

A major update to the Exotic Seismic Events Catalog: a compilation of seismogenic mass movements

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EID 161: Umbrella Glacier, Iliamna, Alaska
Image: 2019-04-03, © 2019 DigitalGlobe, NextView License

Exotic Seismic Events Catalog (ESEC)

A compilation of **landslides** and other **mass movements** which have
seismic detections

Goal: to promote research in exotic **event detection** and **classification**

Event locations and types

First Release: 2017

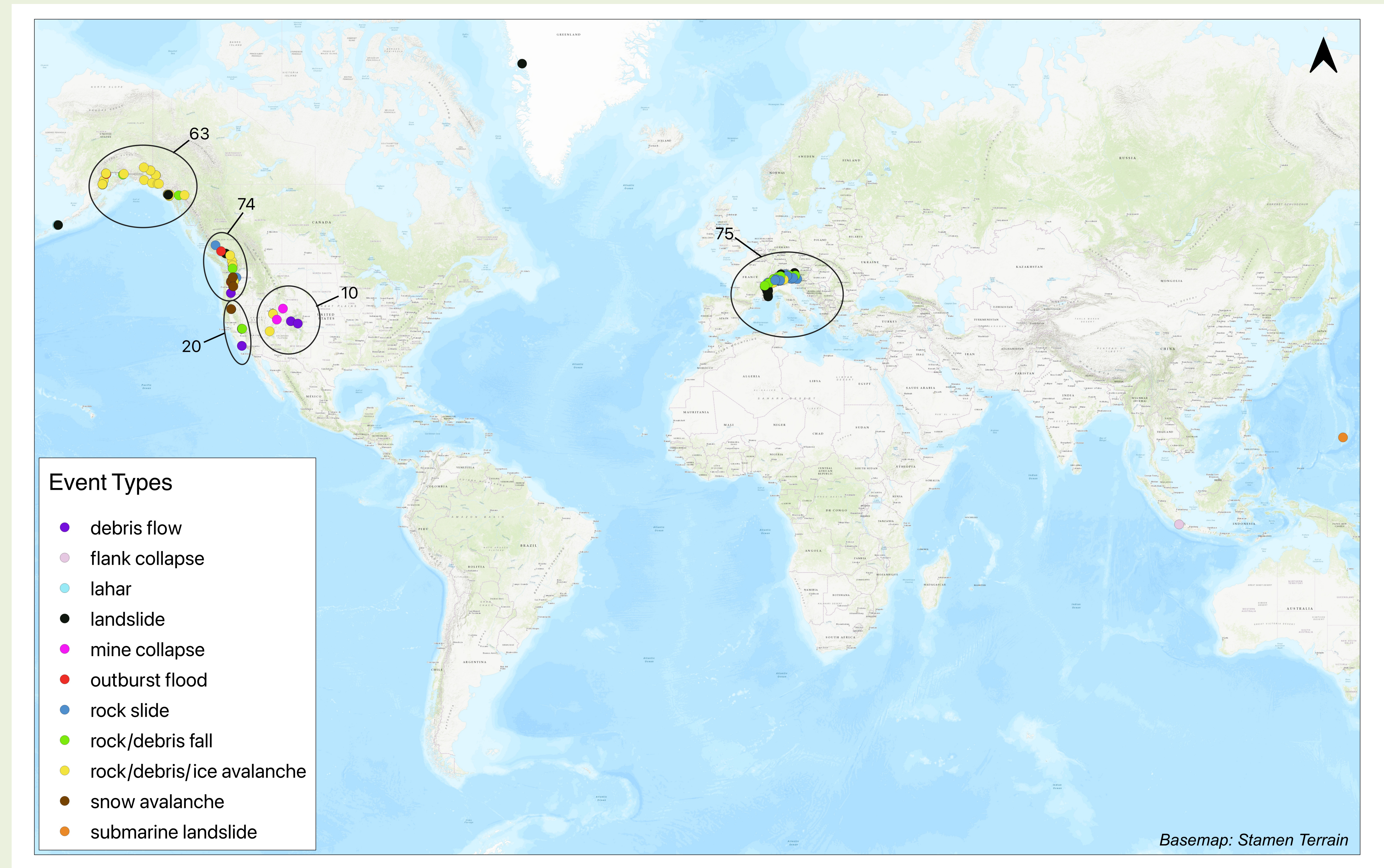
121 events in North America
and Canada

Update: 2022

124 new events added

New regions: Europe and
Pacific Islands

New event types: submarine
landslide, flank collapse, and
mine collapse



Basic Event Information

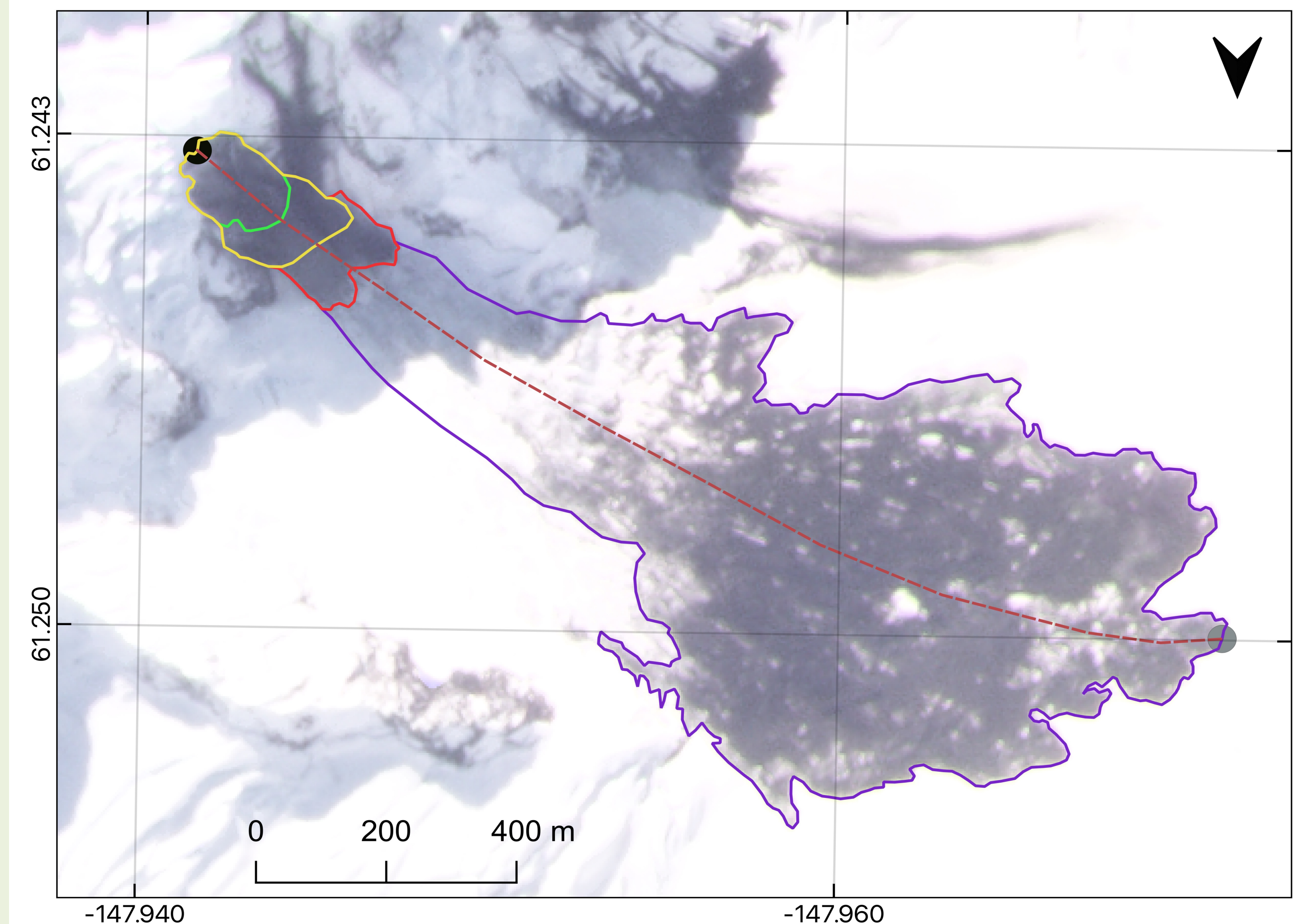
Events are identified from media reports, blogs, personal communication with scientists, and publications.

