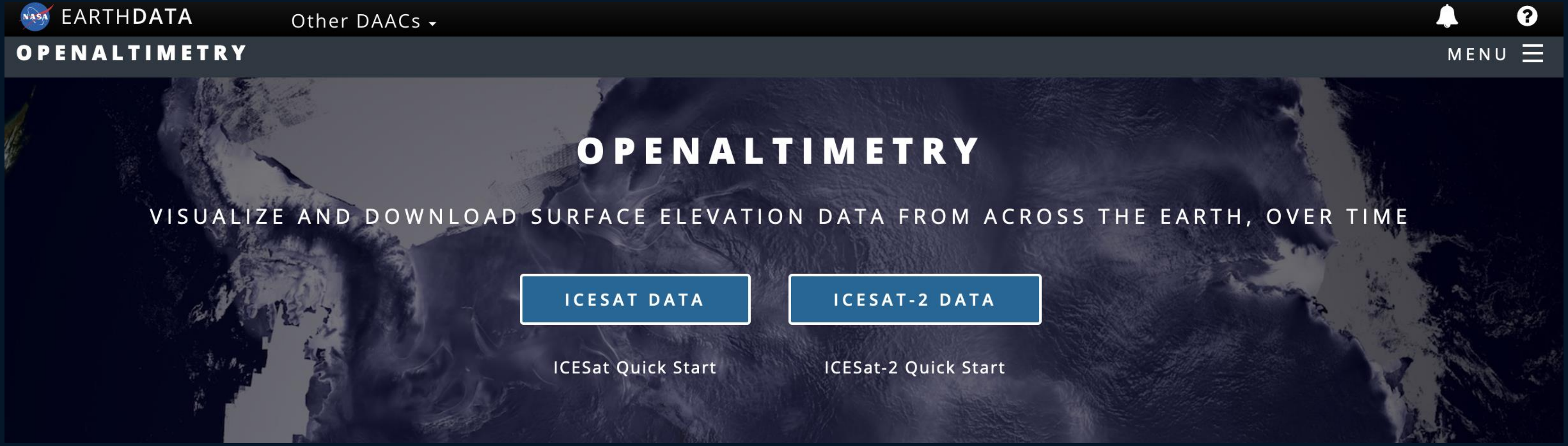
OpenAltimetry



ICESat-2 and ICESat data **discovery** and **visualization**

Siri Jodha S. Khalsa, Adrian Borsa, Viswanath Nandigam, Minh Phan, Kai Lin, Christopher Crosby, Helen Fricker, Chaitan Baru, Luis Lopez OpenAltimetry - rapid analysis and visualization of Spaceborne altimeter data. *Earth Sci Inform* (2020). https://doi.org/10.1007/s12145-020-00520-2.

