with the highest elevations (indicated by darker shading and contour lines) generally towards the top and right sides.

Online Sources of LiDAR Data

C. Crosby

(ccrosby@sdsc.edu)

San Diego Supercomputer Center / OpenTopography.org

2009 SCEC LiDAR Short Course:

Using GeoEarthScope and B4 LiDAR data to analyze Southern California's active faults

- Online access to LiDAR varies significantly:
 - *High-end*: Interactive systems offering access to point cloud data (user defined areas) + tools to generate custom products
 - DEMs, contours, browse images/Google Earth files)
 - Interactive maps (web or Google Earth-based) serving tiled DEMs or LAS tiles
 - *Basic*: FTP servers offering tiled data
- File formats (pts & grids) vary by source
 - Points:
 - ASCII formats (.xyz, .txt) or LAS binary (.las)
 - DEMs in various GIS-compatible formats:
 - ASCII grids (.asc), ESRI binary (Arc/INFO) grids, .grd, .flt, GeoTIFF
- Central clearinghouse for national public domain LiDAR data does not exist.

OpenTopography Portal

www.opentopography.org

<http://www.opentopography.org/index.php/resources/links>

Home	About	Data	Resources	CloudStor	Blog	Forums
Tools	Metadata & Files	Documents	Tutorials	Links	Education	myOpenTopo

Links

LiDAR Data Sources:

Online LiDAR data sources other than the OpenTopography Portal – see the [Data tab](#) above for data hosted by OpenTopography

- [USGS CLICK](#) (Center for LIDAR Information Coordination and Knowledge) – a large collection of LiDAR point cloud data mostly in LAS format.
- [National Center for Airborne Laser Mapping \(NCALM\) Data Distribution Center](#) – high-resolution LiDAR DEM data collected by NCALM for National Science Foundation-funded research projects.
- [Puget Sound LiDAR Consortium](#) – high-resolution LiDAR data for western Washington.
- [USGS Decision Support for Coastal Science and Management](#) – LiDAR data of coastal and marine environments acquired by the USGS Coastal and Marine Geology Program. Data includes coverage of many coastal National Parks, Monuments, Recreation Areas, and Historic Sites.
- NOAA [LiDAR Data Retrieval Tool \(LDART\)](#) – LiDAR coverage in narrow coastal swaths acquired mostly for topographic change mapping. Point clouds and custom DEMs available.

State Data Collections:

- Idaho: [LiDAR Data for Idaho](#)
- Iowa: [Iowa LiDAR Mapping Project](#)
- Louisiana: [Atlas LiDAR Downloader](#)
- North Carolina: [NC Floodplain Mapping Program](#)
- Ohio: [Ohio Statewide Imagery Program](#)
- Oregon: [Oregon LiDAR Consortium](#)
- Pennsylvania: [PAMAP Elevation Data](#)
- Utah: [Utah GIS Portal](#)

Other Topographic Data Sources:

