The geochemistry of Arus & Bogoria geothermal prospects

1st EAST AFRICAN RIFT GEOTHERMAL CONFERENCE –ARGeo-C1

GEOLOGICAL SURVEY OF ETHIOPIA,

24TH NOV– 2ND DECEMBER, 2006

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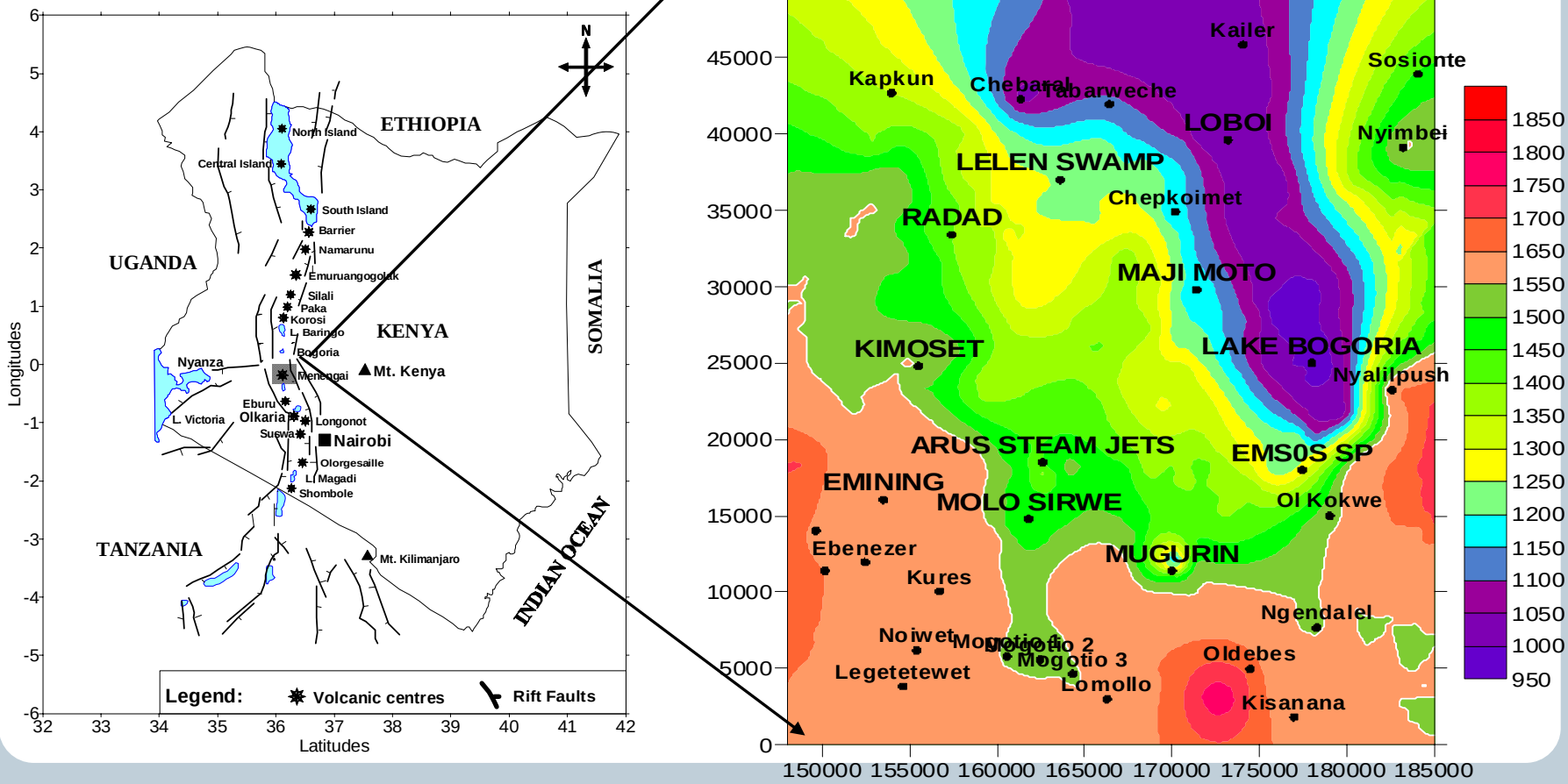
Map of study area



Aerial Photo of Bogoria Prospect

OBJECTIVE

- Locate and map all geothermal surface manifestations.
- Establish the whether a geothermal resource exists in Arus and Bogoria prospects.
- Site exploration wells.

