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Experiment name & nickname

Name: Taku Glacier seismic reflection survey, 2016

Nickname: Taku Seismic

Purpose of experiment

The purpose of this experiment was to image sediment deposits beneath the Taku Glacier terminus, to determine their thickness and geometry, and to perform Amplitude Variation with Offset (AVO) analysis of seismic reflection returns from the glacier bed to learn the nature of the sediments (dilatant and soft vs. dewatered and stiff). This seismic reflection survey was part of a larger glacier monitoring project aiming to characterize the relationship between subglacial sediments and the unusual dynamics of the advancing Taku Glacier terminus.

Layout of instruments

We performed our survey 1 km above the Taku Glacier terminus on ice that is ~200 m deep. We performed our survey between March 17th and March 18th. The glacier surface where we worked was ice covered with one meter of snow.

We had a line of 120 40-Hz geophones spaced every 5 m. See Figure 1. Collinear with that we had shots spaced every 10 meters running for 930 meters.

The line ran SW to NE and we used line coordinates during the survey, starting with 0 m at the SW end of the line and ending with 930 m at the NE end. Shots started at 0 m and ended at 930 m. Geophones started at 0 m and ended at 595 meters.

We used 150-gram charges of Kinopak as our seismic energy source. Shots were placed in boreholes 5-6 m below the glacier surface. Geophones were buried in vertical positions 1 m beneath the snow surface, not quite contacting glacier ice.

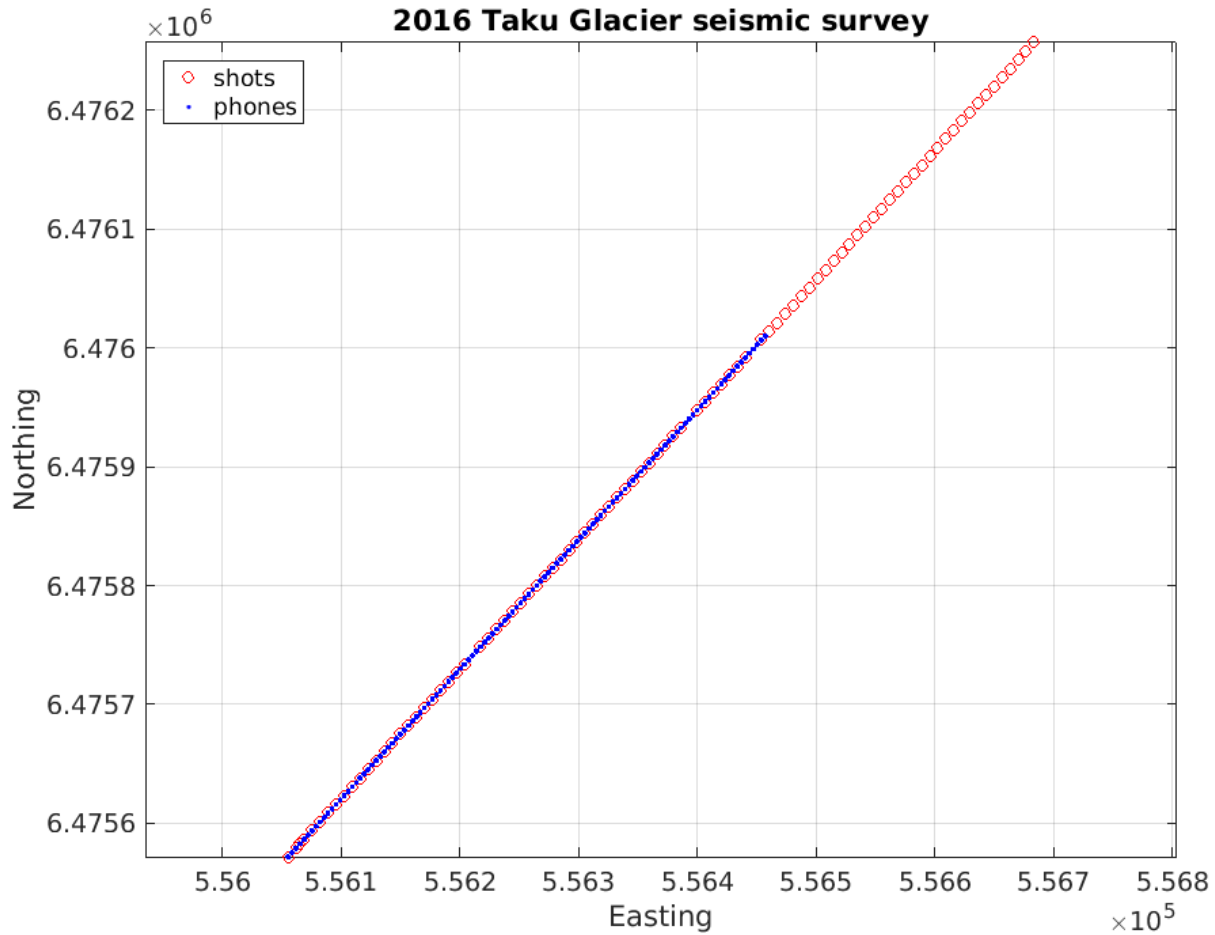


Figure 1. Layout for the 2016 Taku Glacier seismic line.

Data recording

The data are contained in TAKU2016.SGY. These include x, y, and z traceheader coordinates in the form of UTMs (WGS 84, Zone 8V) and elevation above sea level. The Geode recorded data at 8000 samples per second for 2 seconds.

The first common shot gather is relatively very low amplitude because the shot source was 6 seismic detonators bundled together.

We display the common shot gathers in the SEG-Y file by order of shot line coordinate.

The two spreadsheet files (Geophones_Taku_2016.xlsx and Shots_Taku_2016.xlsx) contain the coordinates of the geophones and the coordinates of the shots, with some additional metadata.