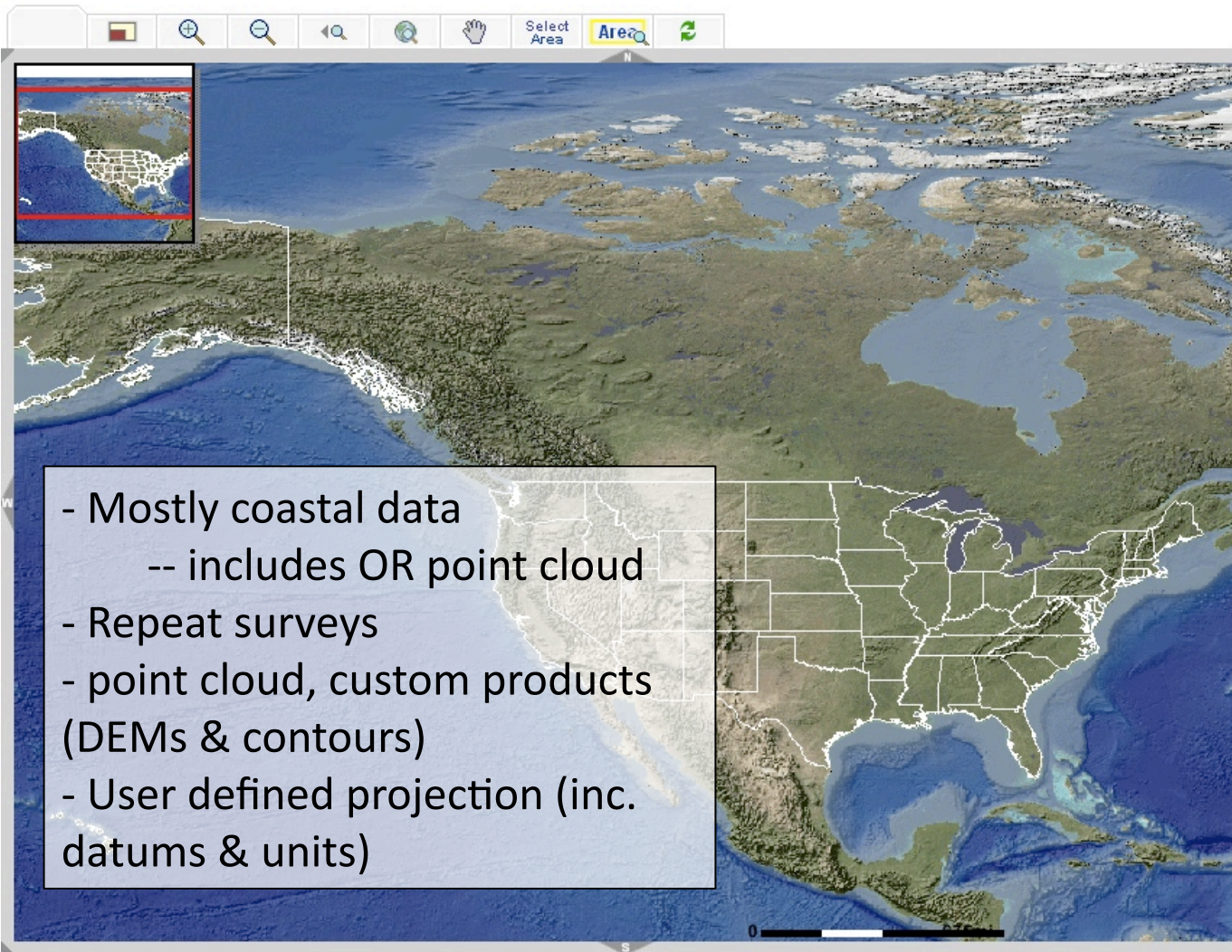
- [USGS National Elevation Dataset](#) (NED) – 1 arc-second (~30 meters), 1/3 arc-second (~10 meters), and some 1/9 arc-second (~3 meters) digital elevation model data via the [USGS National Map Seamless Server](#).
- [Shuttle Radar Topography Mission \(SRTM\)](#) – 90 m DEM data available via [CGIAR-CI](#). 30 and 90m SRTM data are also available via the [USGS Seamless site](#)
- [ASTER Global Digital Elevation Map](#) (GDEM) – 30 meter digital elevation model data created by stereo-correlation of [ASTER](#) VNIR images.
- NOAA National Geophysical Data Center [Global Land 1 km Base DEM](#) – "A 30-arc-second (1-km) gridded, quality-controlled global Digital Elevation Model

NOAA Digital Coasts:

<http://www.csc.noaa.gov/digitalcoast/index.html>

DIGITAL COAST

Digital Coast : Data Access Viewer



Data Search Results Help

Location Search ▼

Click and drag a box on the map to search for data.

Area

(Optional) Limit by keywords*: ?

lidar

☒ Match ANY ☐ Match ALL

State Search ▼

Find data in: Select State

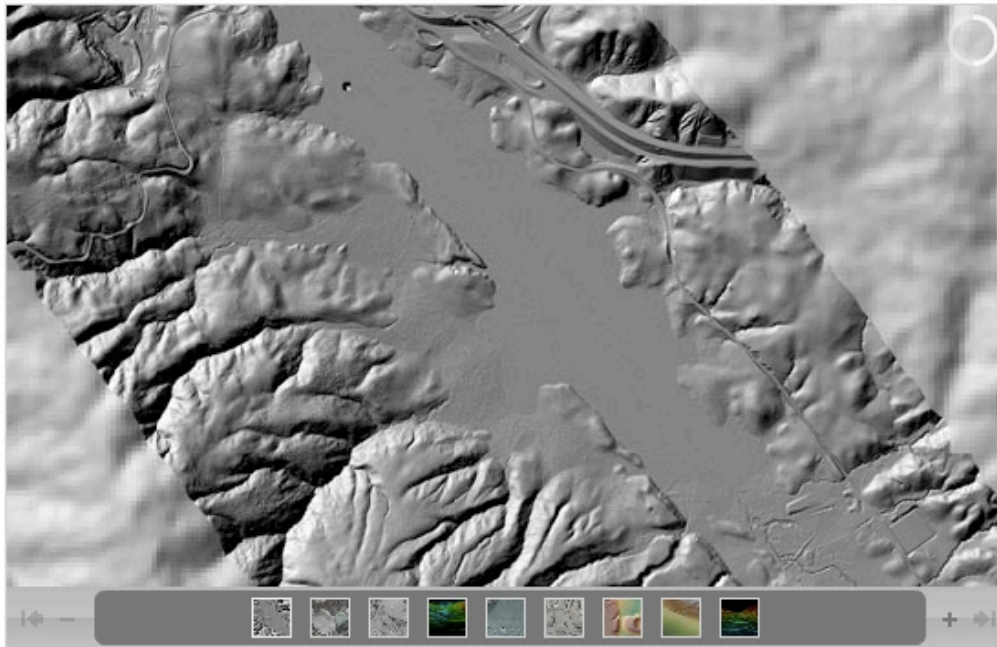
(Optional) Limit by keywords*: ?