Surface exploration Methodology

- Locate, sample and analyse the springs, fumaroles, boreholes and gas holes
- Soil gas survey.
- Ground temperature.

Arus steam jets

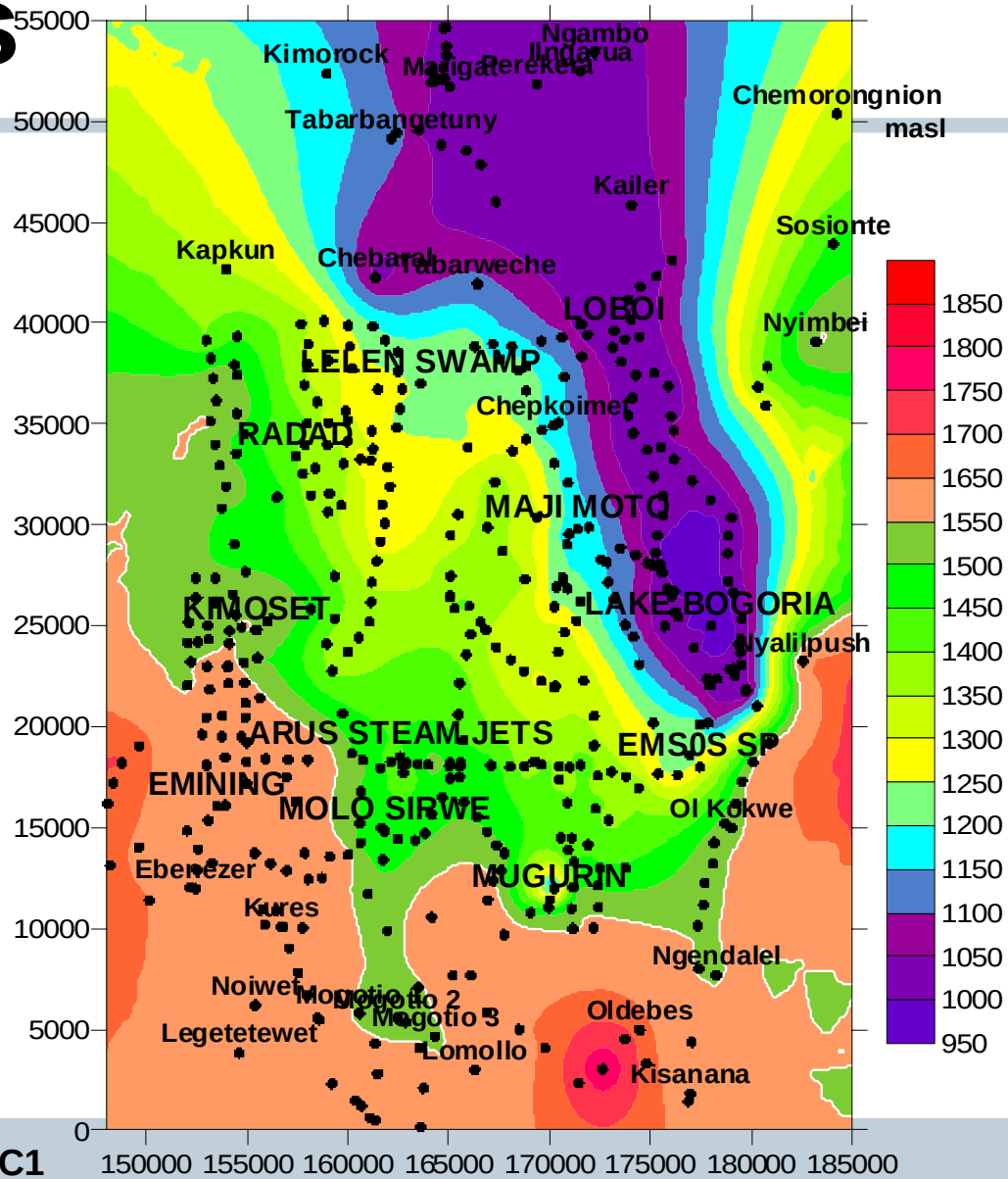
Bogoria geysers