Locations are determined using satellite imagery, photographs, or seismic detection methods

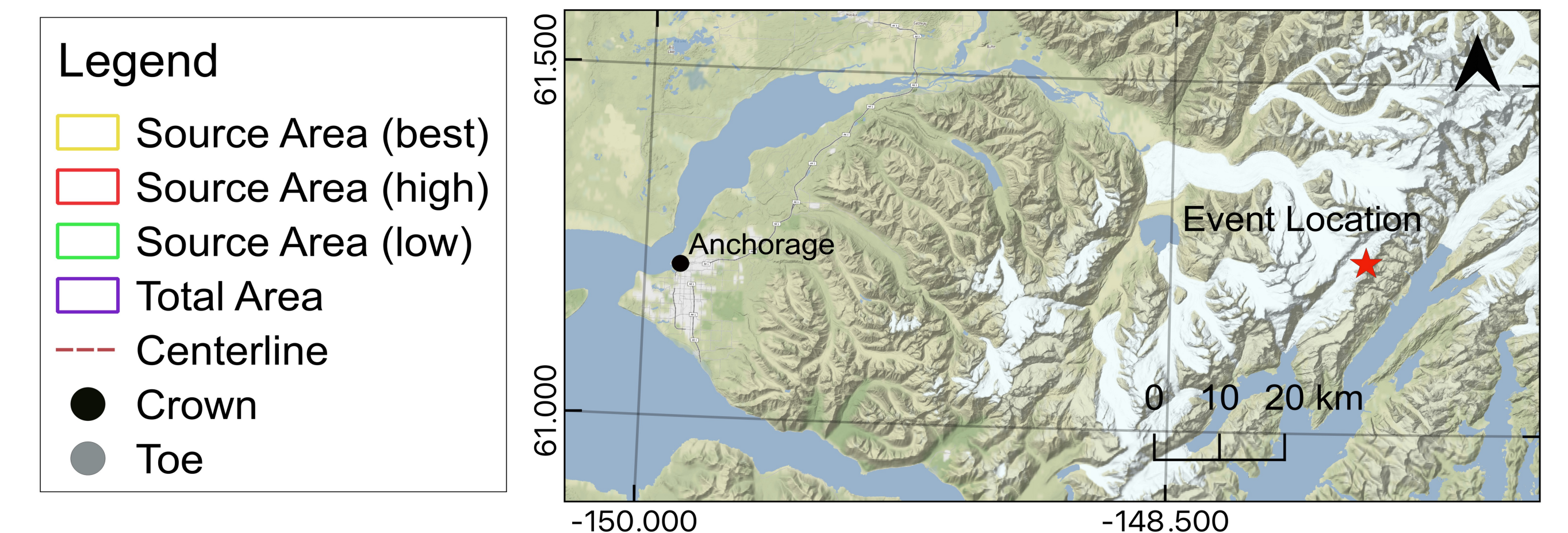
Total area, source area, volume, mass, runout distance, drop height, and type are taken from reports/publications when available or estimated using satellite imagery and photographs.

Each event is rated (between 1 and 5) on its **relative quality of ancillary data** (geospatial files, photographs, publications, etc.).

EID 190: Rock and ice avalanche at Barry Arm Glacier, Alaska
2021-08-09 07:45:40 (UTC)



HM0476-18-C-0044, © 2021, Planet Labs Inc.
Imagery date: 08/13/2021
Map Projection: WGS 84 UTM Zone 6N



Seismic and Infrasound Analyses

Seismic analysis is completed to the farthest distance detected above noise level or up to 500 km for the following bands:

