

Summary

This document summarizes geophysical data presented in a paper entitled “A comparison of electrical resistivity, ground-penetrating radar and seismic refraction results at a river terrace site” by Hirsch M., [Bentley L.R.](#), and Dietrich P. ([Journal of Environmental and Engineering Geophysics](#), 13, 325-333, 2008) and Hirsch, M., “Geophysical survey on Pine Creek field site Calgary, Alberta Canada, M.Sc. Thesis, University Tübingen (2004). The data includes [electrical resistivity imaging \(ERI\)](#), [ground penetrating radar \(GPR\)](#), and [seismic refraction](#). Complementary information such as [borehole logs](#) and the [M.Sc. thesis](#) are also provided.

The surveys were carried out in Pine Creek in southern Alberta during summer of 2004. The files and directories for ERI, GPR, and seismic refraction data are archived in files “ERI_surveys.zip”, “GPR_surveys.zip”, and “REFR_surveys.zip”, respectively. Topography and other complementary information are archived in file “Auxiliary.zip”. You will need to download and unzip the files using e.g. [WinZip](#).

In the following, a brief description of the files, locations, formats and tools are presented as a hyperlink document.

Electrical resistivity imaging (ERI)

The ERI data were collected with a “*Sting*®” system and the “*swift*®” switching box manufactured by *Advanced Geosciences, Inc.* The system had 56 electrodes in four sets of electrode cables each containing 14 electrodes. Data were collected using a Wenner array (range: min $n = 1$, max $n = 17$) with multiple roll alongs. Profiles with roll along were conducted by moving one cable at a time from the rear of the line to the front of the line to obtain continuous coverage. In order to obtain both shallow resolution and sufficient depth penetration, lines were run with a 2 m unit electrode spacing and repeated with a 4 m unit electrode spacing.

Three ERI survey lines were conducted at this site. File “ERI_surveys\ERI_location_map.jpg” shows location map of the lines.

The electric resistivity imaging data consist of three files (see subdirectory “ERI_surveys”).

- ERI1_DATA.dat
- ERI2_DATA.dat
- ERI3_DATA.dat

The ERI data files contain elevation information along the survey lines and was displayed and inverted using [RES2DINV](#) inversion software package. The files for profile 1 and 2 contain combined data for ERI measurements with collocated Wenner arrays with unit electrode spacing of two and four meter electrode. Profile 3 contains data with Wenner configuration and electrode spacing of three meters. Elevation information along the ERI survey lines 1, 2, and 3 can be found in “[Auxiliary\Topo](#)” subdirectory.

[Back to Top](#)

Ground Penetration Radar (GPR)

The GPR surveys were conducted with a PulseEKKO 100 radar system. Data were collected with 100 MHz antennas. Antennas were oriented perpendicular to the line direction and were separated by 1 m. Measurement points were separated by 0.5 m. An average radar velocity of 0.11 m/ns was estimated from several common mid point experiments (CMPs) in combination with borehole information.

The GPR dataset contains data files for three survey lines (see subdirectory “GPR_surveys” and location map “GPR_location_map.jpg”). Data along each survey line is split into several data sections. Each data section includes a data filename (*.dt1) and its corresponding header filename (*.hd). The data file contains GPR time series in binary PulseEKKO format. The data was displayed and processed using [REFLEXW](#) software package. The header file contains information about survey settings and parameters in ASCII format.

Surveys 1 and 2 were conducted along entire profiles 1 and 2, respectively. Survey 3 was carried out for a short section between 500 to 600 meters offset along profile 3. File “GPR_surveys\GPR_Field_Log.pdf” contains information about the survey lines and their corresponding data sections and filenames along the lines. Also, specifications about the CMPs experiments along each line are given in the same file. Elevation information along the GPR survey lines 1, 2, and 3 are similar to that of the ERI profiles and can be found in “[Auxiliary\Topo](#)” subdirectory.

[Back to Top](#)

Seismic refraction

Data were recorded with a Geometrics 60-channel “*Strataview*” seismograph. Multiple blows from a 16-pound sledgehammer on a metal plate provided the seismic energy source. Sixty geophones (*Oyo-Geospace GS-20*, 28 Hz) were spaced at two meters. The geophone spread was moved forward in a “leapfrog” scheme. Half of the spread was moved forward along the profile and the other half that was at the end of the last spread was kept in place to work as the beginning of the new geophone spread. Each spread (0 to 118 meters) used five shots while all geophones were recording. Shots were initiated at -1, 29, 59, 89, and 119 meter offsets for each 118 m spread. In order to reduce wind noise, most of the geophones were buried in shallow holes to reduce wind noise.

The seismic refraction data set contains time series acquired along profile 1, 2, and 3. The survey line locations are shown “REFR_surveys\REFR_location_map.jpg”. The data files associated with each profile (“*.DAT”) as well as the files containing the acquisition geometries (files “*.xls”) can be found in “REFR_surveys” subdirectory. The seismic raw time series are in SEG2 format and were displayed and processed using [REFLEXW](#) and inverted using [GLI3D](#) software package. First-arrival travel-time picks for each shot point are also given in “*.PCK” files. The shot gathers in the *.DAT files can be displayed to repick arrival times or used for more advanced processing.

Elevation information along the refraction survey lines 1, 2, and 3 are similar to that of the ERI and GPR profiles and can be found in “[Auxiliary\Topo](#)” subdirectory.

[Back to Top](#)

Miscellaneous

For the calibration of the interpretation of the results the information from boreholes that were on or in close vicinity of the profiles were used. Borehole locations as well as the borehole log information can be found in subdirectory "Auxiliary\Miscellaneous". Also, a comprehensive summary of the surveys, processing, inversion, and interpretation of the data can be found in file "Auxiliary\Miscellaneous\Master_Thesis.pdf".

[Back to Top](#)

Topography

Elevation data versus offset along lines 1, 2, and 3 as well as location of the survey points and boreholes in UTM coordinate system are given in subdirectory "Auxiliary\Topo" in files;

- Line1_TOPO.txt
- Line2_TOPO.txt
- Line3_TOPO.txt
- Topo_Lines_UTM.xls
- Topo_Boreholes_UTM.xls

[Back to Top](#)