TEMPERATURE GRADIENT DRILLING AND MEASUREMENTS AT KIBIRO AND KATWE GEOTHERMAL FIELDS

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25th November 2008

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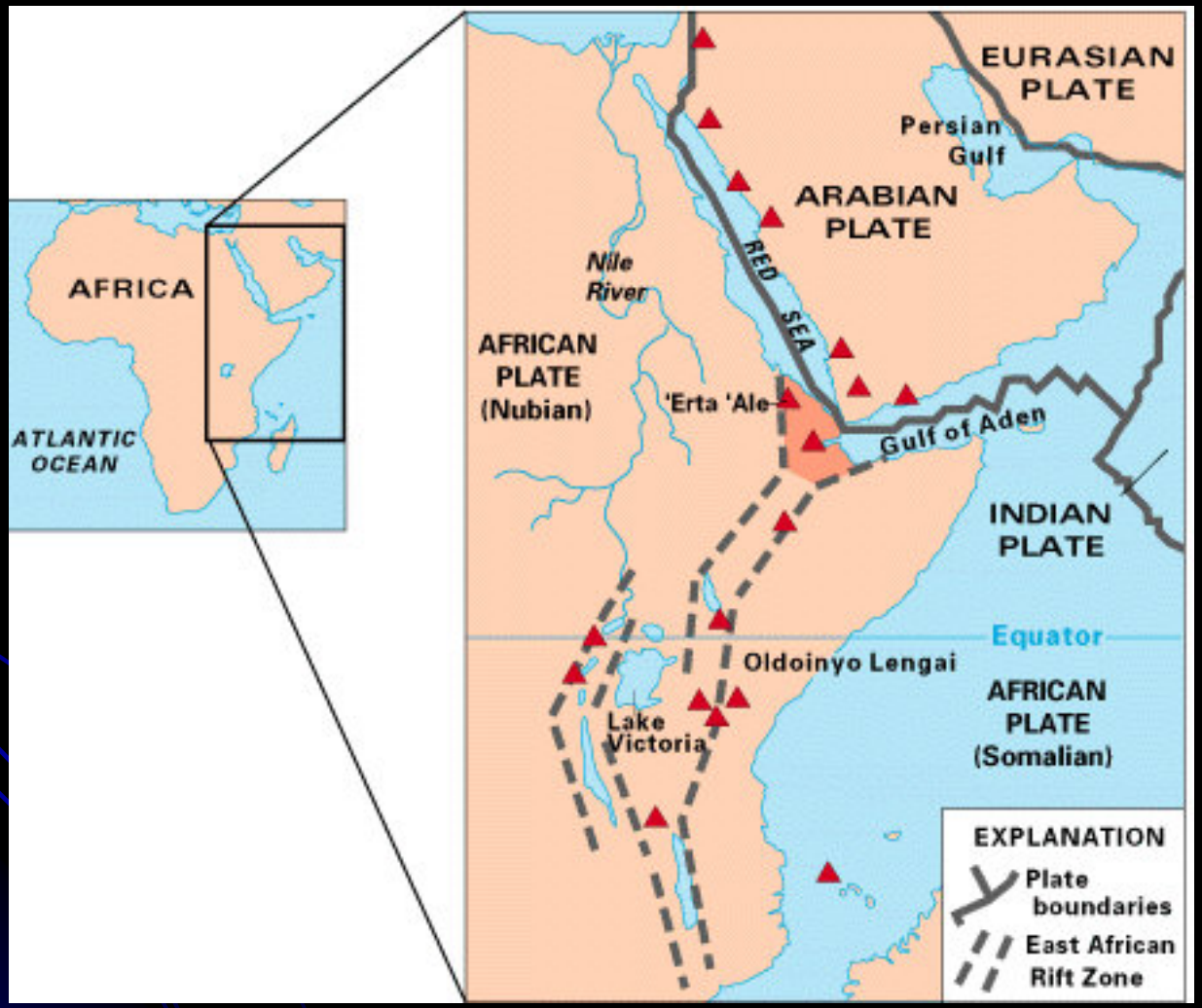
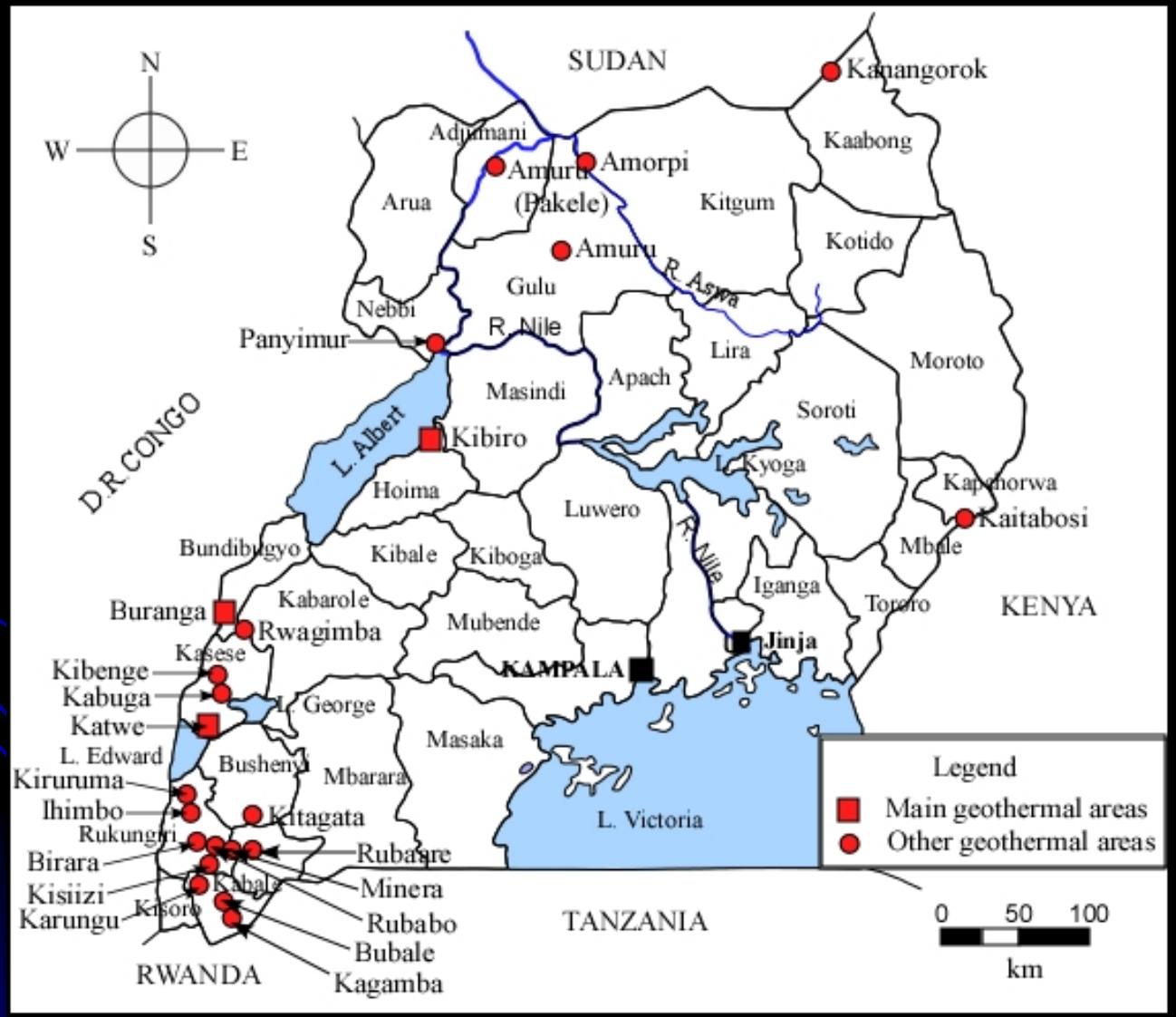
African Rift System



