

Reflection seismic study of the post-glacial Burträsk fault: Migrated cross-dip stack

SND-ID: snd1099-4. **Version:** 1.0. **DOI:** <https://doi.org/10.5878/k3zc-s495>

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SND1099-004-V1.0.zip (13.61 MB)

Citation

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Description

In 2008, a 22 km long high resolution reflection seismic profile was acquired over the Burträsk fault in Northern Sweden. The Burträsk fault formed at the end of the last glacial, triggered by the rapid melting of the Scandinavian ice sheet and the following crustal rebound. The aim of the survey was to image the structure of the fault with depth. The profile followed existing roads resulting in a very crooked acquisition geometry. A list of the key acquisition parameters is given below.

The dataset was first processed and published in 2011. In 2018, the dataset was reprocessed using an additional cross-dip correction step to improve the imaging of reflection with a dip component in the cross-profile direction. The following data files are available for downloading:

- 1) raw shot gathers (decoded and quality controlled, with geometry information in the headers)
- 2) original stacked section from Juhlin and Lund (2011)
- 3) cross-dip corrected stacked section from Beckel and Juhlin (2019)
- 4) cross-dip corrected migrated section from Beckel and Juhlin (2019)

A short summary of the main processing steps for each dataset is given below. For a complete description, please refer to the above mentioned publications.

Key acquisition parameters:

Number of channels: 280

Near offset: 0 m

Geophone spacing: 20 m

Geophone type : 28 Hz single

Nominal source spacing : 20 m

Source type : VIBSIST

Hit interval between hammer blows : 100-200 ms

Sweeps per source point :3-4

Nominal fold : 140

Recording instrument : SERCEL 408L

Sample rate : 1ms
Field low cut : Out
Field high cut : 400 Hz
Record length : 23 s
Profile length : 22 km
Source points : 799
Dates acquired: 2008/08/05-2008/08/16

Short summary of the main processing steps:

1) BUR_shots_geom.sgy

The raw shot records are pre-processed with VIBSIST decoding, quality control. Information about the shot and receiver geometry has been added to the trace headers.

2) BUR_original_stack.sgy

The processing flow of the original data stack includes trace editing and balancing, spectral equalization, time-variant bandpass filtering, refraction and residual statics, horizontal median filtering, NMO correction, DMO correction, stacking and coherency filtering (for a complete description see Juhlin & Lund, 2011)

3) BUR_crossdip_stack.sgy

The main processing steps of the crossdip stack are very similar to those of the original stack, including trace editing and balancing, spectral equalization, time-variant bandpass filtering, refraction and residual statics, horizontal median filtering, NMO correction, DMO correction, stacking and coherency filtering. Before DMO correction, an additional cross-dip correction step has been added. For a complete description see Beckel & Juhlin, 2019.

4) BUR_crossdip_mig.sgy

The processing flow of the migrated section includes trace editing and balancing, spectral equalization, time-variant bandpass filtering, refraction and residual statics, horizontal median filtering, NMO correction, cross-dip correction, DMO correction, stacking, coherency filtering and migration (for a complete description see Beckel & Juhlin, 2019).

This dataset contains the migrated and depth converted crossdip stack of the Burträsk profile (Beckel & Juhlin, 2019).

Processing steps for this data set:

1. Read decoded VIBSIST data
2. Bulk static shift to zero time
3. Apply geometry
4. Manual first-break picking
5. Trace balance: 0-3000 ms
6. Ground-roll and first-break muting in local time-frequency domain: 25 % threshold
7. Spectral equalization: 30 Hz window, 25-40-120-150 Hz bandpass
8. Time-variant bandpass filtering:
0-200 ms: 35-60-120-180 Hz
250-500 ms: 30-50-120-180 Hz
600-900 ms: 25-40-110-165 Hz
1100-3000 ms: 20-35-100-150 Hz
9. Refraction statics: floating datum, replacement velocity from model
10. Trace editing
11. Horizontal median filter: 11 traces, 5300 m s⁻¹ and

- 3000 m s⁻¹
12. Butterworth filter: 20–40–90–120 Hz
 13. Spherical divergence correction: 0.8 tpower, 2.0 vpower
 14. Velocity analysis
 15. NMO correction: 40 % stretch mute
 16. Residual statics
 17. Cross-dip correction: 5400 m s⁻¹ , 20 % taper;
Velocity analysis
 18. DMO correction;
Velocity analysis
 19. Stacking
 20. FX deconvolution: 19 trace window
 21. Trace balance
 22. Stolt migration: 5400 m s⁻¹ , 0.6 stretch factor
 23. Zero mute
 24. Approximate depth conversion: 5400 m s⁻¹

Processed seismic data stored as one file for the entire seismic profile, according to SEG technical standard SEG-Y revision 1 (SEG-Y_r1.0, 2002); <https://seg.org/Publications/SEG-Technical-Standards>

Language

[English](#)

Time period(s) investigated

2008-08-05 – 2008-08-16

Data format / data structure

[Numeric](#)

[Text](#)

[Geospatial](#)

[Other](#)

Data collection 1

- Time period(s) for data collection: 2008-08-05 – 2008-08-16

Geographic spread

Geographic location: [Sweden](#), [Skellefteå Municipality](#)

Geographic description: Burträsk fault, northern Sweden

Responsible department/unit

Department of Earth Sciences

Funding

- Funding agency: Swedish Research Council

Research area

[Earth and related environmental sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

[Natural sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

[Geoscientific information](#) (INSPIRE topic categories)

Keywords

[Earth science](#), [Seismic profile](#), [Fault](#), [Geophysics](#), [Geology](#)

Publications

Beckel, R. A. and Juhlin, C.: The cross-dip correction as a tool to improve imaging of crooked-line seismic data: a case study from the post-glacial Burträsk fault, Sweden.

Accepted for publication in Solid Earth, Special Issue: Advances in seismic imaging across the scales, 2019.

Juhlin, C. and Lund, B.: Reflection seismic studies over the end-glacial Burträsk fault, Skellefteå, Sweden, Solid Earth, 2, 9–16, <https://doi.org/10.5194/se-2-9-2011>, 2011.

[Link to article: Solid Earth](#)

If you have published anything based on these data, [please notify us](#) with a reference to your publication(s). If you are responsible for the catalogue entry, you can update the metadata/data description in DORIS.

Accessibility level

Access to data through SND

Data are freely accessible

Use of data

[Things to consider when using data shared through SND](#)

Versions

Version 1.0. 2019-04-17

Related research data in SND's catalogue

[Reflection seismic study of the post-glacial Burträsk fault: Shot gathers with geometry](#)

[Reflection seismic study of the post-glacial Burträsk fault: Original stack](#)

[Reflection seismic study of the post-glacial Burträsk fault: Cross-dip stack](#)

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