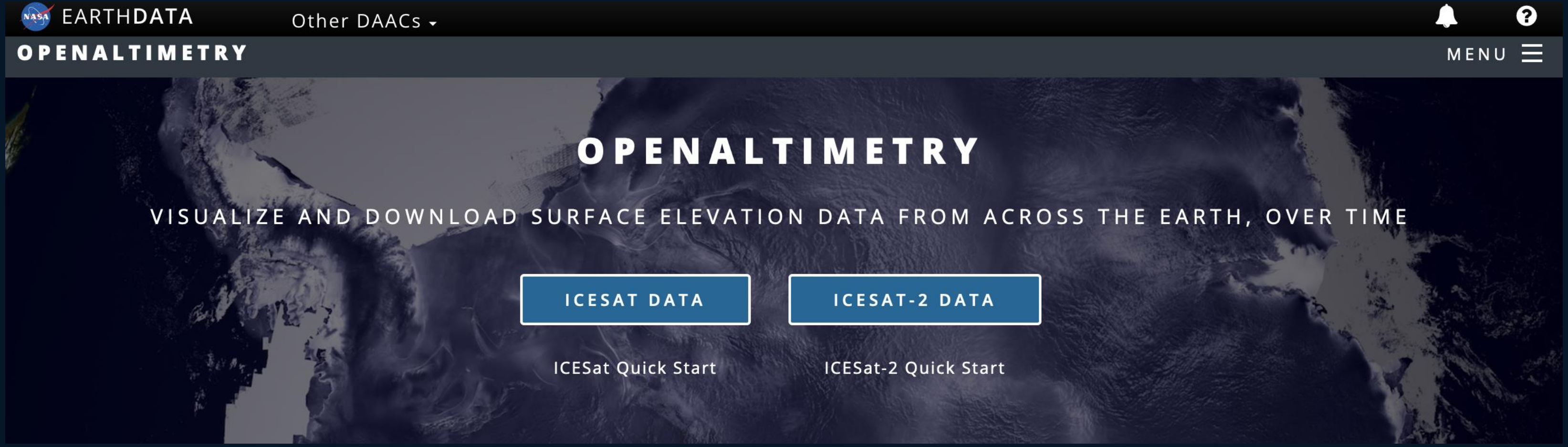
OPENALTIMETRY –NASA ACCESS 2015

“The increasing complexity and size of Earth sciences datasets calls for better ways to access, visualize, analyze and understand the data that is being generated. Earth observation data is increasingly being used to inform decision making regarding pressing environmental and societal issues, driving the need for intuitive data interfaces that support the needs of non-expert users.“

- Challenge: large volumes of data => “steep learning curves and heavy demands on computational resources”

- NASA ACCESS program => “improve and expand the use of NASA’s Earth science data for scientific research and applications by leveraging modern techniques for discovering, managing and analyzing large and complex Earth science datasets.”

OpenAltimetry -> NASA's Earthdata Cloud



HISTORY

OpenAltimetry began as an Advancing Collaborative Connections for Earth System Science (ACCESS) Program-funded collaboration between Scripps Institution of Oceanography, San Diego Supercomputer Center UC San Diego, NSIDC, and EarthScope Consortium (formerly @UNAVCO).

NEWS

In October 2023 OpenAltimetry became a NSIDC DAAC / NASA ESDS supported application in NASA's Earthdata Cloud environment

ACCESS

https://openaltimetry.earthdatacloud.nasa.gov

OpenAltimetry – from ACCESS grant to NASA's Earthdata Cloud

Project Timeline

2016 (3 yr + 1 no cost extension)
NASA ACCESS Grant Award

2020
NASA ACCESS Supplement to keep OA operational and take part in cloud infusion plan and meetings

2021
NASA ACCESS Supplement for cloud migration

2023 (Oct/Nov)
OA goes live at NSIDC in the cloud

OpenAltimetry strengths

- Lowers technical hurdles for visualizing TB's of ICESat and ICESat-2 data
- Supports a diverse user group (web app – no software download or expensive licensing necessary)
- Fosters new user engagement with laser altimetry data – OA is a great teaching tool!
- Provides users a quick snapshot of data availability in their area of interest
- Allows for deeper data exploration by displaying elevation profiles over features

Documentation and access

Documentation on NSIDC website

https://nsidc.org/openaltimetry

Access on earthdata.nasa.gov website

https://openaltimetry.earthdatacloud.nasa.gov/

Questions?? Send an email to nsidc@nsidc.org

OpenAltimetry demo

Search

Select

Visualize

Download

https://openaltimetry.earthdatacloud.nasa.gov/

EARTHDATA Other DAACs

OPENALTIMETRY MENU

OPENALTIMETRY

VISUALIZE AND DOWNLOAD SURFACE ELEVATION DATA FROM ACROSS THE EARTH, OVER TIME

ICESAT DATA ICESAT-2 DATA

ICESat Quick Start ICESat-2 Quick Start

OVERVIEW

NASA's OpenAltimetry (OA) is a free and powerful map-based data visualization and discovery tool for exploring surface elevation profiles from ICESat and ICESat-2 satellite mission altimetry data. Use OA explore how different types of surface heights have changed across the Earth over time. You can also easily download the data without the need for any special software or scripts; all you need is a web browser.