Very high frequency* (VHF): >15 Hz

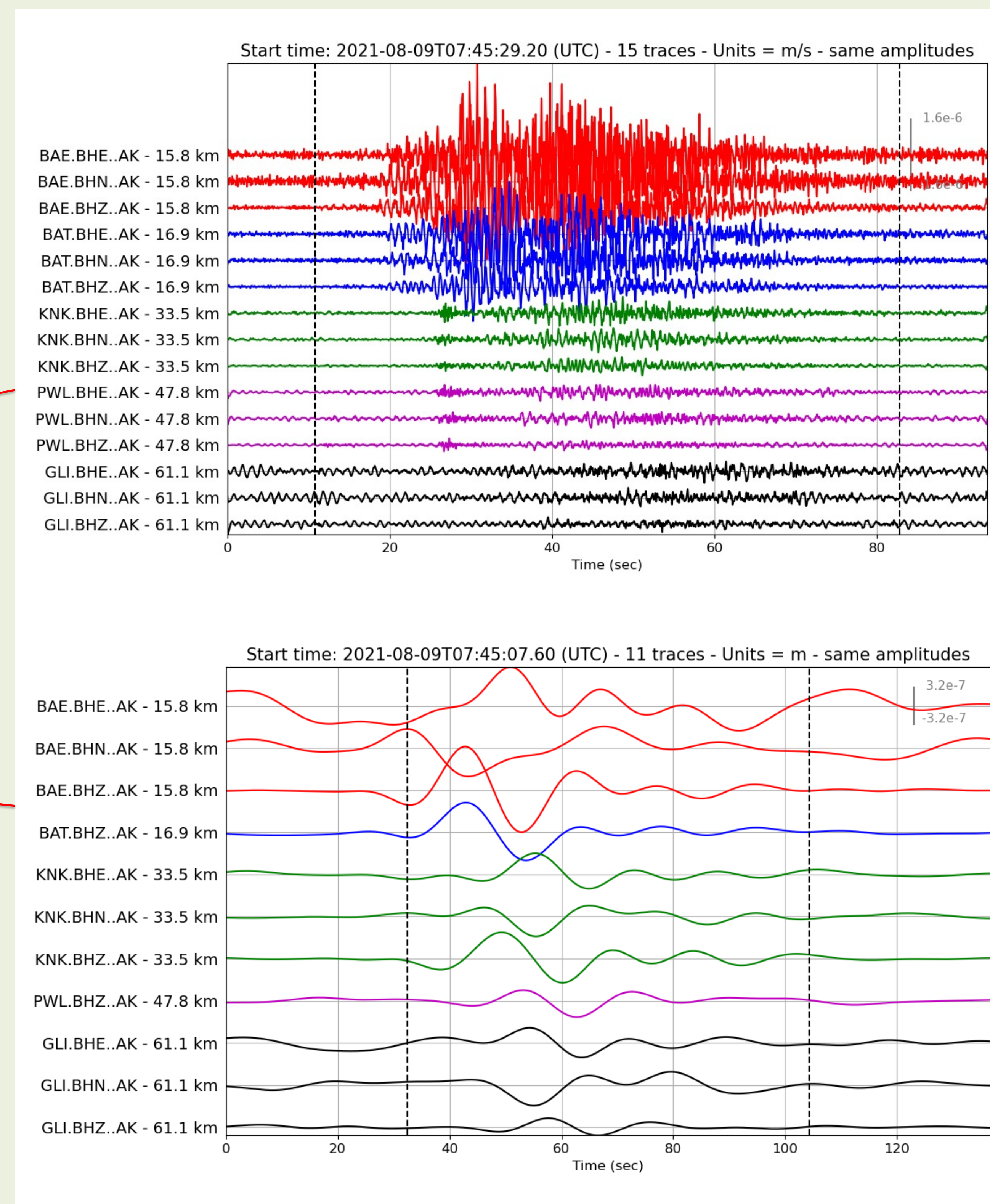
High frequency (HF): 1-5 Hz

Long period (LP): >20 sec

Infrasound data (0.5-2 Hz) are analyzed for events with infrasound stations (?DF) within 200 km or up to detection limits.