Bogoria fumaroles

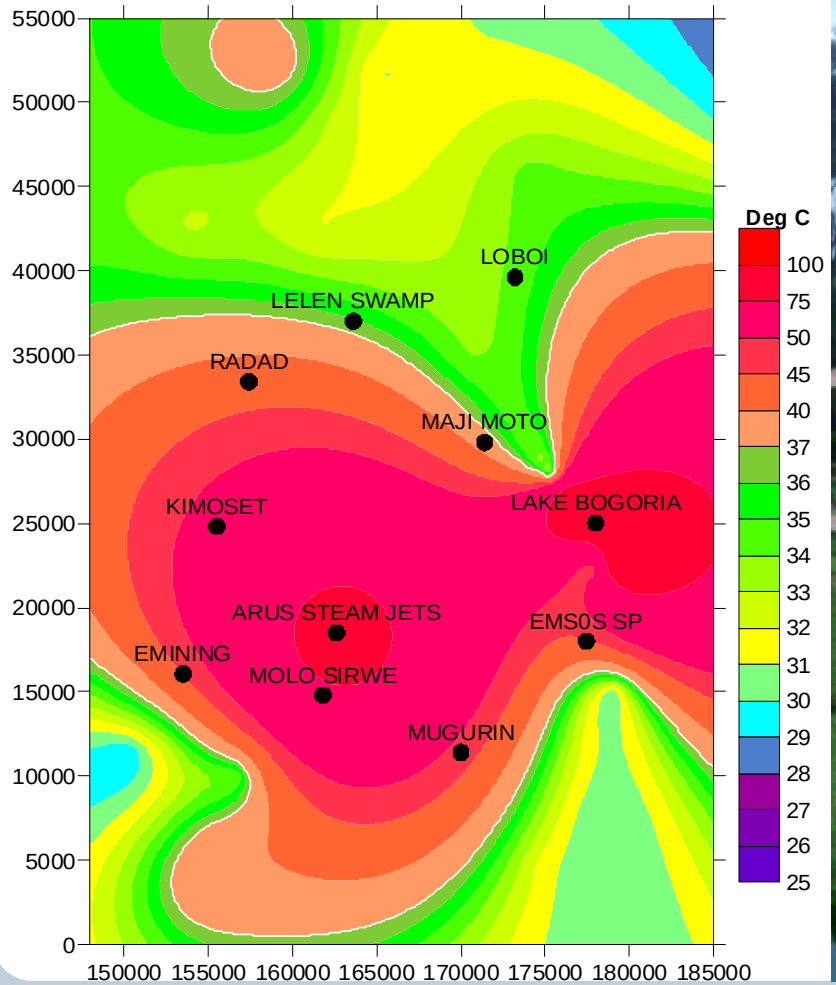
Work done to date

- Located and Sampled EIGHTEEN (18) springs
- Located and Sampled 31 boreholes
- 338 radom radon and soil gas measurements
- Located and sampled ten fumaroles