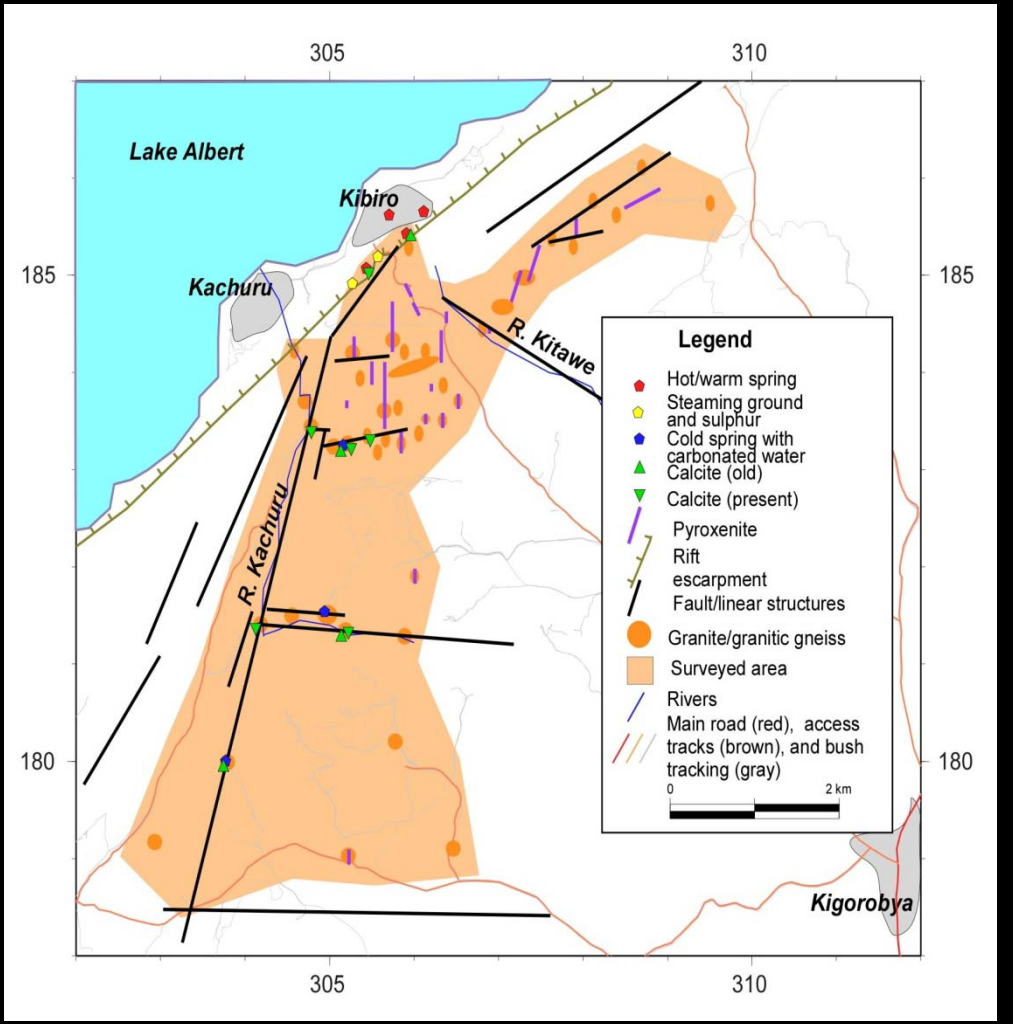
Ugandan geothermal areas



Kibiro geothermal field

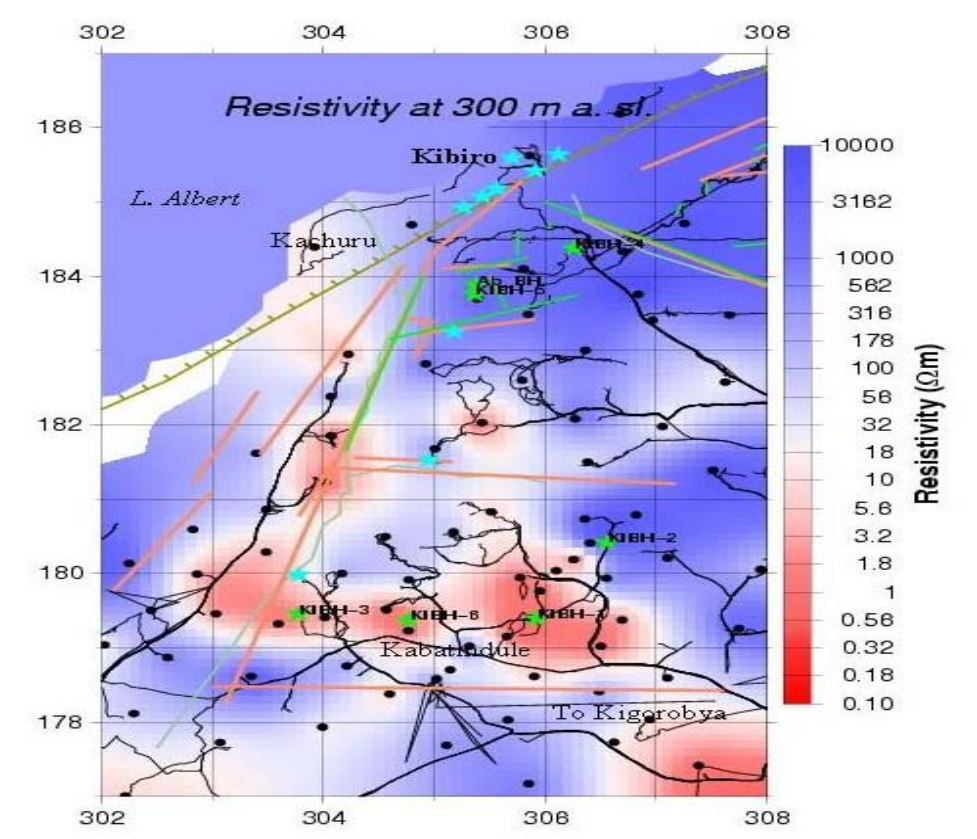
Background - Kibiro geology

- West of escarpment -sediments - 4-5 km thick
- East of escarpment – Block faulted granites & gneisses
- Manifestations: hot springs, sulphur deposits on the escarpment