lidar

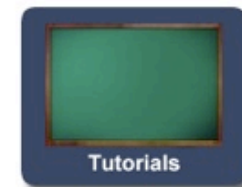
☒ Match ANY ☐ Match ALL

Search

Enter Search Coordinates ►



The OpenTopography Portal provides integrated access to high-resolution topographic data and web-based processing tools as well as enables its user community to share knowledge, resources and build science collaborations.



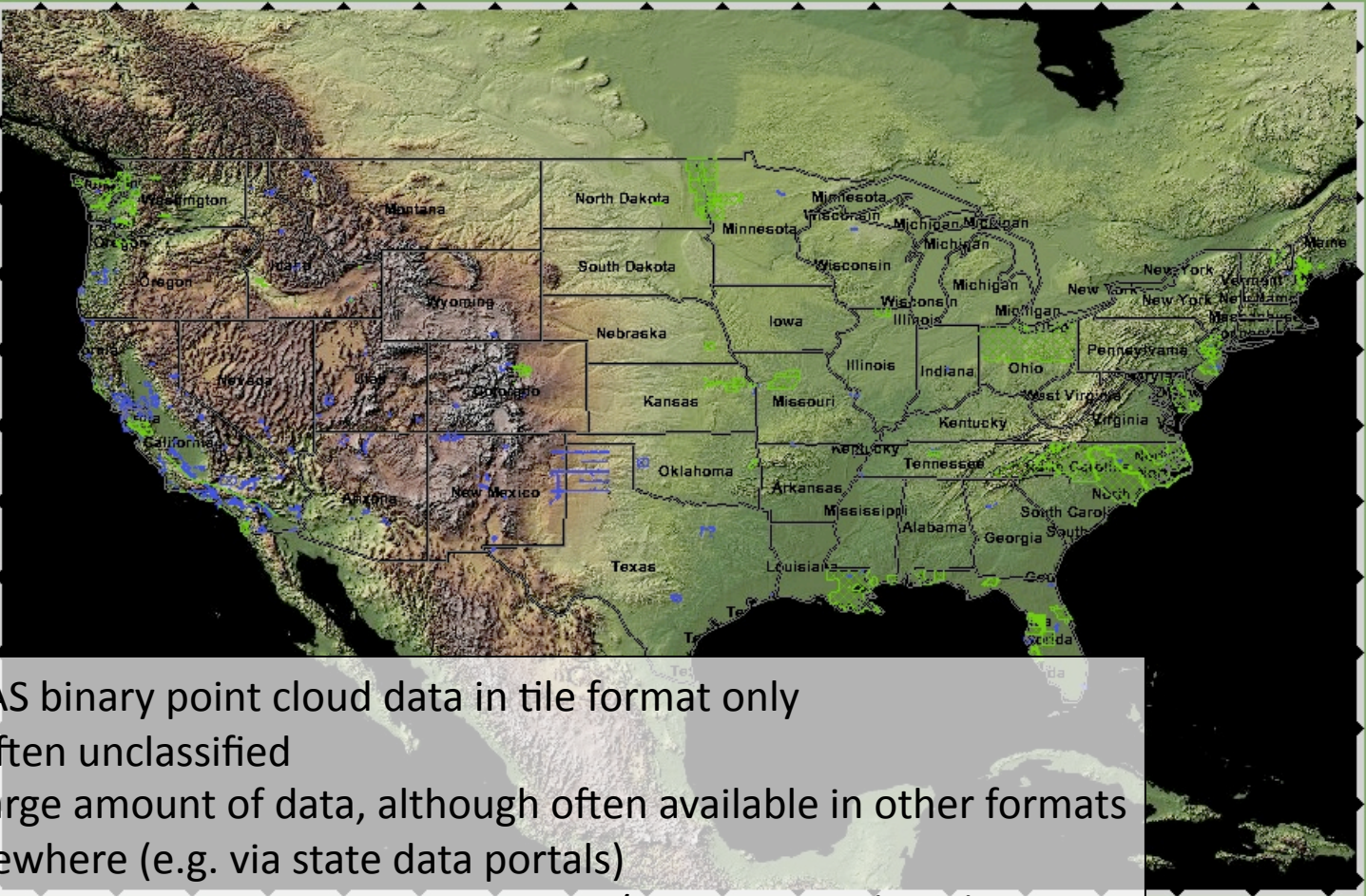
- Latest News
- Mostly active faults (and associated landforms) in western US
 - point cloud, custom products (DEMs), standard DEMs, Google Earth hillshades
 - Other resources including tutorials, short course materials, links, etc.
- Workshop: Using GeoEarthScope and B4 LIDAR data to analyze Southern California
- New Southern California LIDAR Available: Elmore Fault, Burro Flats San Andreas.