Location of all sampling points



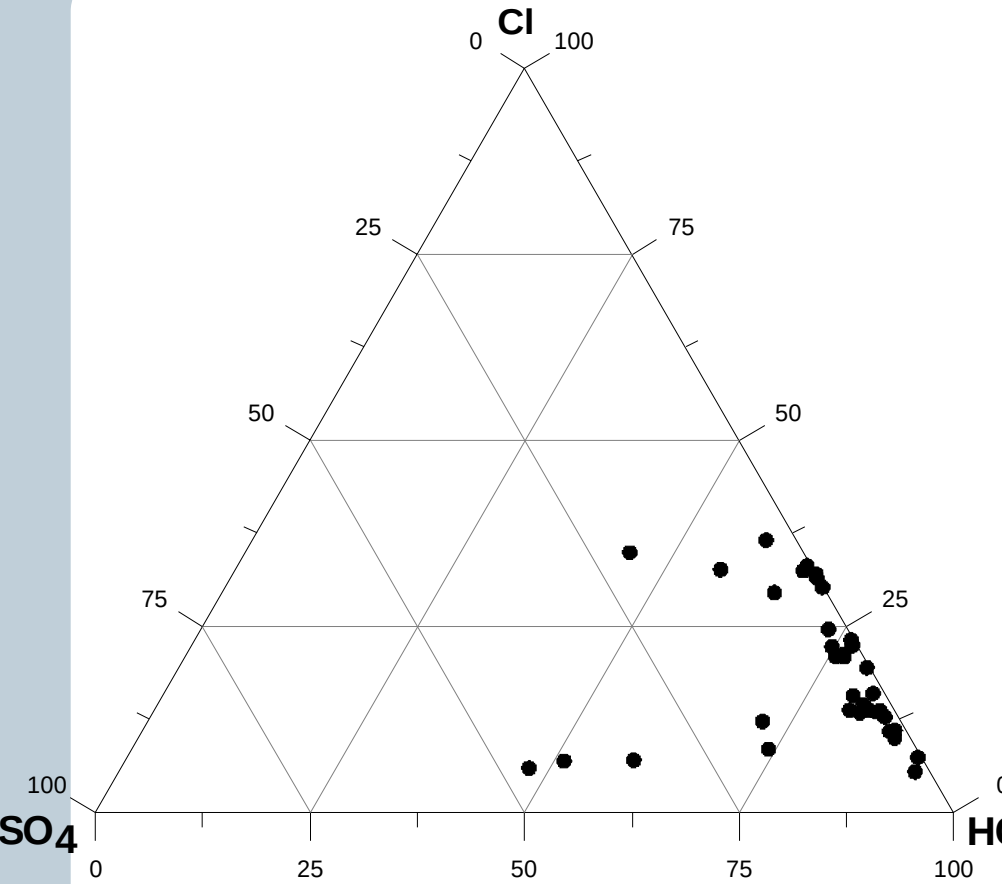
Boreholes and springs temperature distribution plot



Results

- The temperature of the boreholes varied between 24 °C for Seretion borehole to 40 °C at the Mogotio boreholes.
- The pH varied from 7.2 to 9.2, however, 22 out of 31 boreholes discharged water whose pH was between 6.5 and 8.0.
- With the exception of five samples, the conductivity of the water samples is less than 1000 µS/cm. None of the boreholes have silica concentration exceeding 100 ppm.