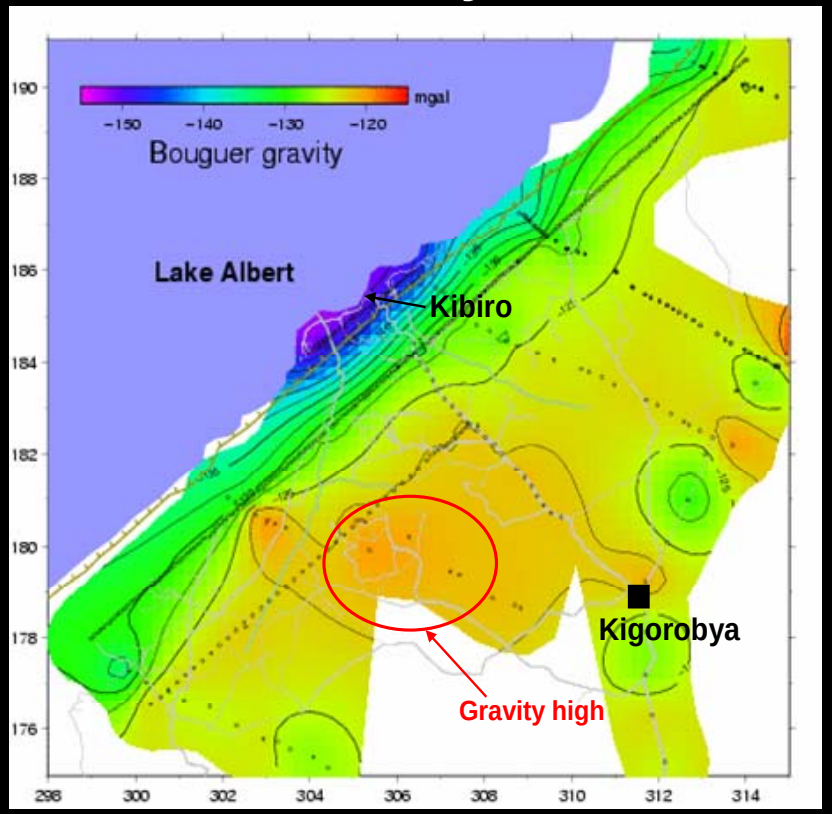
Background - Geophysical Surveys

TEM



- Low resisitivity anomaly in crystalline basement; conductive alteration minerals in fractures suggested.

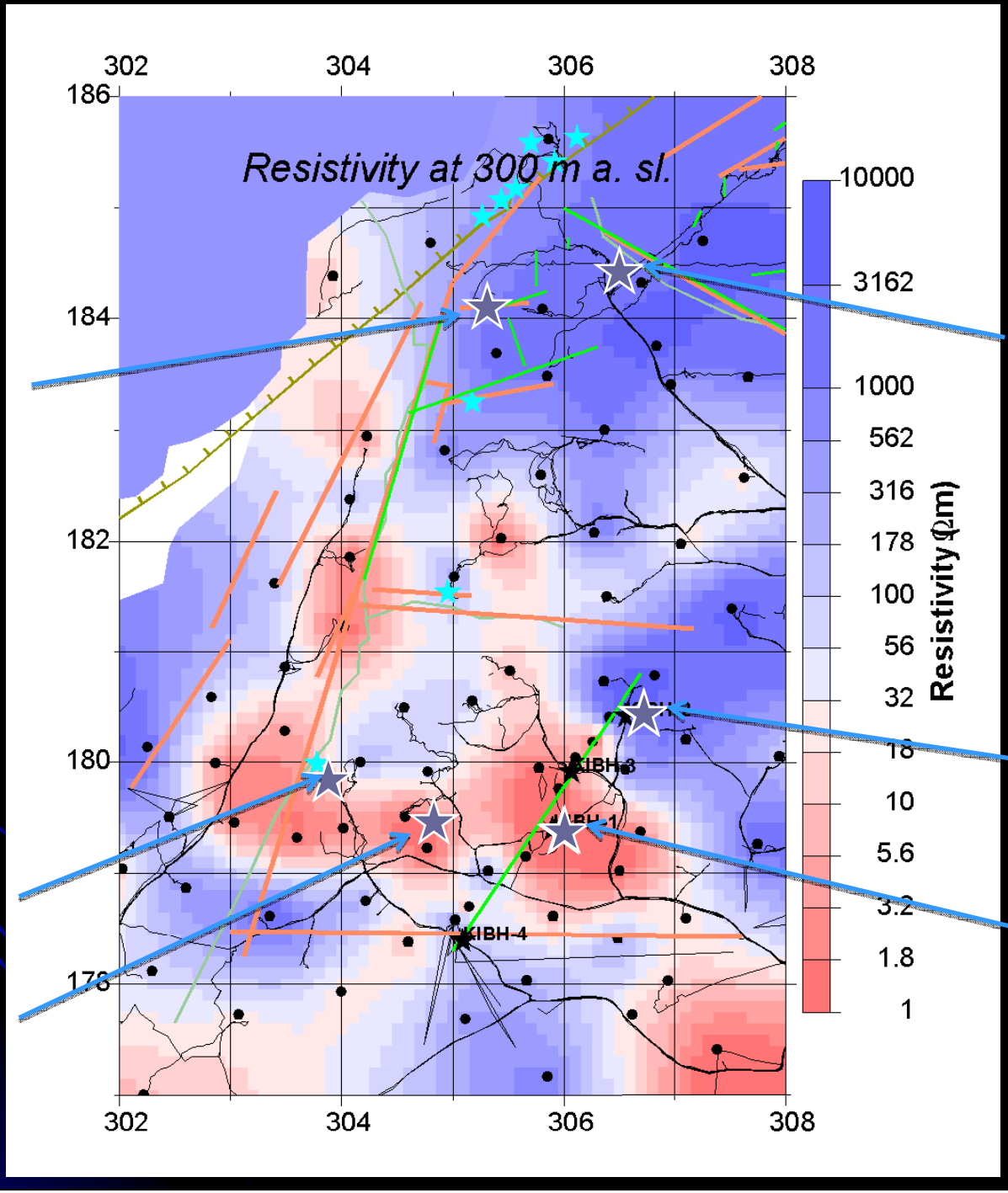
Gravity



- Gravity high coincides with low resisitivity;- a deep high density intrusive suggested.