Available Data



http://lidar.cr.usgs.gov/LIDAR_View/

USGS
Light Detection and Ranging (LIDAR) [Go to viewer Intro](#) [Back to CLICK Webpage](#)



Zoom
[Icons for zoom in, zoom out, pan, etc.] XY

Query
[Icons for query, etc.]

Tools
[Icons for tools, etc.]

Downloads
[Icons for downloads, etc.]

Documents
[Icons for documents, etc.]

Scale Information
Out In
Scale ~ 1:28,521,193

Layers
Transportation
Boundaries
Hydrography
Orthoimagery
Land Cover
Elevation

- LAS binary point cloud data in tile format only
- Often unclassified
- Large amount of data, although often available in other formats elsewhere (e.g. via state data portals)
- Bare earth data in CLICK becomes 1/9 arc second (~3m) DEM data in NED.
- Excellent LiDAR discussion forum also hosted by CLICK

U.S. Department of the Interior
URL: /Lidar_viewer/ | Last Update: May 4, 2004 | Maintenance Comments and Suggestions | Disclaimer



NCALM

LIDAR DATA
DISTRIBUTION CENTER



The National Center for Airborne Laser Mapping

Welcome to the NSF Supported NCALM Data Distribution Center
For the main NCALM website please visit www.ncalm.org

<http://calm.geo.berkeley.edu/ncalm/ddc.html>

Google Earth

File Edit View Tools Add Help

Search

Places

My Places

Sightseeing

Select this folder and click on the 'Play' button below, to start

Temporary Places

NCALM LIDAR Data

Napa Watershed, CA

Tender Foot Creek, MT

South Fork Eel River, CA

Dragon's Back Ridge (Sa...

Big Sky, MT

Archibold Station, FL

Susquehanna River, MD

Potomac River, MD

Silver Plume, CO

St. Elias Mountains (Katal...

Lake Powell, UT

Death Valley (Furnace Cr...

Flathead Lake, MT

Death Valley (Furnace Cr...

logo

- Google Earth-based (download KML file)
- DEMs delivered in tiles
- ESRI Arc/INFO grids

Image © 2008 TerraMetrics

© 2008 Europa Technologies

© 2008 Tele Atlas

Google

Puget Sound Lidar Consortium

public-domain high-resolution topography for western Washington

<http://pugetsoundlidar.ess.washington.edu/>

[Data!](#)

[About
LiDAR](#)

[About
the
PSLC](#)

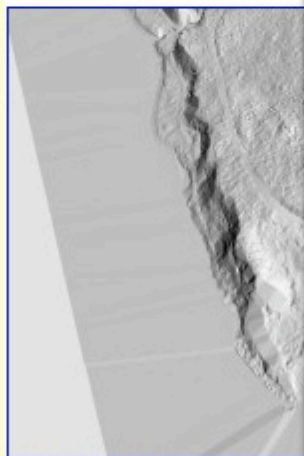
[Uses of
LiDAR
Data](#)

[Links](#)

[Contact
Us](#)