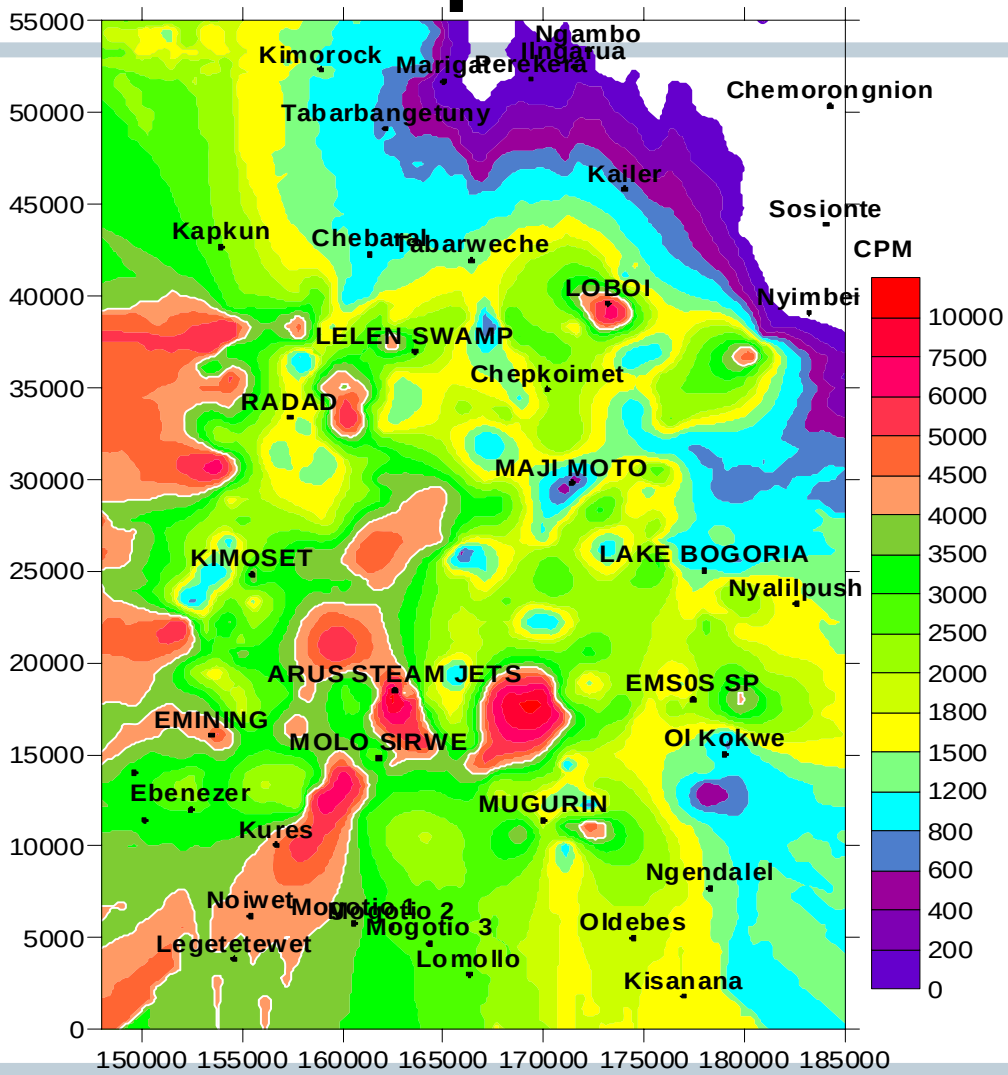
Chloride-Sulphate-Bicarbonate ternary diagram



Results

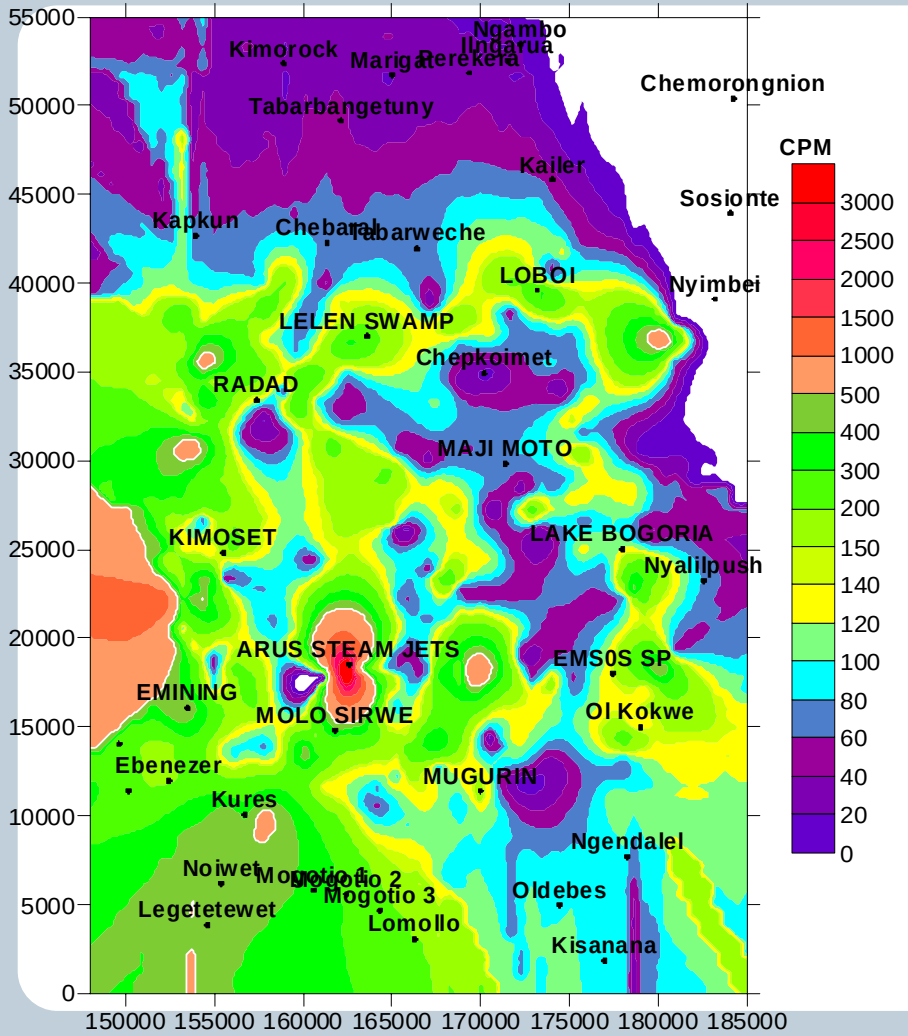
- The pH of the spring samples varies from 7.3 to 9.8
- Chloride concentration varies from 31 ppm (BS 5) to 3295 ppm (BS 15).
- Quartz geothermometer temperature range from 115 to 325 deg C, while the Na/K geothermometer temperature range from 122 to 377 deg C.