DATA AVAILABILITY

OA's ICESat-2 elevation data include observations from 2018 to present. The data show multiple photon beams, one day at a time, and users can easily select different dates and overlay MODIS cloud cover data. Types of altimetry data include:

- Land ice height
- Sea ice height
- Land and vegetation height
- Sea ice freeboard
- Ocean surface height
- Inland water surface data

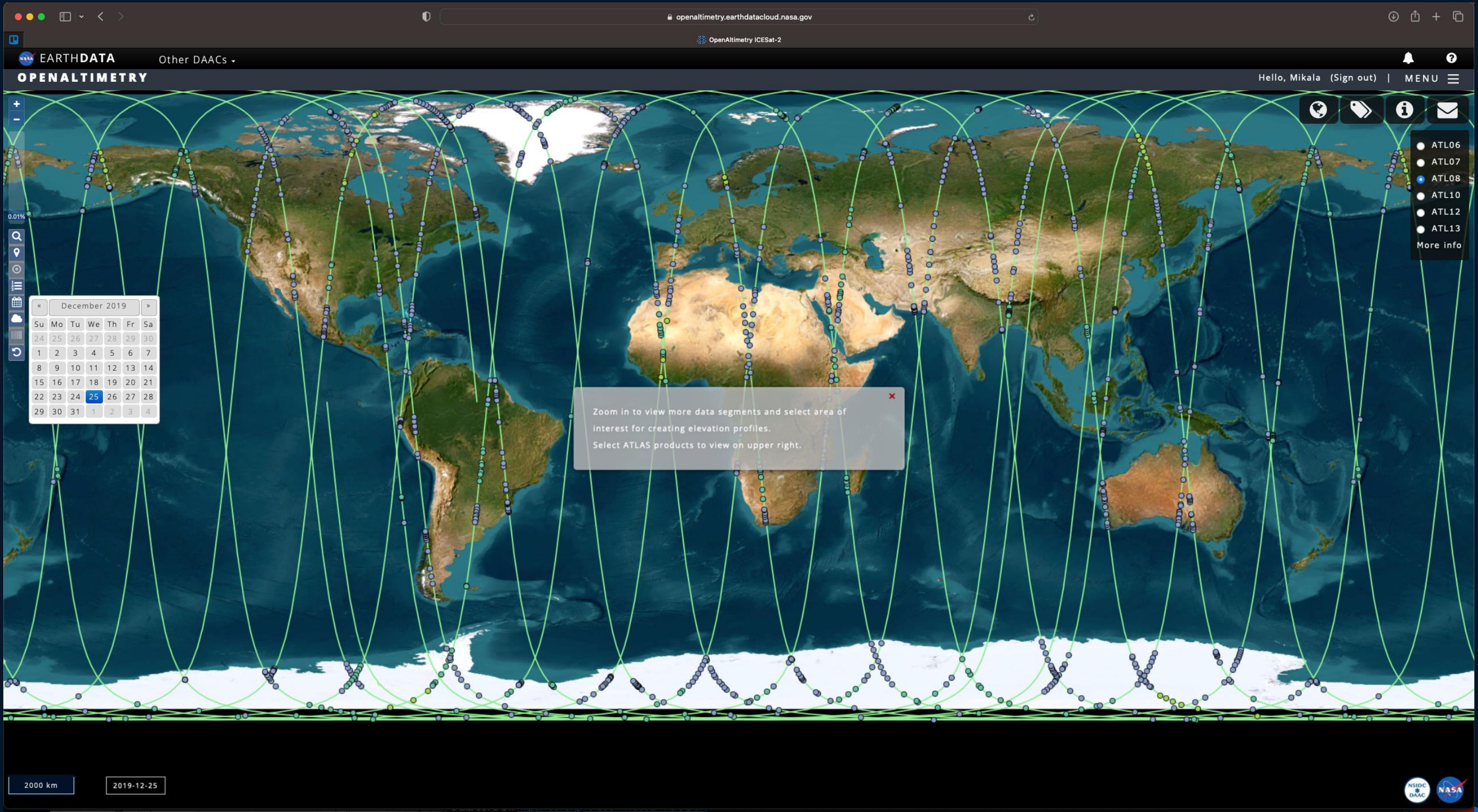
ICESat elevation data: This data set is GLAH06 Global Elevation Data. ICESat is the predecessor to ICESat-2 and collected data from 2003 through early 2010.

