

## Precision of ABEM SAS 4000 / LUND Imaging System

The **accuracy** of an instrument is defined as its capability to show the true value, whereas the **precision** is defined as its repeatability of results.

The purpose of the following test was to demonstrate the precision of the ABEM SAS 4000 resistivity & IP instrument. The SAS 4000 was connected to a LUND Imaging System, and the test was conducted by repeating the LUND survey three times without moving the electrodes. The location was a farming area in southern Sweden characterized by clayey sandy till and clay till. The test was conducted in early spring, with a temperature around +5 deg C. The three runs was separated in time by approximately 30 minutes.

### Layout of the test

- The instrumentation was an ABEM SAS 4000 connected to the ABEM LUND ES464 electrode switcher.
- 31 steel electrodes were placed in a line with 10 m separation, connected to the ABEM ES464 with a LUND cable.
- In each run totally 60 Wenner readings were conducted along this 300 m profile.
- The Wenner inter-electrode spacing varied from  $a = 10$  m up to  $a = 100$  m.
- In the first run the integration time was 1 sec and the output current 200 mA.
- In the second run the integration time was 0.5 sec and the output current 200 mA.
- In the third run the integration time was 0.5 sec and the output current 20 mA.

### Result

The data from the three separate runs are presented as apparent resistivity in pseudosections. Because the three sections for all practical purposes look identical, only one of them is shown in Figure 1.