Arus & Bogoria Soil gas Radon 220 distribution plot



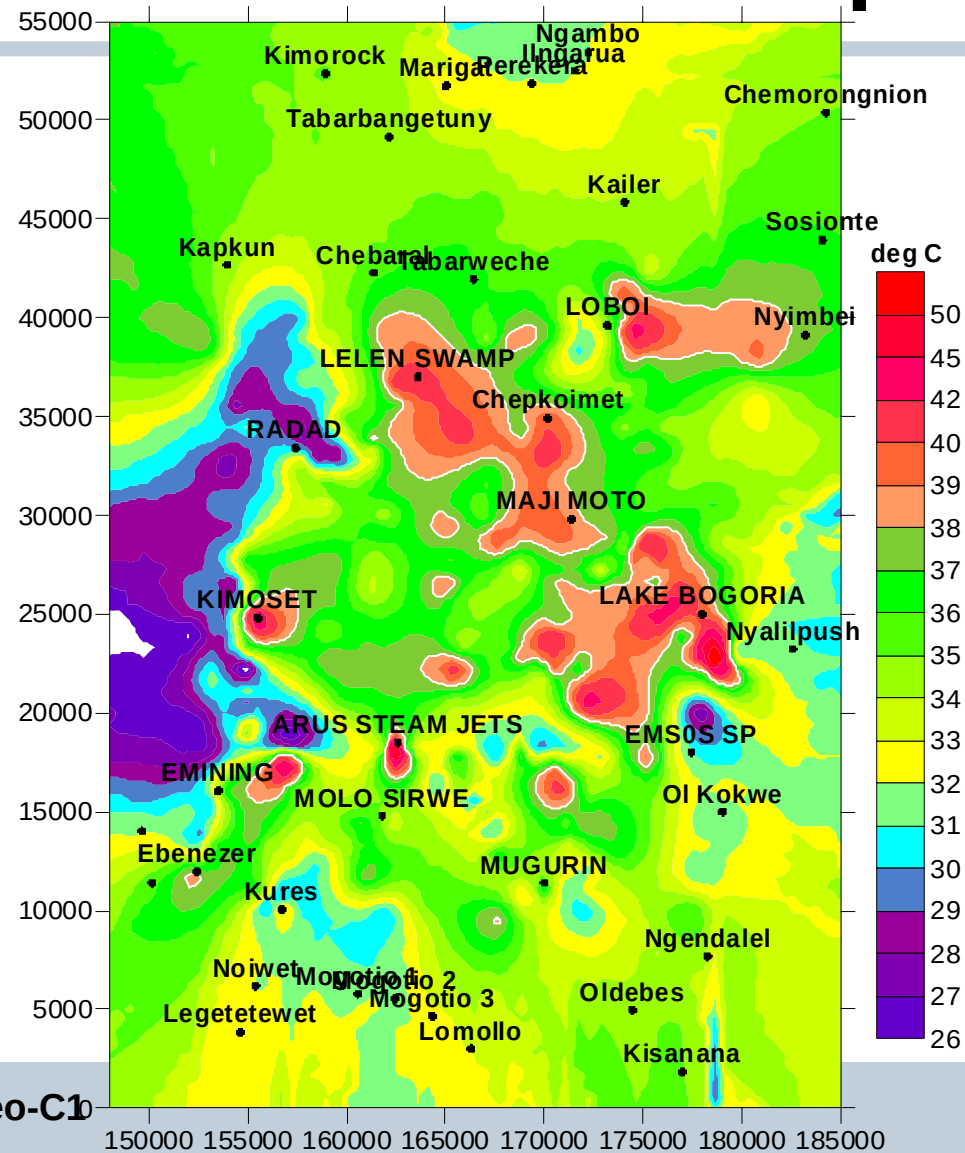
Arus & Bogoria Soil gas Radon 222 distribution plot