WHERE TO FIND USER SUPPORT

OA has become a NASA Earth science application maintained and supported by the NASA National Snow and Ice Data Center Distributed Active Archive Center (NSIDC DAAC). For assistance with OA, contact NSIDC User Services with questions and user-support requests.

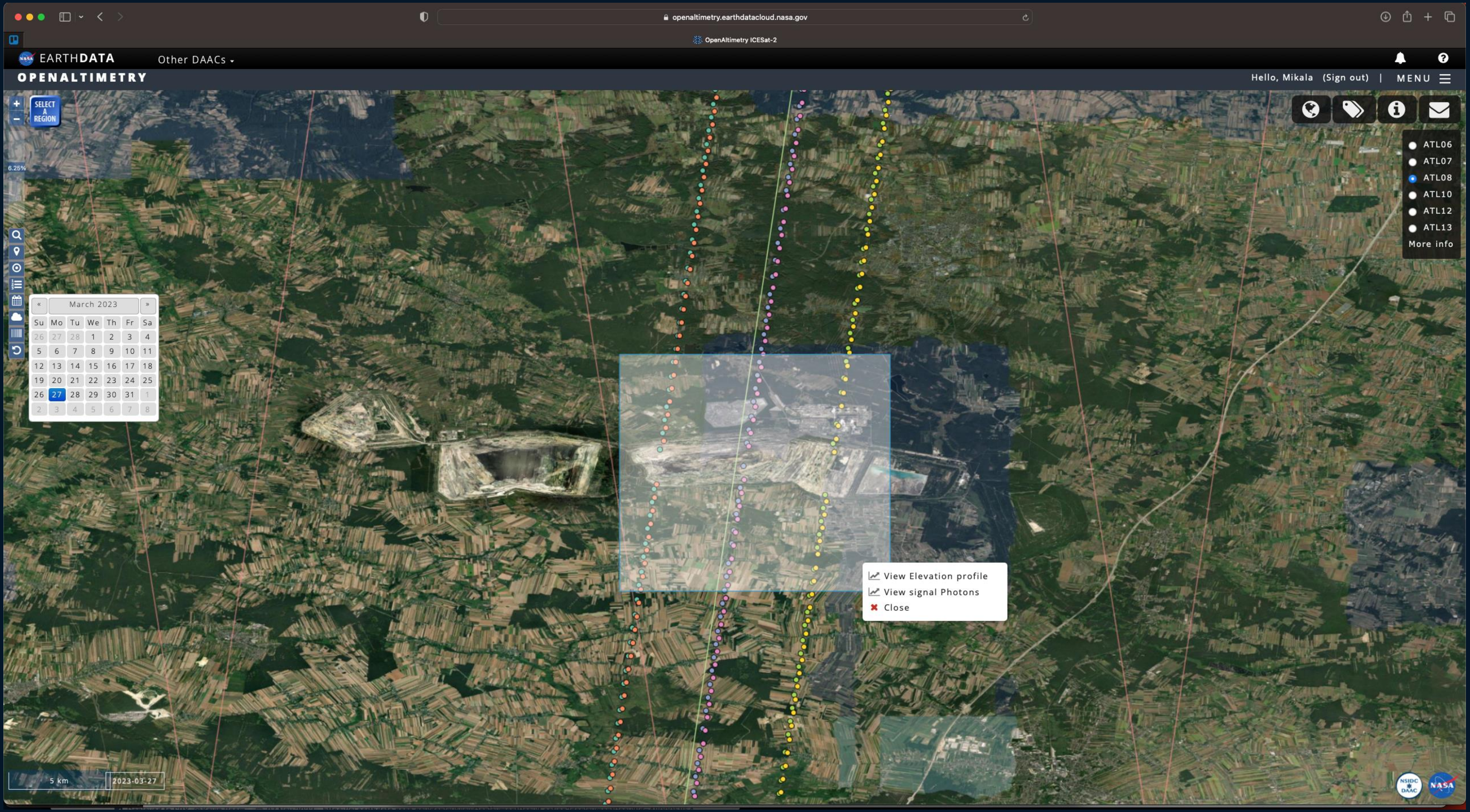
OA HISTORY