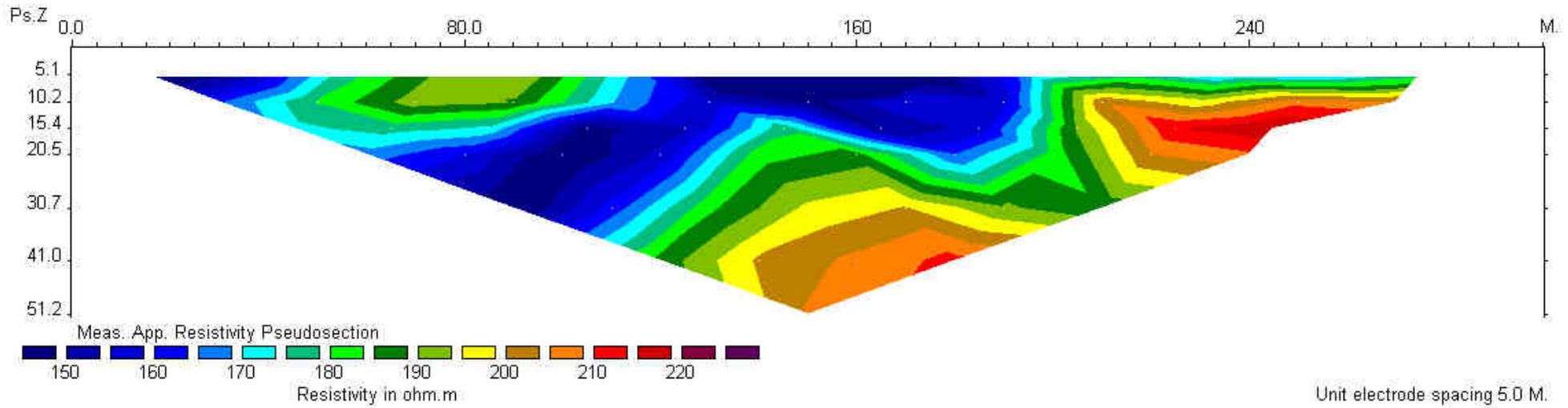
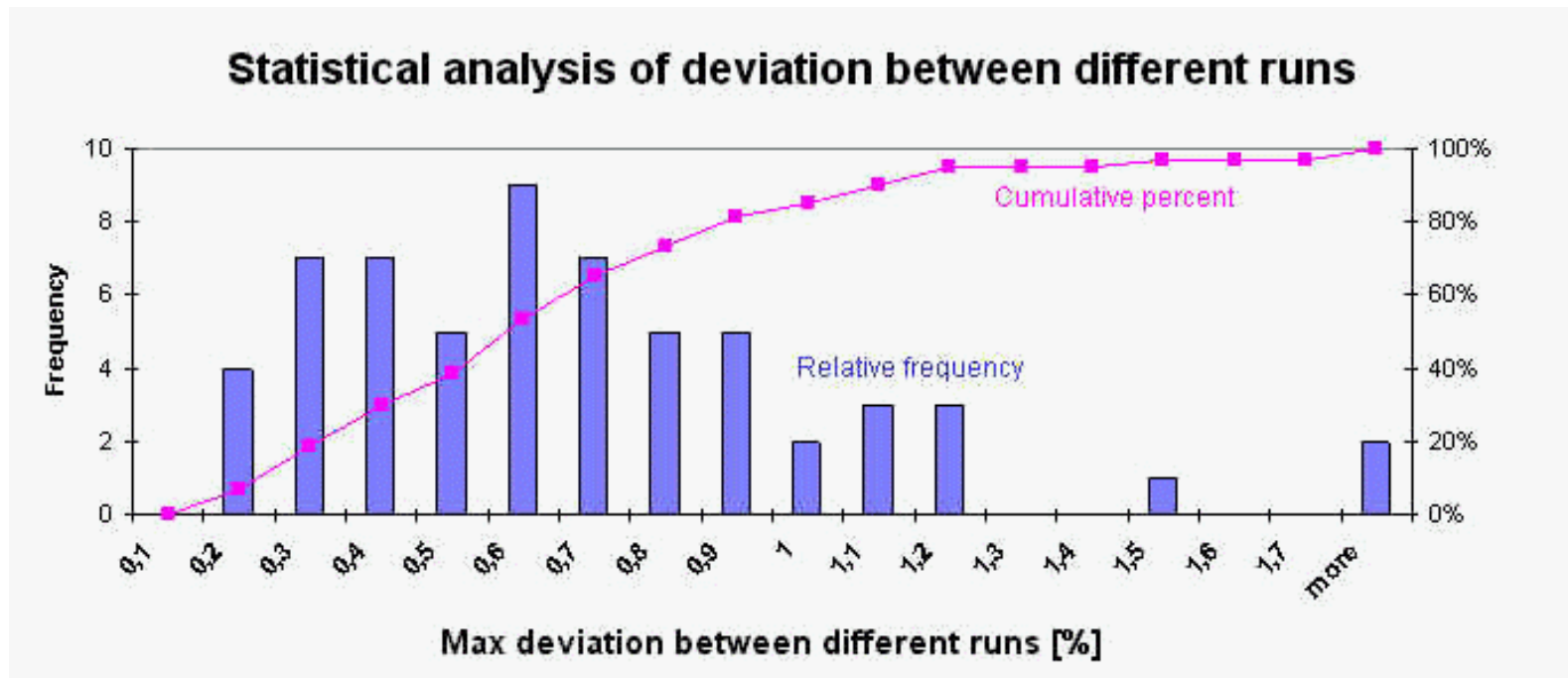


Figure 1: Pseudosection of the 300 m profile used for the test.

In order to quantify the precision, a statistical analysis of the data was performed. Figure 2 shows the difference between the maximum and minimum values of the apparent resistivity at each electrode position from each of the three runs.



*Figure 2: Statistical analysis of the deviation between three different runs.*

The typical deviation (median value) is 0,6%. The 90 percentile lies around 1% which means that 90% of the readings are within 1% between the different runs. The worst deviation observed is 4.6%.

## **Conclusion**

The resulting precision of the ABEM SAS 4000, connected to the ABEM LUND Imaging System, is better than 1%. Some data with deviations up to 4.6% are observed. These exceptions are likely due to time-varying conditions around the electrodes.

## **Acknowledgement**

Thanks to Bjulemar & Brorsson Geofysik AB, [bbgeo@algonet.se](mailto:bbgeo@algonet.se), for providing data for this test.