Temperature Gradient - Kibiro

6 gradient wells were drilled in crystalline basement



KIBH 5
31°C/km

KIBH 4
27°C/km

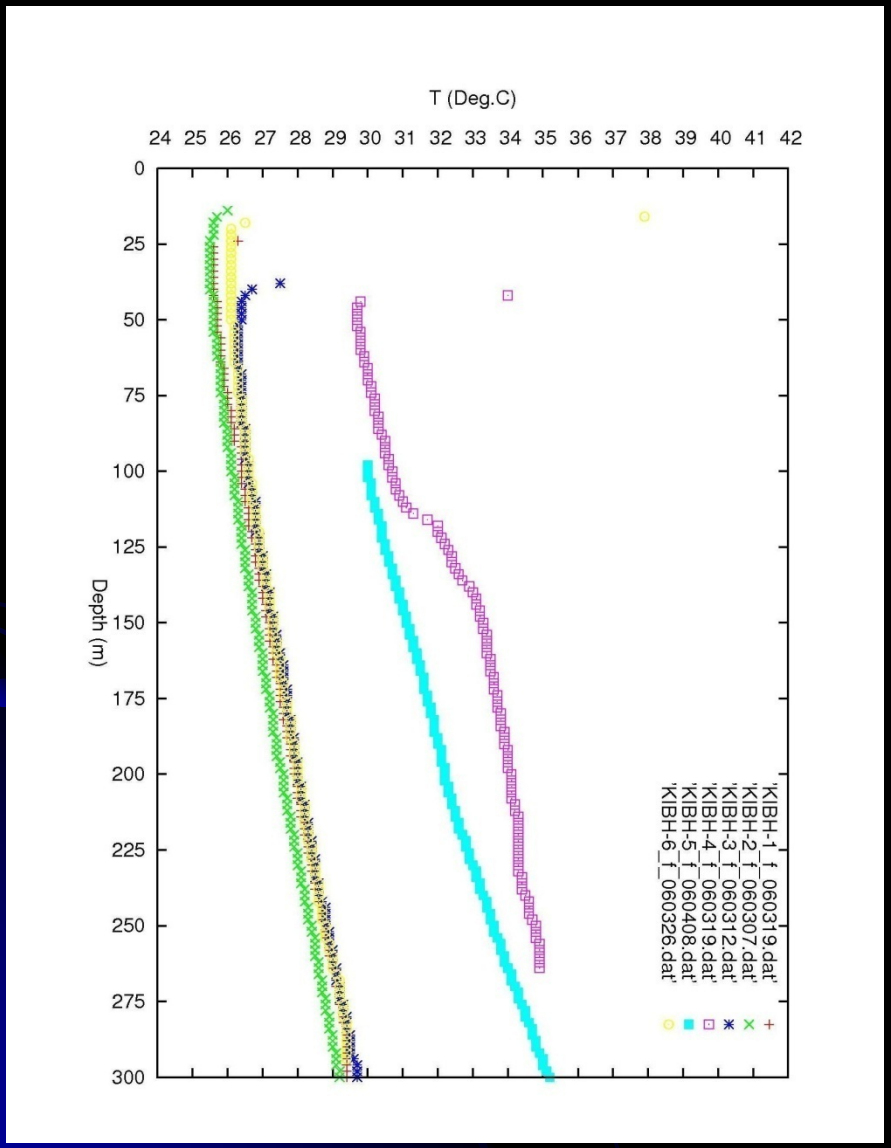
KIBH 2
16°C/km

KIBH 1
16°C/km

KIBH 3
16°C/km

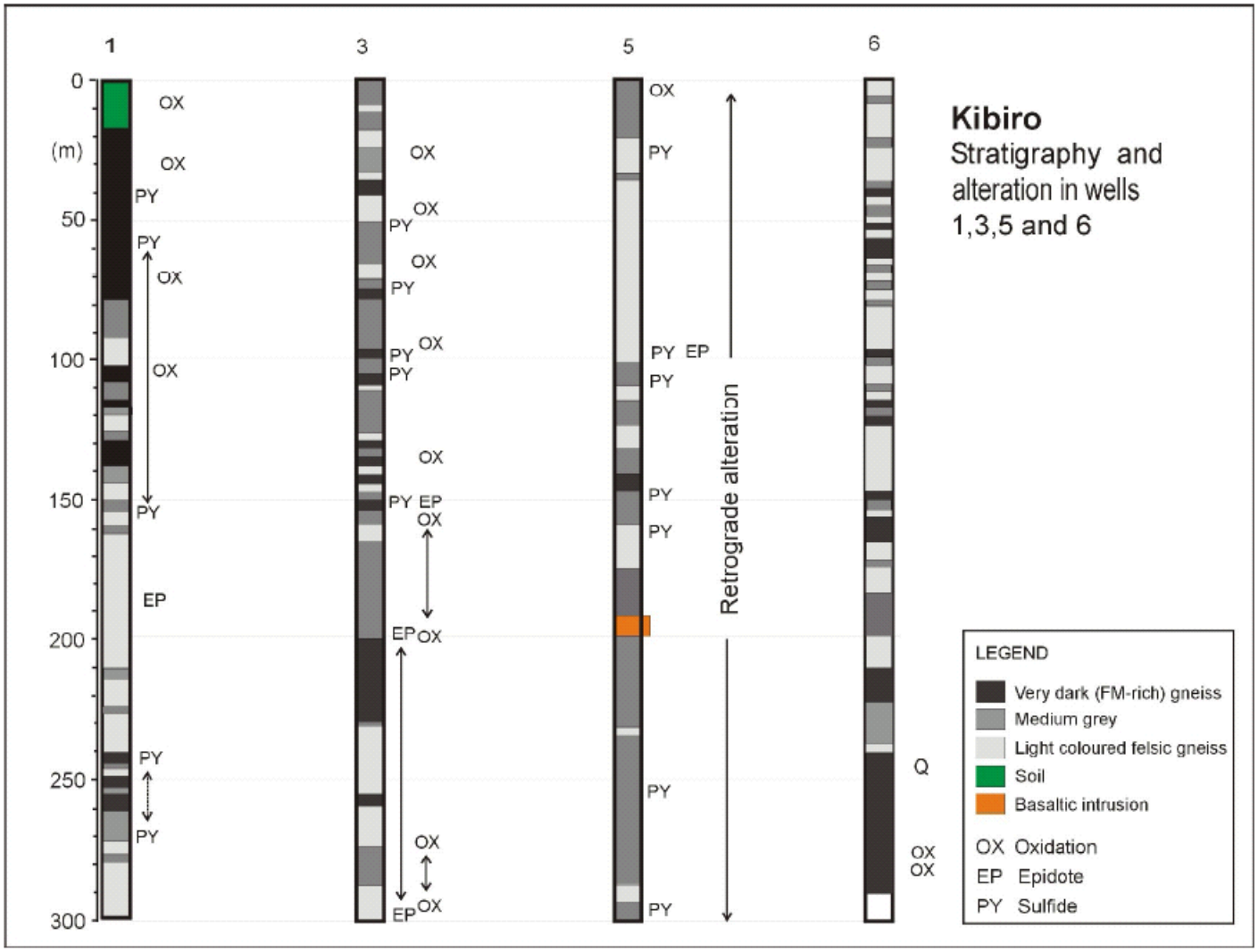
KIBH 6
16°C/km

Kibiro -Temperature Gradient measurements



The latest temperature measurements in all the holes in the Kibiro area

Kibiro - borehole geology



Kibiro - Conclusions

- No evidence of hydrothermal alteration in boreholes