OA started as an Advancing Collaborative Connections for Earth System Science (ACCESS) Program-funded collaboration between Scripps Institution of Oceanography, San Diego Supercomputer Center at the University of California San Diego, National Snow and Ice Data Center, and EarthScope Consortium (formerly @UNAVCO).



Search

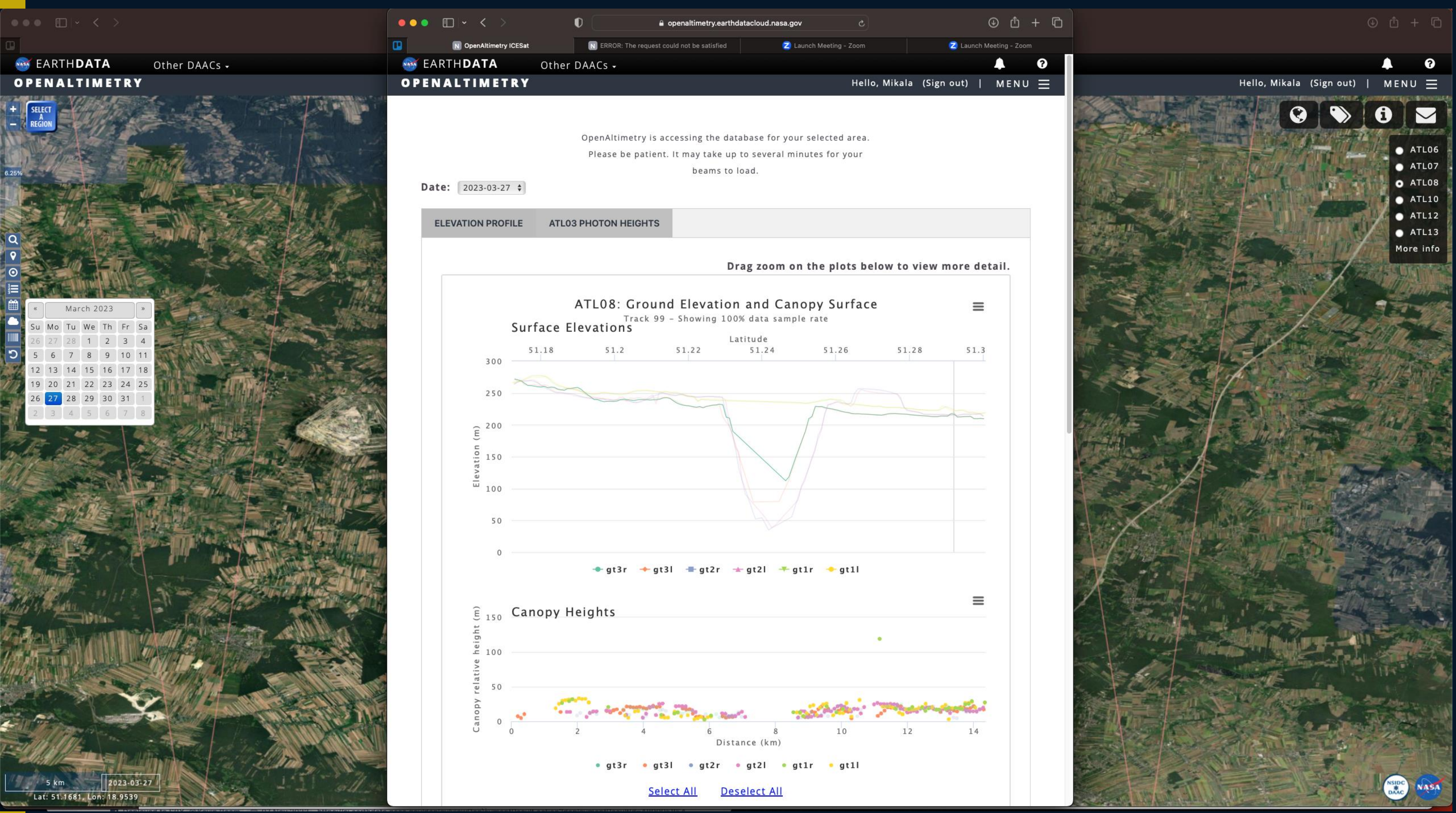
ICESat-2 – overview of available tracks for a particular date