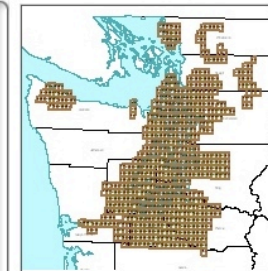
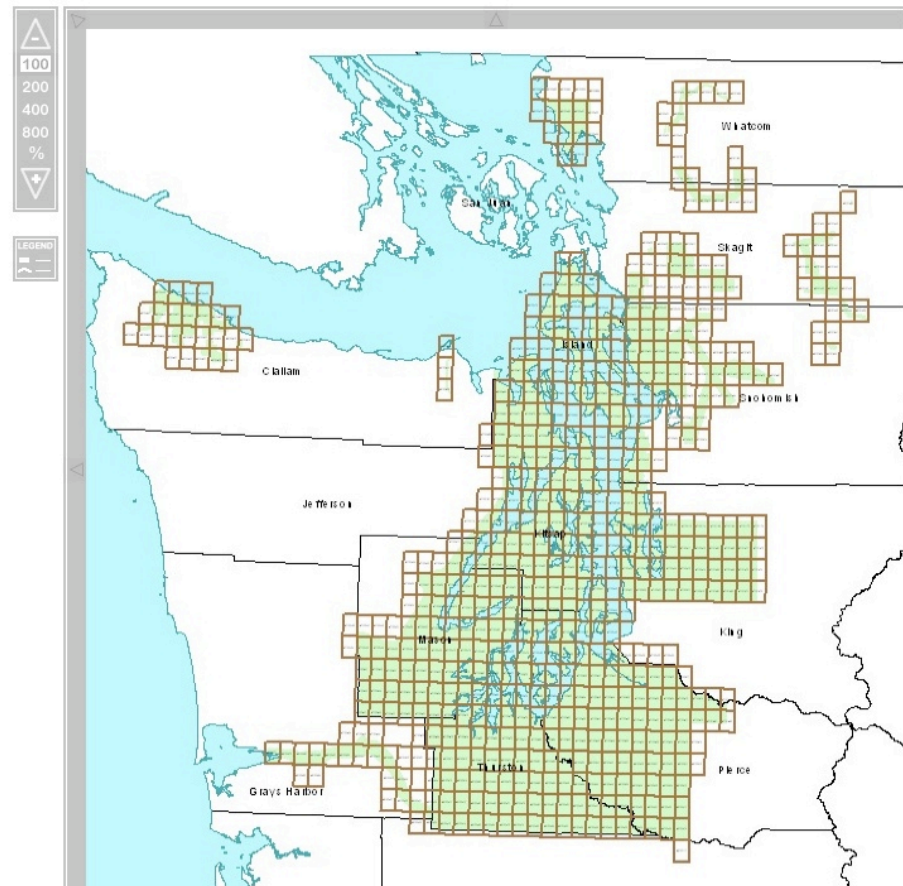


Seattle
Public
Utilities



Oblique view of south
SE Bainb
[More examples o](#)

Download Bare Earth 6-ft DEM - Washington State Plane North



Zoom in and then Click on the map on the left to download data for each quarter quad.

- Lots of data for w. Washington
- DEMs, ASCII point clouds, hillshade images, contours
- clickable maps and FTP

Decision Support for Coastal Science and Management

DSP Home

Technology

Mapping

Data

Publications

Outreach

Collaborators

Contact

Acronyms

Decision Support for Coastal Science and Management

Data: View in Google Maps

<http://ngom.usgs.gov/dsp/>

- [Assateague Island National Seashore](#)
- [Biscayne National Park](#)
- [Cape Cod National Seashore](#)
- [Colonial National Historic Site](#)
- [Dry Tortugas National Park](#)
- [Fire Island National Seashore](#)
- [Florida Keys](#)
- [Gateway National Recreation Area](#)
- [George Washington Birthplace National Monument](#)
- [Gulf Islands National Seashore](#)
- [Jean Lafitte National Historic Park and Preserve](#)
- [Natchez Trace Parkway](#)
- [Northeast Barrier Islands](#)
- [Northern Gulf of Mexico](#)
- [Padre Island National Seashore](#)
- [Sagamore Hill Historic Site](#)
- [Thomas Stone National Historic Site](#)
- [U.S. Virgin Islands](#)
- [Vicksburg National Military Park](#)



- Coastal and National Park/Monument emphasis
- Collected with Experimental Advanced Airborne Research Lidar (EAARL)
- DEMs, point clouds, hillshade images, Google Earth overlays
- links to USGS OFR and Data series
- Data not in CLICK...

State Data Collections:

State collections with some form of data online (*list may be incomplete – if you know of others let me know*):

- Idaho - <http://inside.uidaho.edu/geodata/LiDAR/>
- Iowa - <http://www.geotree.uni.edu/lidarProject.aspx>
- Louisiana - <http://atlas.lsu.edu/lidar/>
- North Carolina - <http://www.ncfloodmaps.com/>
- Ohio - <http://ogrip.oit.ohio.gov/ProjectsInitiatives/StatewideImagery.aspx>
- Oregon - <http://www.oregongeology.org/sub/projects/olc/default.htm>
- Pennsylvania - <http://www.dcnr.state.pa.us/topogeo/pamap/elevation.aspx>
- Utah - <http://gis.utah.gov/elevation-terrain-data/2-meter-bare-earth-lidar>

List with URLs updated as I encounter new data sources at:

<http://www.opentopography.org/index.php/resources/links>

Interactive hillshade viewers:

- Web map or Google Earth based
- Make the data easy to access without GIS skills
- Excellent resource for education



State of Oregon

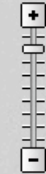
DOGAMI Lidar Data Viewer

OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES (A MEMBER OF THE OREGON LIDAR CONSORTIUM)