- The gradient temperature drilling has shown that the low-resistivity anomalies in the basement rocks are not caused by existing heat anomaly
- The apparent epidote and sulfide appear to have been formed at much earlier time rather than geothermal activity at the current erosional level
- The anomalies could be caused by epithermal ore deposits

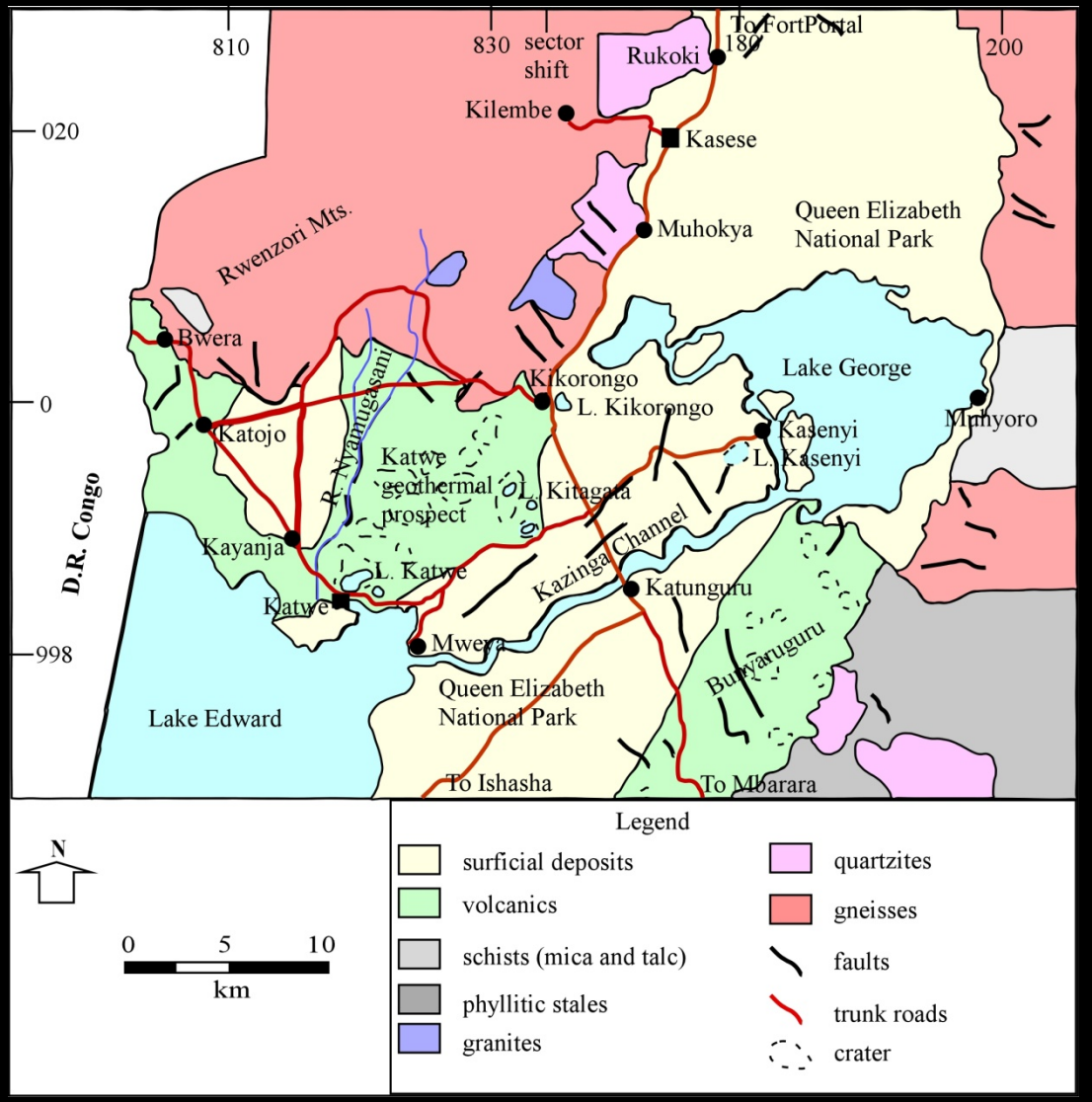
Kibiro - Recommendations

- Carry out MT survey around Escarpment to look the deeper structures of the Rift to locate deeper drilling sites