Select

Zoom in for a detailed look over an area of interest

(Elektrownia Bełchatów – largest coal-fired power plant in Europe)



Visualize

Plot the elevation profile from the selected region.

Date: 2023-03-27

ELEVATION PROFILE | ATL03 PHOTON HEIGHTS

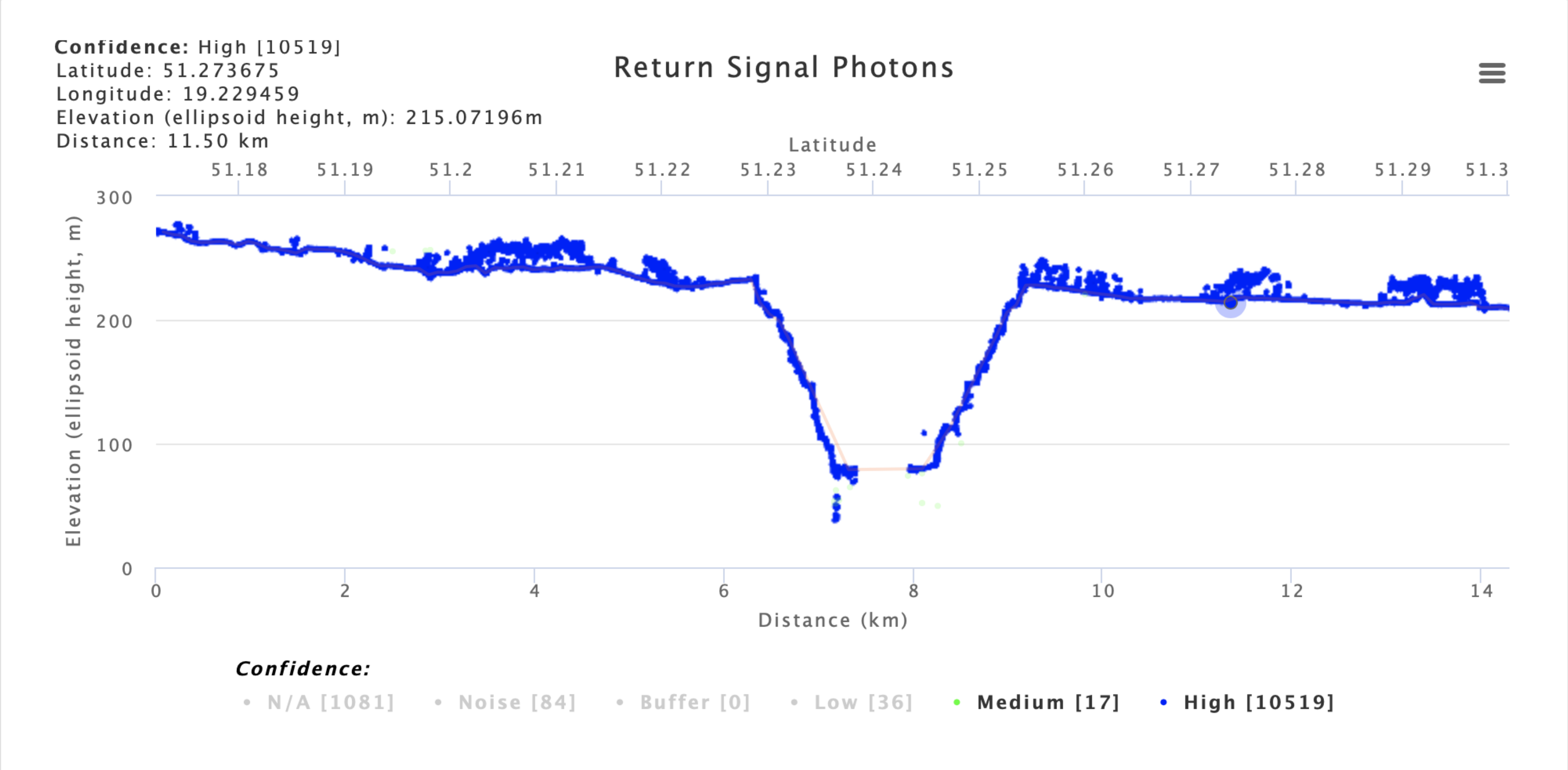
Select ATLAS beam gt3r (weak) | gt3l (strong) | gt2r (weak) | gt2l (strong) | gt1r (weak) | gt1l (strong)