<http://www.oregongeology.org/interactivemaps/lidardataviewer/>



- ☒ Reference Features
- ☒ South Coast Project Area
- ☒ Camp Creek Project Area
- ☒ Ontario Project Area
- ☒ Regional Base Map



Map Data Credit: Oregon Lidar Consortium, DOGAMI, Oregon Geospatial Data Clearinghouse

540

Cape Arago

3224 Feet

earth
scope
GEON

<http://www.opentopography.org/kml/>

Image © 2009 DigitalGlobe

Google

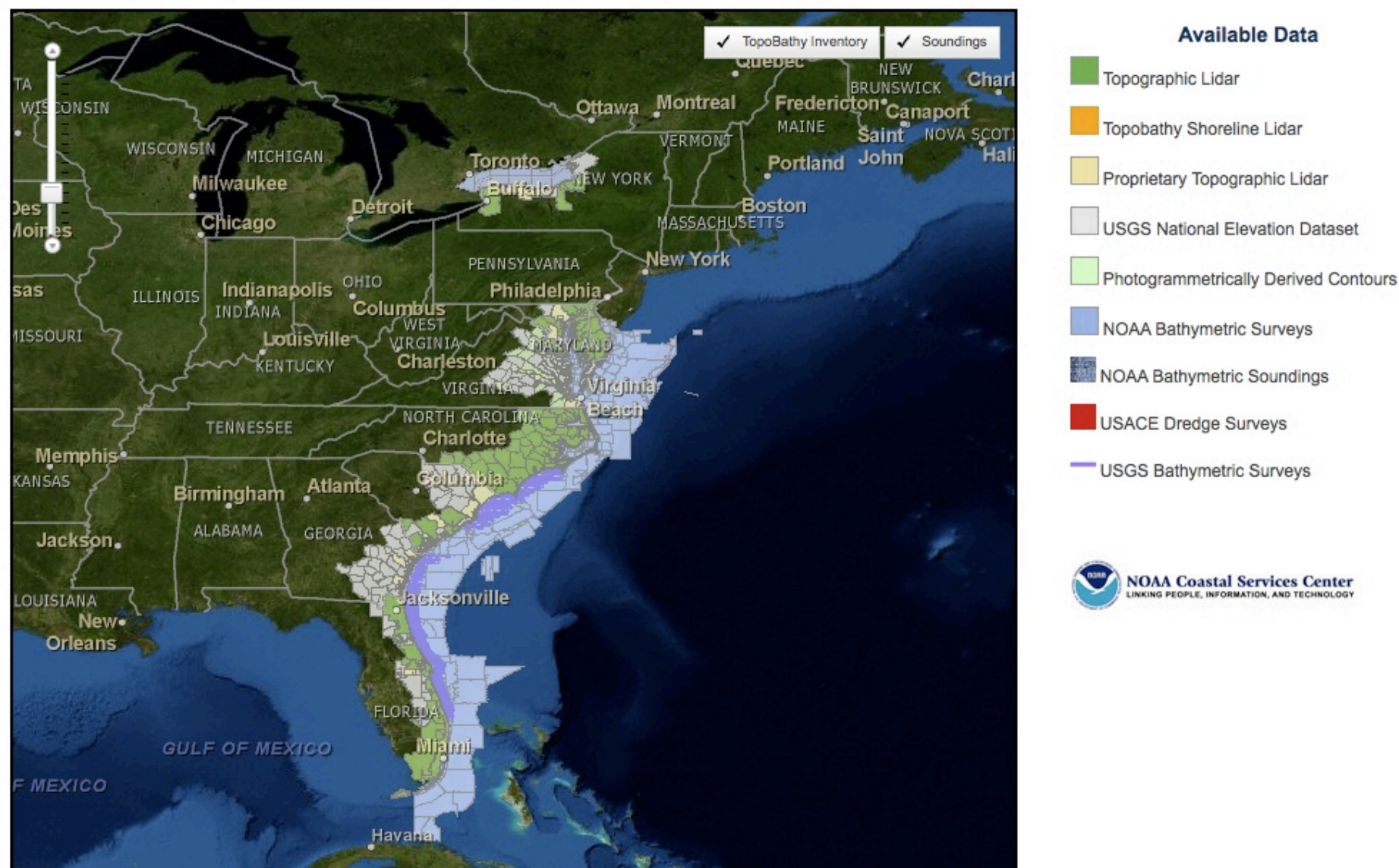
Imagery Date: 2005

11 S 443362.38 m E 3924262.46 m N elev 982 m

Eye alt: 2.54 km

Towards a national LiDAR data inventory: NOAA regional topobathy inventories
<http://www.csc.noaa.gov/topobathy>

Topographic and Bathymetric Data Inventory





OpenTopography

- Recently received NSF funding to operate as a Facility for high resolution lidar topography.
- Started as an R&D project under GEON call the “GEON LiDAR Workflow” (GLW) in ~2004.
- Current goal is to be “A Portal to High-Resolution Topography Data and Tools”, with an emphasis on Earth science-oriented public domain data.
- Utilizing “advanced cyberinfrastructure” to democratize access to datasets like EarthScope and B4 lidar.