Katwe geothermal field

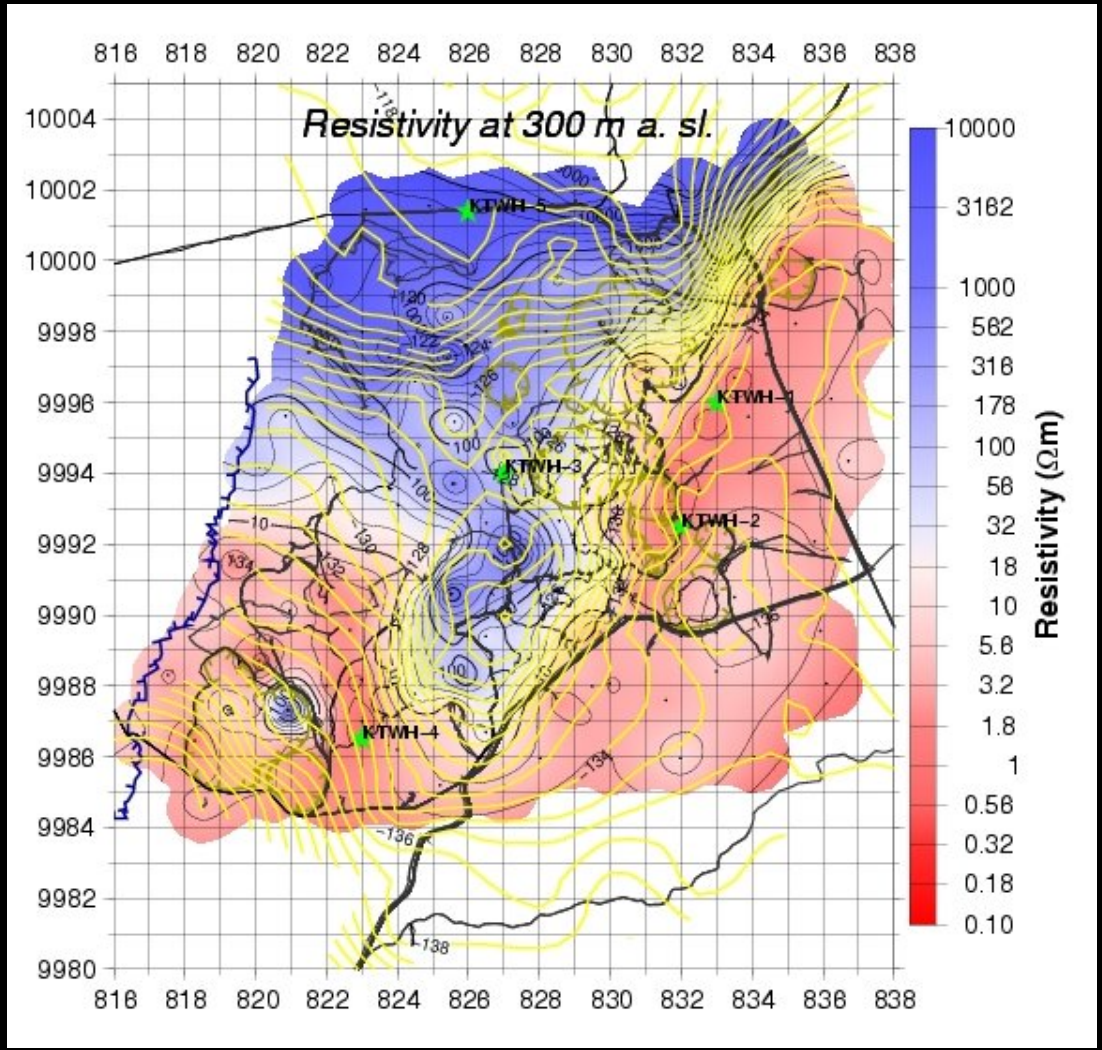
Background - Geology

- Explosion craters, pyroclastic lava blocks, tuffs & fragts of granites and gneisses deposited on Pleistocene sedts.
- Lava flows in L. Kitagata and Kyemengo craters
- Travertine in L. Katwe & near L. Kikorongo



Background - Geophysics

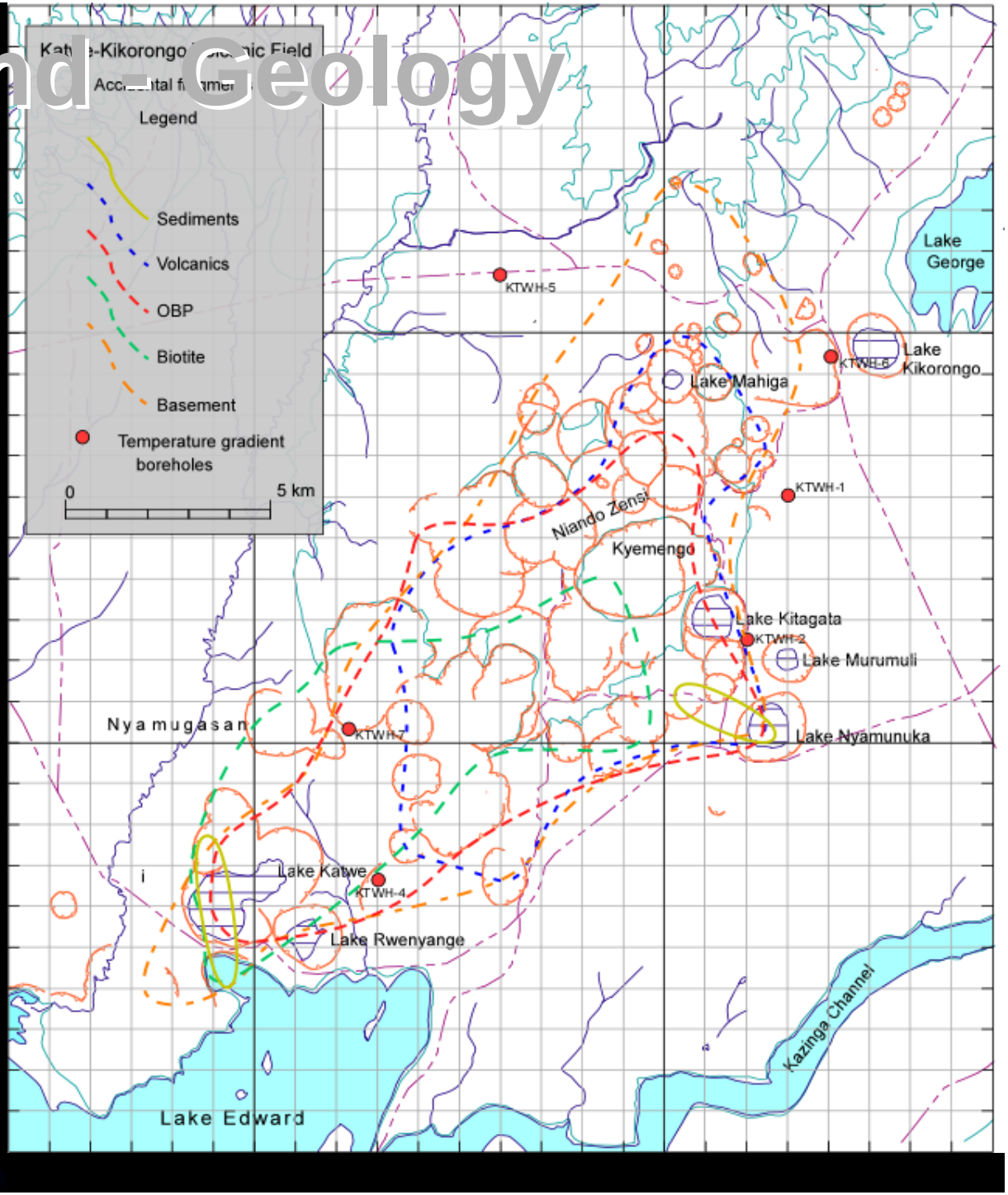
- Geophysical surveys (TEM & gravity) delineated anomalous areas for drilling