Track ID: 99 - **Beam:** gt3l - **Showing 100.00% data sample rate**

Total number of photons: 11,737 - **Total segments:** 714 - **Segment range:** [716,863 - 717,576]

Overlay L3A ATL08 terrain height

Drag zoom on the plot below to view more detail.



Visualize

View underlying ATL03 photon heights and overlay ATL08 surface

Download


Date: 2023-03-27
ELEVATION PROFILE
ATL03 PHOTON HEIGHTS
Drag zoom on the plots below to view more detail.
ATL08: Ground Elevation and Canopy Surface
Track 99 – Showing 100% data sample rate
Latitude
Elevation (m)
Distance (km)
gt3r gt3l gt2r gt2l gt1r gt1l
Canopy Heights
Canopy relative height (m)
Distance (km)
gt3r gt3l gt2r gt2l gt1r gt1l
Select All
Deselect All
Download data as CSV
Download subsetted HDF5 (NSIDC DAAC)
Get API URL (Binder example)
3D Viewer
ATL06: Land Ice Surface Elevation
Track 99 – Showing 100% data sample rate
Latitude
Elevation (m)
Distance (km)
gt3r gt3l gt2r gt2l gt1r gt1l
Select All
Deselect All
Download data as CSV
Download subsetted HDF5 (NSIDC DAAC)