* only for events recorded at very close distances

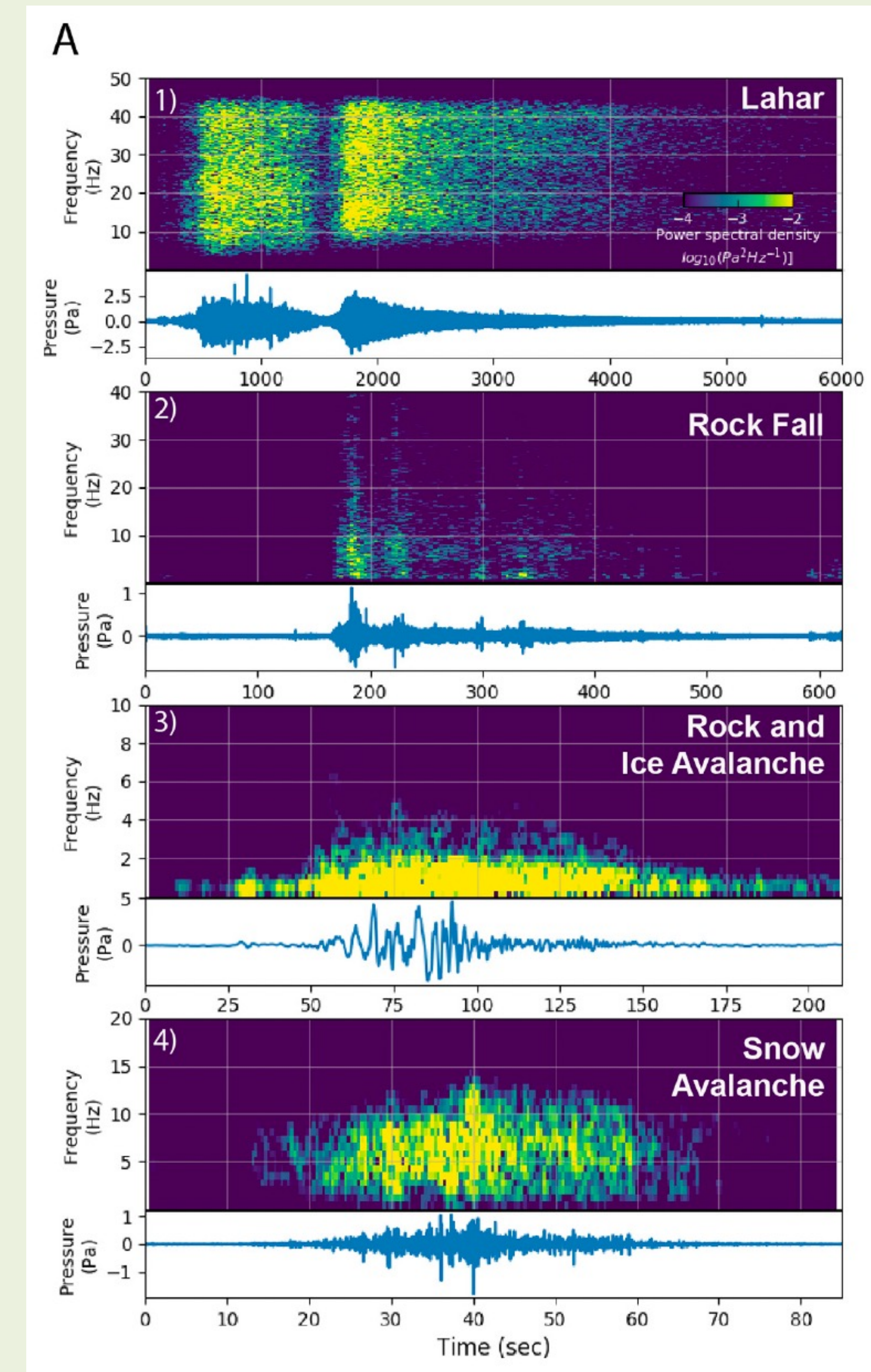
Start and end times are derived from seismic analysis in HF band



Future Work – event detection & classification

Different events have different signal characteristics based on:

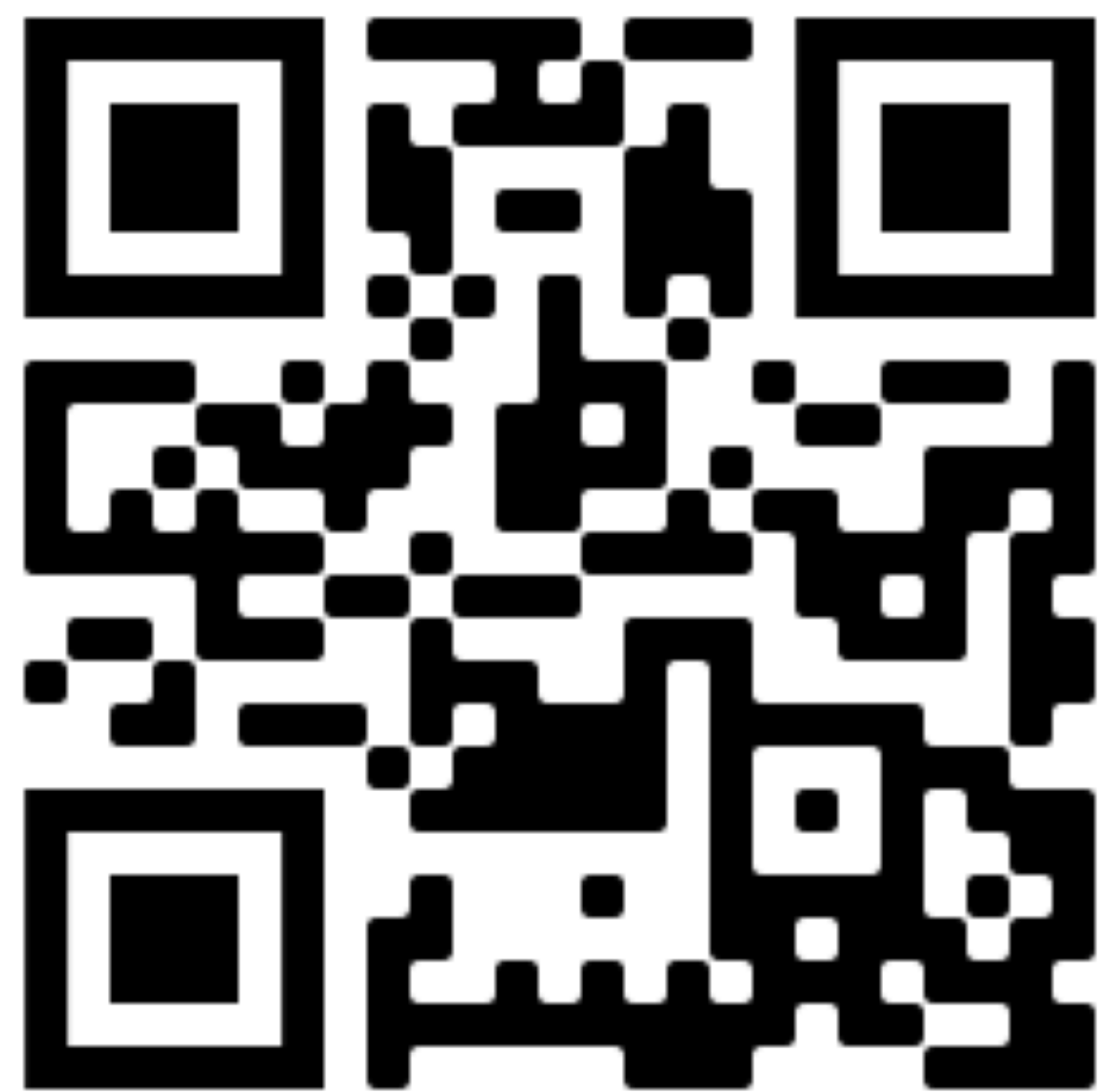
Style of motion (avalanche, fall, flow, etc.)
Material type (rock, ice, snow, debris, etc.)
Size
Event sequence/dynamics
... etc.



Allstadt et al. (2018)

Data and Contributions

ESEC on IRIS's searchable
product depository



<http://ds.iris.edu/spud/esec>

USGS ScienceBase data release
SQLite relational database, event point
shapefiles, and CSV summary files



DOI: [10.5066/P90VGCSK](https://doi.org/10.5066/P90VGCSK)

References

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- Collins, E.A., Allstadt, K.E., Groult, C., Hibert, C., Malet, J.-P., Toney, L.D., and Bessette-Kirton, E.K., 2022, Seismogenic Landslides and other Mass Movements: U.S. Geological Survey data release, <https://doi.org/10.5066/P90VGCSK>.

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Questions?

EID 150: Taku River, Alaska

Image: <https://blogs.agu.org/landslideblog/2020/12/29/taku-river-landslide-1/>