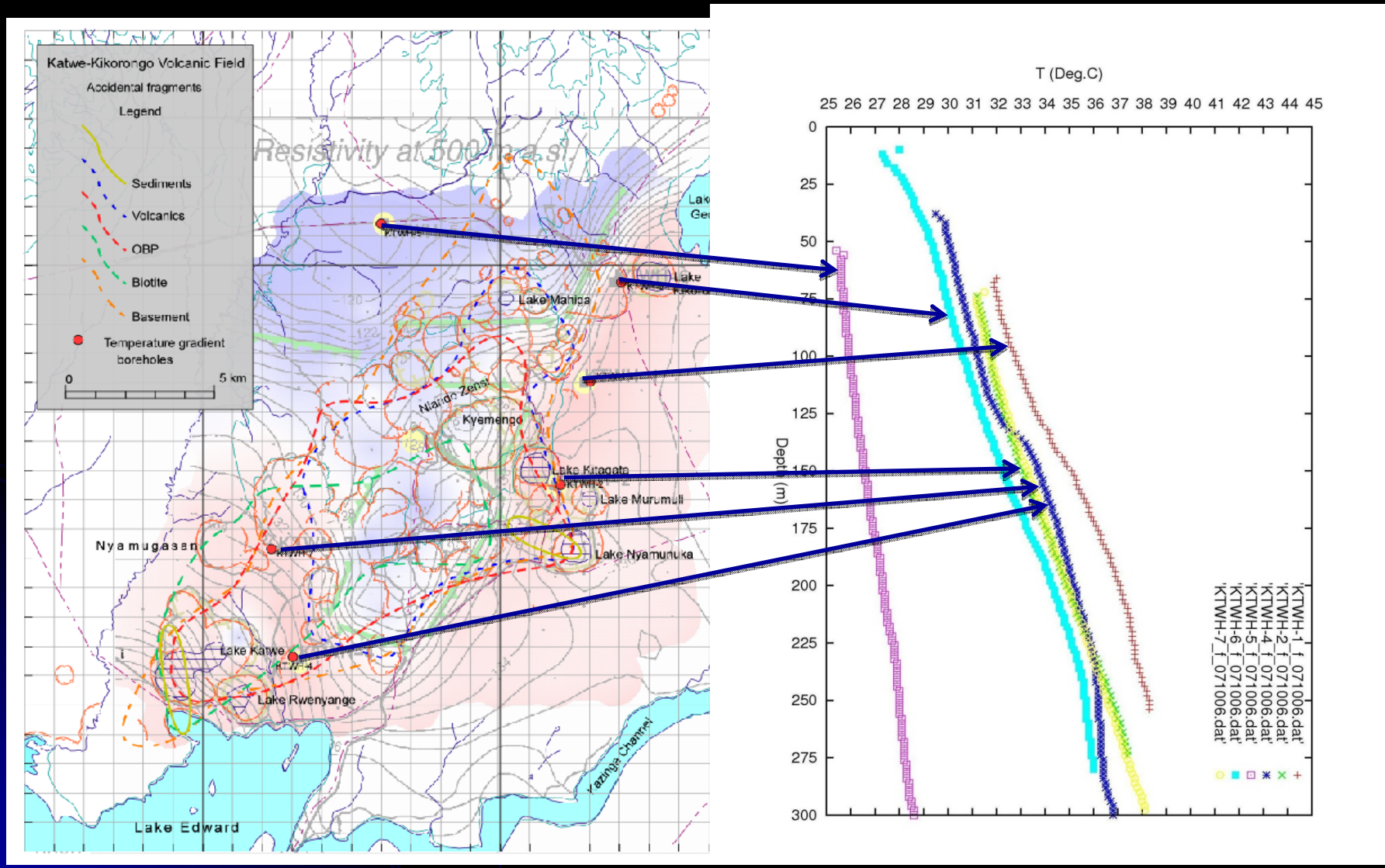
Katwe: Resisitivity & gravity results

Background - Geology

- Geology – Evidence of permeability & heat source
- Drill sites and accidental fragment map