KenGen

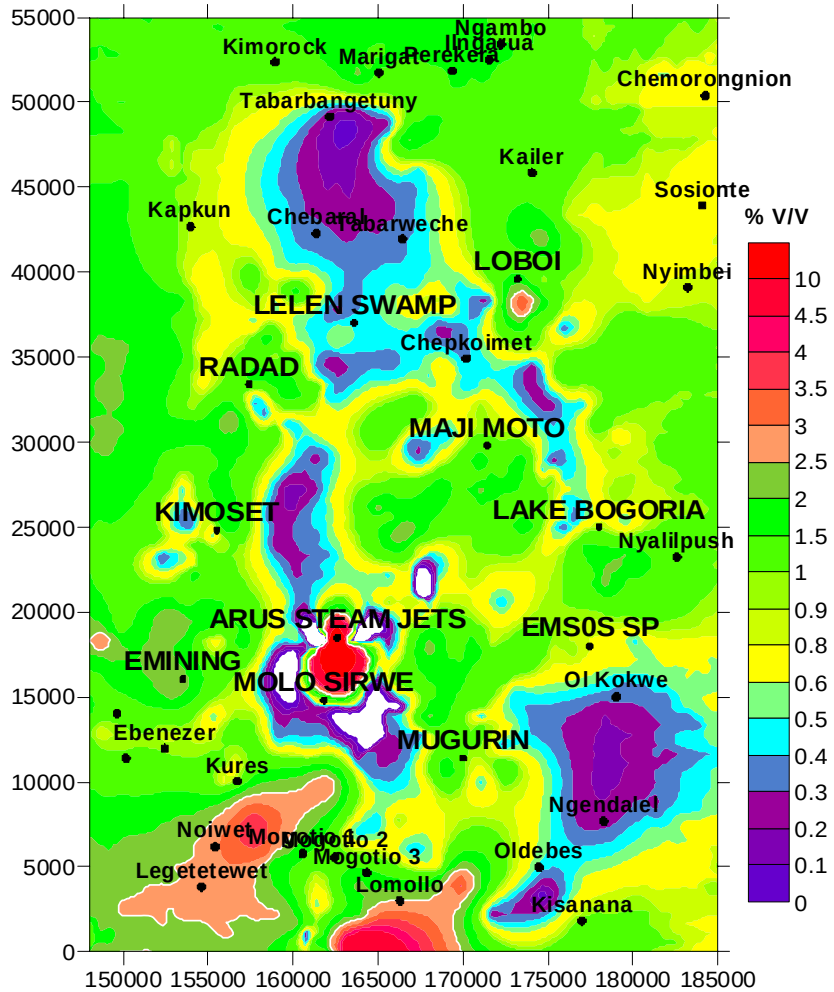


Arus & Bogoria Ground temperature distribution plot

KenGen



Arus & Bogoria Soil gas CO_2 distribution plot



CONCLUSIONS

- A GEOTHERMAL RESOURCE EXISTS IN ARUS AND BOGORIA,145–325 deg C
- THE UPFLOW MAY BE LOCATED IN THE AREA CLOSE TO THE ARUS STEAM JETS AND THE AREA NORTH OF MUGURIN. **High radon and ground temperature.**

Acknowledgements

- Special thanks to the Management of Kengen for allowing us to publish this paper

- Thank you very much

- Have a wonderful WEEK