The Problem:

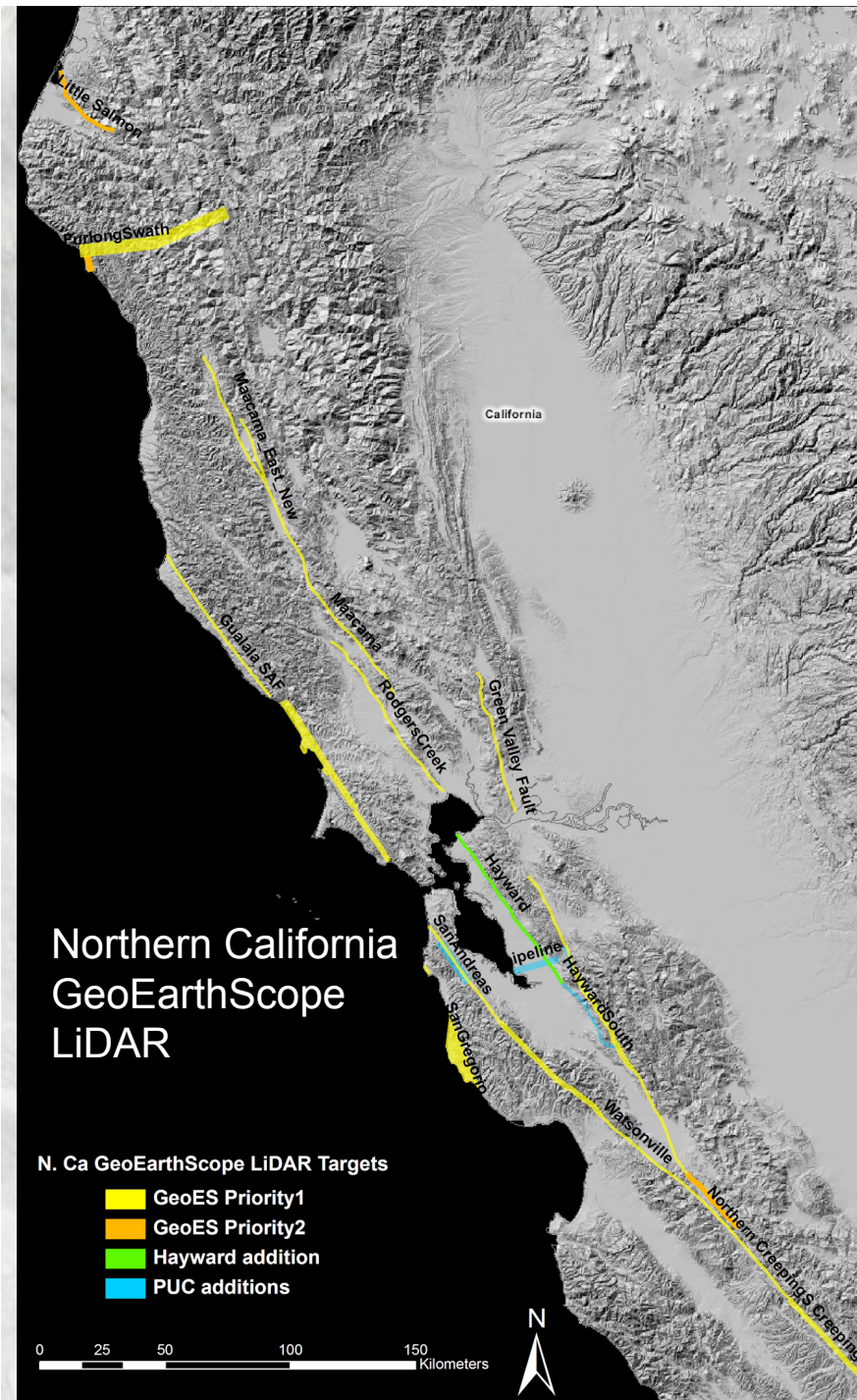


Analogy credit to Jason Stoker, USGS EROS

The Challenge of Community LiDAR data

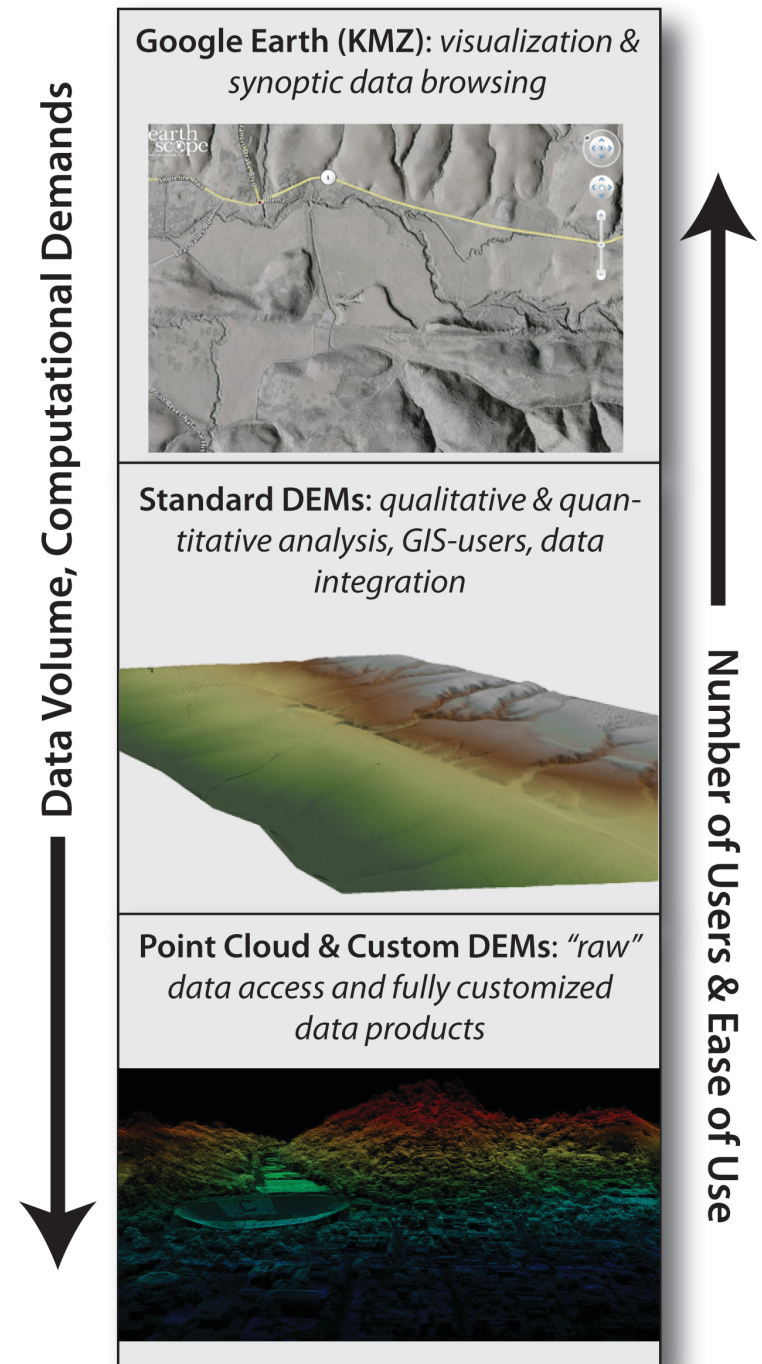
- LiDAR acquisition over 1200+ km² = ~ 8.3 billion LiDAR returns
- ~ 9,500 1 km² 0.5 m DEMs as “standard” products
- Large user community with variable needs and levels of sophistication.

How do we deliver large community datasets such as these?



Tiered Data Access:

- Vast majority of earth science users want a standard products:
 - DEM
 - “pretty picture”
- Most don’t want to think about point clouds, return densities & algorithms:
 - Likely an issue of education of user community
 - Data processing stands in the way of science
 - Smaller percentage of LiDAR users want point cloud access (~20% ?)





OpenTopography

A Portal to High-Resolution
Topography Data and Tools

myOpenTopo

Home

About

Data

Resources

Community

Support



Old Faithful area of Yellowstone National Park shown in first return GeoEyeScope LIDAR data. Image overlain in Google Earth.

Quicklinks:

Point Cloud Data

Standard DEMs

Google Earth Files

Tutorials

Spotlight

New Southern California LiDAR Available

Available EarthScope LiDAR data in southern California has now grown to include the Elsinore fault, the Burro Flats segment of San Andreas fault, and the Crater Mountain portion of the Owens Valley.

[News item](#)

Posted: September 15 2009

Latest News

Materials from 2009 GSA Short Course now Available

Lectures, tutorials and sample data, and related documents from the [2009 Geological Society of America Short Course](#), [Introduction to the acquisition, visualization, and interpretation of airborne lidar-derived digital elevation models](#), are [now available](#) via OpenTopography.

Available Data



Latest dataset:

[EarthScope Alaska Denali Totschunda LiDAR Project](#)

Total LiDAR returns for this dataset: 2,328,316,068

Total Size on Database Disk: 209.4 GB