Temperature Gradient measurements



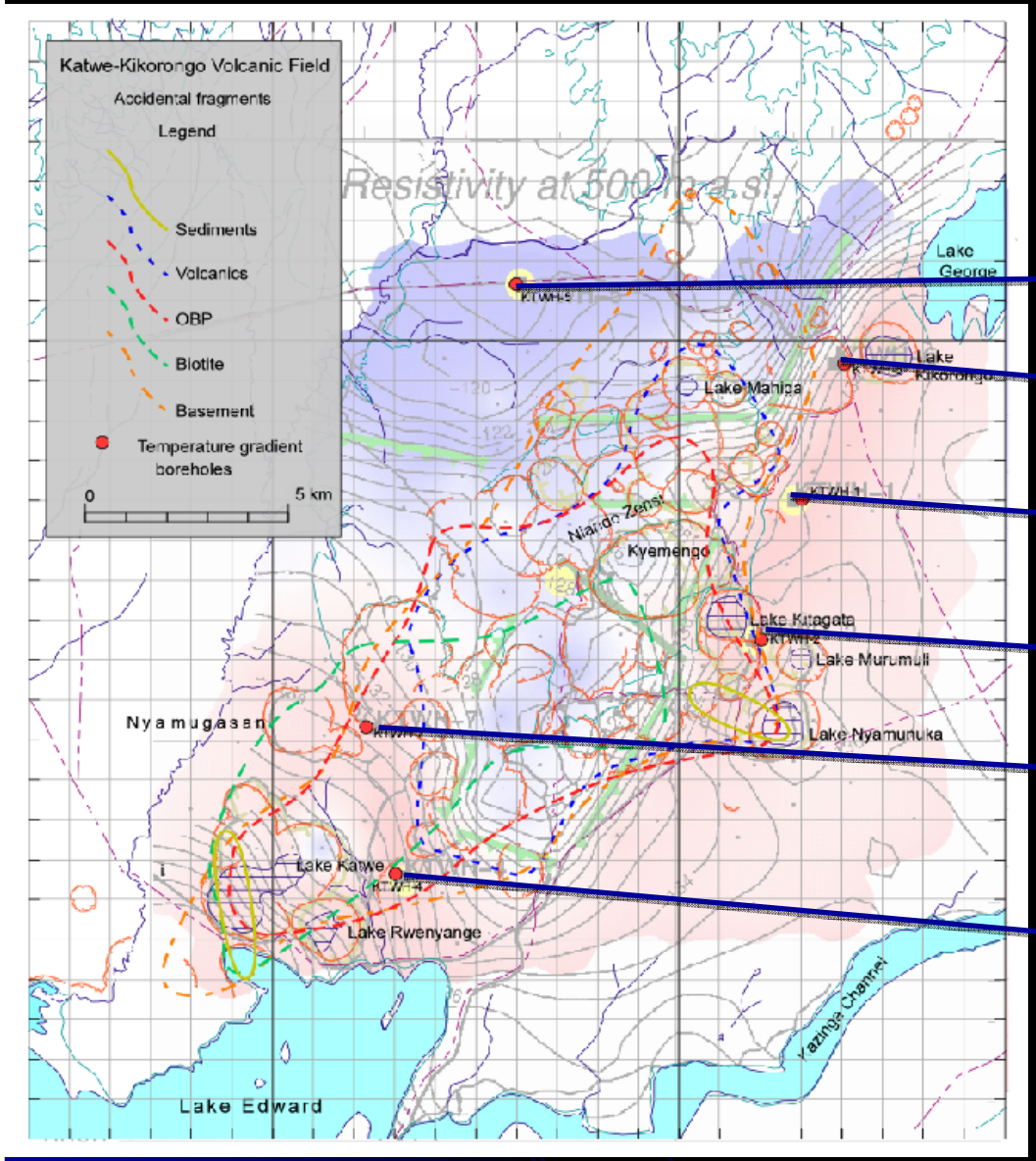
Temperature gradient

- 6 gradient wells were drilled; 5 in volcanic/sediment formation & 1 in crystalline basement (control)
- Samples were taken at 2 m interval, totaling 900 & analyzed using binocular stereomicroscope at Iceland GeoSurvey

Results: Katwe & Kibiro contd.

Temp. Gradient Measurement at KTWH 4

Results: Katwe & Kibiro contd.



13°C/km

30°C/km

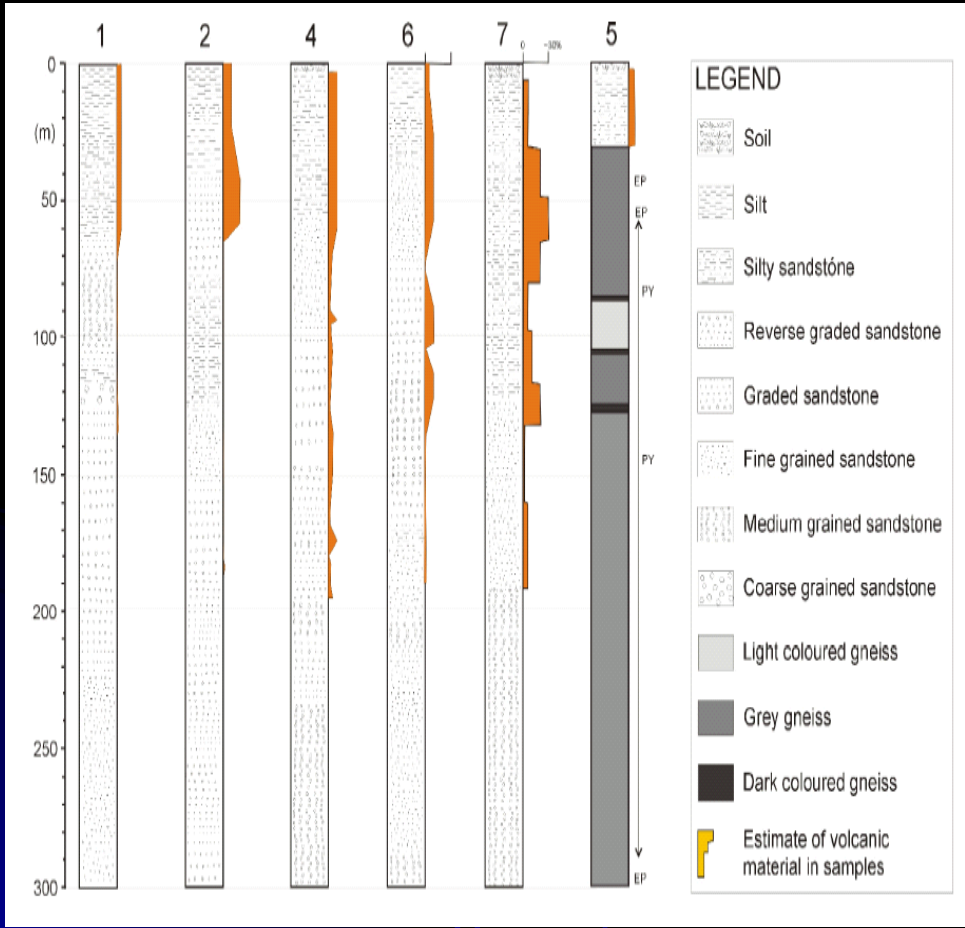
36°C/km

36°C/km

34°C/km

28°C/km

Borehole geology



- Indication of geothermal activity, i.e. fracturing, veining, void fillings were not seen in samples – indication of absence of shallow reservoir & suggesting deep seated reservoir

Conclusions

- The geothermal gradient drilling operation have not shown anomalous temperature at shallow depth in Katwe
- With the current knowledge the geothermal potental of the Katwe – Kikorongo field cannot be be confirmed
- Carryout magnetotellurics (MT) surveys, to probe deeper and identify the heat source in Katwe and Kibiro areas.

Thank you