OUTLINE

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INTRODUCTION

Location map

- Located in southern central sector of Kenyan rift
- Other volcanic centres also located within axial of rift
- Olkaria, Eburru and Menengai at production stage
- Study focuses on Olkaria-Domes (OW-911A, OW-912B, OW-916 and OW-914A)
Olkaria geothermal field

- Surface geology comprise of ash deposits, pumice lapilli, pyroclasts and comenditic lava
- Sub-surface geology comprise of basalt, rhyolite, tuff, trachyte, dykes and intrusives
- Divided into seven field
- Total installed capacity of 677 MWe
OBJECTIVES

- To review and compare stratigraphy and hydrothermal alteration minerals
- Compare the paleo-thermal trends in the study area
METHODOLOGY

- Samples collected at 2 m interval during drilling
- 1200-1400 samples collected in each well
- Analytical methods include:
  i. Binocular microscope analysis
  ii. Petrographic microscope analysis
  iii. X-ray diffractometer analysis
  iv. Fluid inclusion analysis
RESULTS

Stratigraphy

- Pyroclastics 0-100 m
- Rhyolite 100-500 m
- Basalt 500-1000 m
- Trachyte 500-3000
- Tuff
Occurrence and distribution of common alteration minerals

- Minerals found: zeolites, calcite, pyrite, chalcedony, opal, quartz, epidote, prehnite, wollastonite, actinolite, sphene, haematite and clays

- Low temp zeolites found at shallow depth

- High temp minerals found in abundance in OW-916 and OW-914A compared to OW-912B and OW-911A
Paleo-thermal reconstruction

Well OW-916

- Homogenisation temp range between 275 °C and 305 °C - average of 282 °C

- Formation temp is 276 °C

- Formation temp, alteration mineral temp and fluid inclusion lie in the same path

- System has maintained more or less steady state of equilibrium

Mwangi (2012)
Well OW-914A

- Homogenisation temp range between 250 °C and 290 °C - average of 255 °C

- Alteration mineral temp and fluid inclusion lie in the same path

- System has maintained more or less steady state of equilibrium
Well OW-911A

- Homogenisation temp range between 195 °C and 286 °C - average of 220 °C

- Formation temp is 220 °C

- Formation temp, alteration mineral temp and fluid inclusion lie in the same path

- System has maintained more or less steady state of equilibrium
Well OW-912B

- Homogenisation temp at 756 m is between 160 °C and 200 °C - average of 175 °C
- At 1456 m is between 250 °C and 300 °C - average of 260 °C
- Formation temp is 280 °C
- Formation temp, alteration mineral temp and fluid inclusion lie in the same path

Ronoh, (2012)
CONCLUSIONS AND RECOMMENDATIONS

Conclusion

• The stratigraphy comprises of five lithological units; pyroclastics, rhyolite, tuff, basalt and trachyte.

• High temp alteration minerals are noted at shallower depth at the region of wells OW-916 and OW-914A.

• Well OW-912B recorded the greatest depth at which high temperature alteration mineral were observed.

• Area around wells OW-916 and OW-914A has the heat closer to the surface.

• Temp curves shows that the system has maintained a steady state of thermal equilibrium over time.
Recommendations

• More fluid inclusion studies need to be done in wells drilled in Domes area in order to get a detailed picture of the temperature variation in the whole of the Domes field.
THANKS