

TGI4 PROJECT
(INDIRECT SENSING METHODOLOGY DEVELOPMENT PROJECT)
GEOLOGICAL SURVEY OF CANADA

PROGRESS REPORT

Borehole gravity in Lalor project

Author:

Pejman SHAMSIPOUR

Feb, 2014

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1 Summary

Borehole gravity concerns the detection of the Earth's gravitational field within a borehole. Precise vertical variations of the Earth's gravity field may be detected over the length of a borehole. These depend on the variations in the formation density not only above and below the sensor, but also laterally away from the borehole. Thus, borehole gravity measurements can be used to detect the following phenomena (Oilfield Glossary- Schlumberger):

- overburden pressure
- lateral formation density changes arising from porosity changes away from the borehole
- lateral proximity to lithology changes, such as major faulting or salt intrusions
- time-lapse density measurements to monitor fluid saturation changes during the life of a reservoir.

2 Lalor borehole gravity

The borehole gravity measurement of 5 boreholes in Lalor mining camp is finished. The location of boreholes are shown in Figure 1 and 2 . We expect the company (Abitibi Geophysics) to finish the the final precessing of data by this month .

3 Preliminary Results

The Figure 4 shows the Bouguer anomaly and bulk density in the borehole DUB202. The corrections are done by Abitibi Geophysics. As we can see there exist an interesting anomaly at depth.

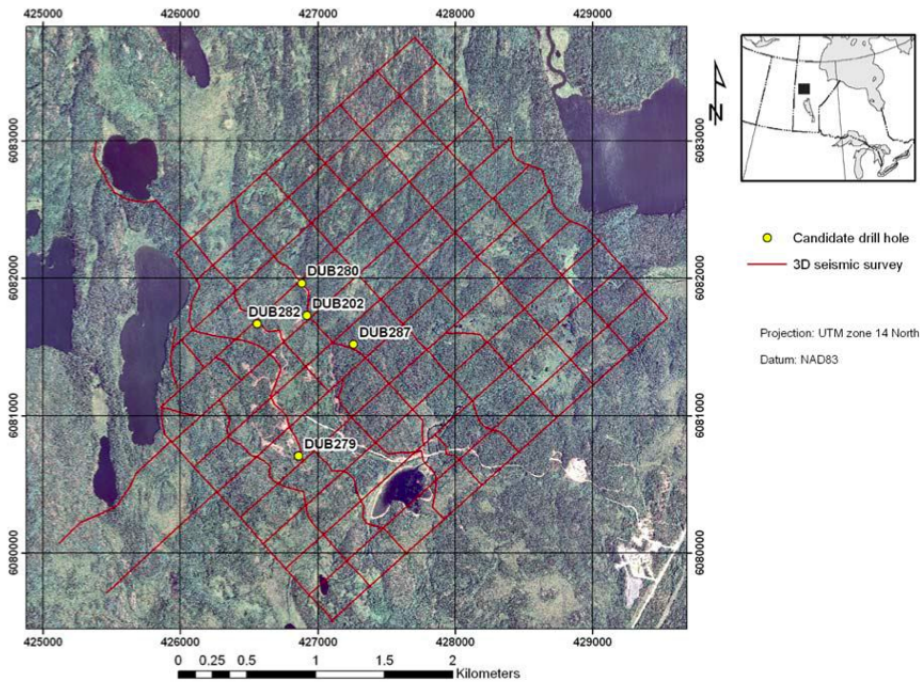


Figure 1: Location of the 5 candidate boreholes for conducting borehole gravity measurements.