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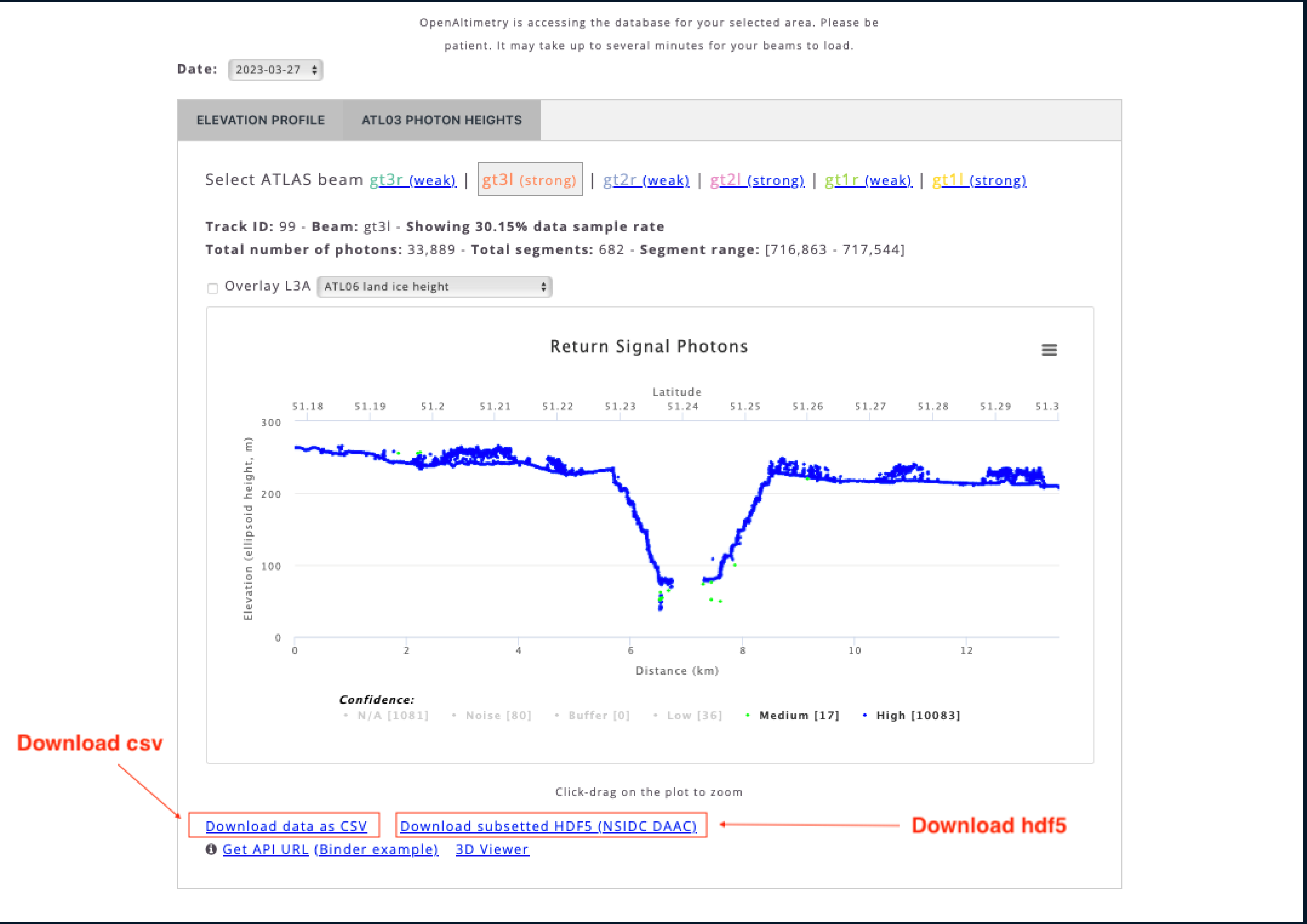
3D Viewer
Download csv files
Download hdf5 files


OpenAltimetry is accessing the database for your selected area. Please be patient. It may take up to several minutes for your beams to load.
Date: 2023-03-27
ELEVATION PROFILE
ATL03 PHOTON HEIGHTS
Select ATLAS beam gt3r (weak) | gt3l (strong) | gt2r (weak) | gt2l (strong) | gt1r (weak) | gt1l (strong)
Track ID: 99 - Beam: gt3l - Showing 30.15% data sample rate
Total number of photons: 33,889 - Total segments: 682 - Segment range: [716,863 - 717,544]
Overlay L3A
ATL06 land ice height
Return Signal Photons
Latitude
51.18
51.19
51.2
51.21
51.22
51.23
51.24
51.25
51.26
51.27
51.28
51.29
51.3
Elevation (ellipsoid height, m)
300
200
100
0
0
2
4
6
8
10
12
Distance (km)
Confidence:
N/A [1081]
Noise [80]
Buffer [0]
Low [36]
Medium [17]
High [10083]
Click-drag on the plot to zoom
Download csv
Download data as CSV
Download subsetted HDF5 (NSIDC DAAC)
Download hdf5
Get API URL (Binder example)
3D Viewer

Download

API ENDPOINTS