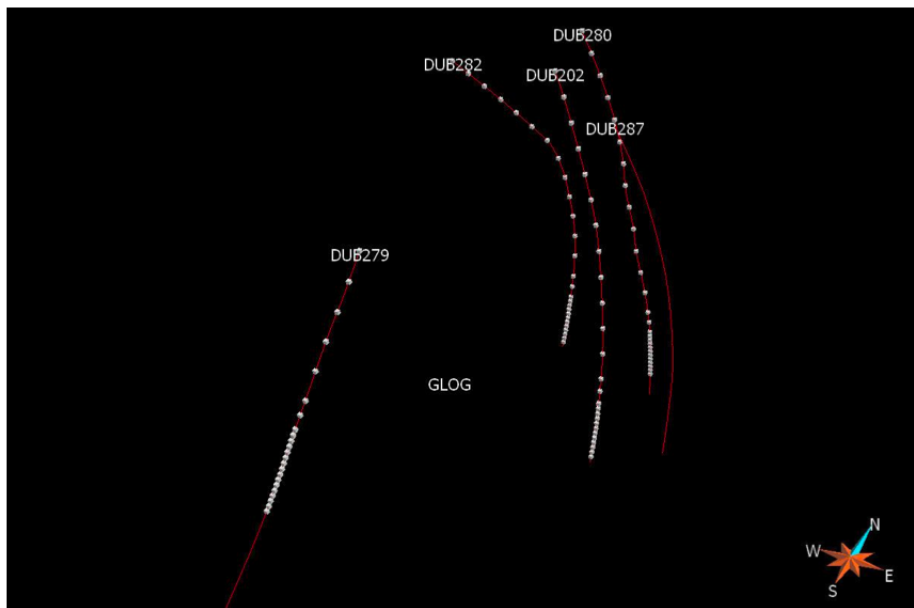


Figure 2: 3D perspective view of borehole gravity survey

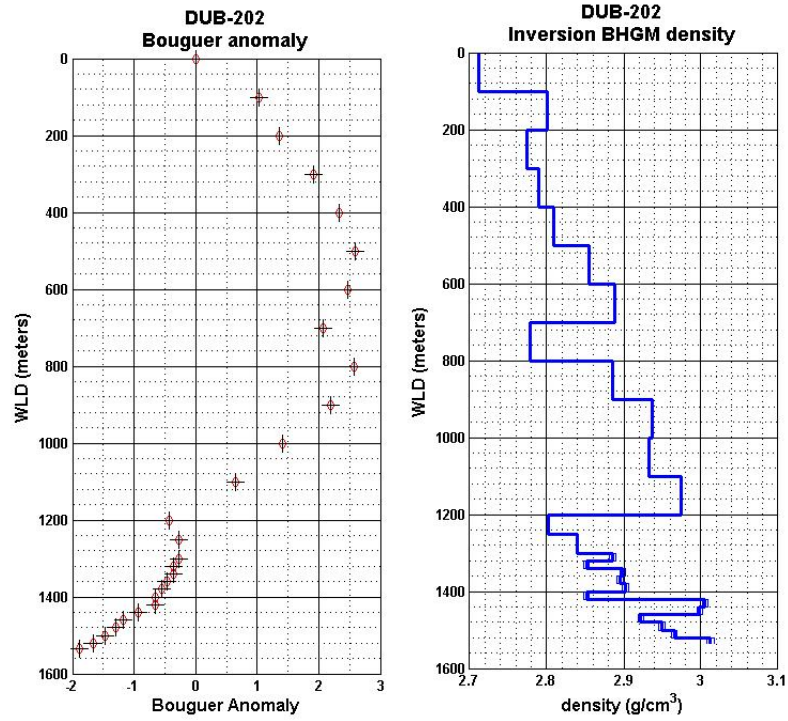


Figure 3: Bouguer anomaly and bulk density for borehole DUB202.

The bulk density also shows good correlation with density obtained from the log. Unfortunately we have just one log (DUB202) information for comparison. This comparison is shown at Figure 4. It should be noted the data are not calibrated yet.

4 Future work

We plan to invert the gravity data of surface and borehole data simultaneously.

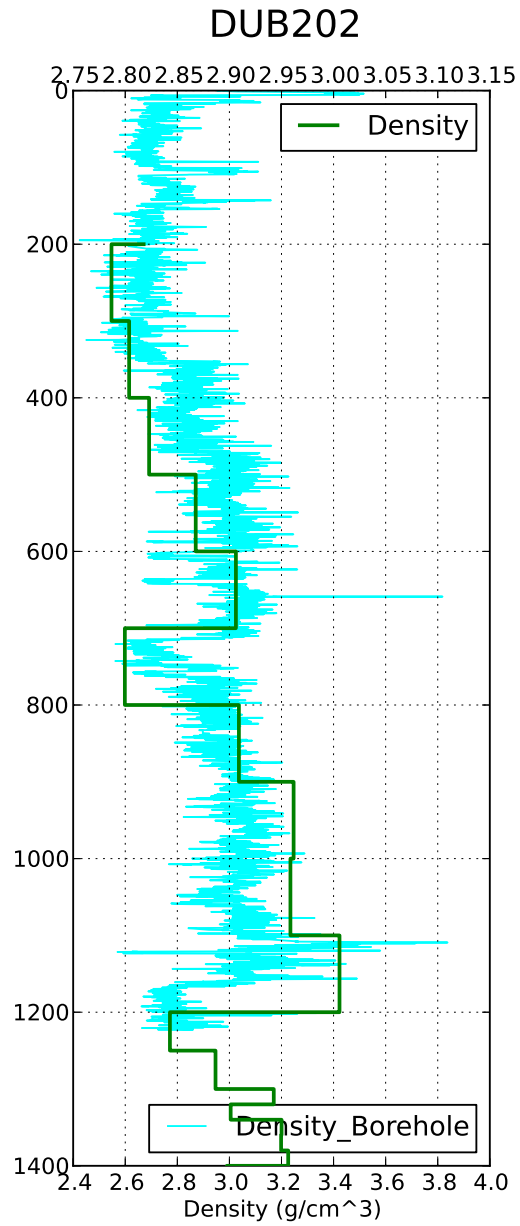


Figure 4: Bulk density vs log density