KENYA

GEOLOGICAL MAP OF THE BARRIER VOLCANIC COMPLEX AND ADJACENT AREAS

1:50 000

EXPLANATION OF GEOLOGICAL COLOURS AND SYMBOLS

INNER TROUGH

Age (yr A.D.)

- c.1870 — K^{my} — Recent mugearite lavas
- 1030-1090 — K^{by} — Recent basalt lavas
- K^{py} — Recent phonolite lavas and lava domes

Lavas of Teleki and Andrews Volcanoes

Age (Ma)

- 0.01 — K^{bu} — Upper Basalts; including hawaiites
- 0.05 — K^{t} — Trachyte lavas and lava domes
- 0.09 — K^{vu} — Pyroclastic deposits; including air-fall pumice and accretionary lapilli tuffs with minor welded and unwelded pyroclastic flows
- K^{td} — Trachyte lava domes
- K^{bl} — Lower Basalts; including basanites
- 0.09 — K^{vl} — Upper Trachytes; lavas and welded pyroclastic flows (K^{vl}) minor air-fall tuffs
- 0.23 — K^{tu}
- K^{tl} — Lower Trachytes; lavas and pyroclastic rocks

Post-Caldera Lavas — KAKORINYA VOLCANO

- LW^{h} — Hawaiite lavas
- LW^{b} — Basalt lavas
- LW^{v} — Trachyte and phonolite unwelded pyroclastic flows and breccias
- LW^{t} / LW^{hy} — Trachyte, benmoreite and phonolite lavas and lava domes with unwelded pyroclastic flows (LW^{hy})
- N^{b} — Basalts of Namuriinyang tuff cone

LIKAIU WEST VOLCANO

- KL^{m} — Mugearite lavas
- KL^{b} — Basalt lavas
- 0.707 / 0.773 — KL^{t} — Trachyte lavas and welded/unwelded pyroclastic flows

KALOLENYANG VOLCANO

- 1.37 — LE^{t} — Trachyte lavas and welded/unwelded pyroclastic flows

LIKAIU EAST VOLCANO

- B^{b} — Basalt lavas of Logipi and Latarr

Abbreviation: superscript (P) with the above symbols indicates pillows and / or hyaloclastite deposits and breccias (eg K^{byP}, B^{bP}).

WESTERN MARGIN OF RIFT

Age (Ma)

PLIOCENE

- 1.86-4.0 — LP^{t} — Loriu Plateau trachyte, rhyolite and benmoreite lavas
- LB — Lorikipi Basalts; basalts, hawaiites and minor pyroclastic and sedimentary rocks
- Pc — Precambrian basement; biotite gneisses
- l — Lacustrine sand, silts, clays and diatomites with fluvial sands and gravels. Stipple indicates where thick gravel deposits overlie

EXTRUSIVE IGNEOUS ROCKS

- V^{b} — Unconsolidated and consolidated basalt scoria spatter and ash
- V^{t} — Unconsolidated and consolidated trachyte scoria and pumice lapilli deposits
- V^{p} — Basaltic deposits of phreatic origin; including palagonite

INTRUSIVE IGNEOUS ROCKS

- b — basalt
- t — trachyte
- f — foyaite, with associated pyroclastic rocks (f^{v})

Geological boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary
- fault, (tick on downthrow side)
- fault uncertain and/or concealed
- open fracture or minor fault
- caldera ring fault
- caldera ring fault uncertain and/or concealed by younger deposits
- landslip scarp
- lineament or joint from air photo/satellite image
- dyke, b - basaltic, t - trachyte

EASTERN MARGIN OF RIFT

Age (Ma)

PLEISTOCENE

- 2.3-4.2 — LO^{b} — Longipi Basalts
- TT — Tirr Tirr Series

PLIOCENE

- 4.53 — E^{t} — Ejuk trachytes and rhyolites
- P^{b} — Parkati Basalts

DRIFT DEPOSITS

- Landslip
- Alluvium
- Alluvial fan deposits; cobbles, sands and gravels
- Scree or colluvium
- Lacustrine beach deposits; gravels and sands

Geological symbols

- horizontal strata
- 10 — dip of strata, in degrees or estimate from air photo; (a)- gentle, (m)- moderate

Volcanic landforms

- Lava front
- Lava flow features; pressure ridges
- Lava levee
- Prominent break of slope

Eruptive centres

- Parasitic pyroclastic scoria cone size and shape indicated. R - Tuff ring T - Tuff cone
- Minor parasitic pyroclastic scoria cone
- Open fissure with spatter ramparts

LAKE TURKANA

Lake level subject to fluctuation. 1972 level shown here at 365 metres a.s.l. Based on published topographical maps.

Lake margin liable to fluctuate

Von Hohnels Bay

LOKIDIRR

Luguruguru

Loguruguruit

Abili Agituk

Nabuyatom Cone

NAKWE

NAKUJAKABON

LOKWEAM

KAPEDO

KALOLENYANG

KAKORINYA

Andrews Cone

LIKAIU WEST

LIKAIU EAST

PARKATI

ALOWALAN

Emuruanyangan

Naperito (Cathedral Rock)

tubular pahoehoe toes and incipient pillows

LAKE LOGIPI (Namakat)

SUGUTA VALLEY

SUBJECT TO FLOODING

TOPOGRAPHIC SYMBOLS

- Contours at 100m intervals
- Motorable track
- Name of major topographical feature: KAKORINYA
- Name of area: LOKWEAM
- Name of village or settlement: PARKATI
- Name of local feature: Naperito
- Water course (stream or gully) seasonal
- Water course (wide), seasonal with name where known: Nooguruit
- Lake margin, broken line where poorly defined. Subject to seasonal fluctuation
- Old shoreline-bench or standline

1000 metres 0 1 2 3 4 5km

Scale 1:50 000

Grid North / True North / Magnetic North 0°35'

At Sheet Centre
Magnetic Variation as at 1979
Annual change 5' East

Projection:-Transverse Mercator
Spheroid:-Clarke 1880 (Modified)

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

KENYA GOVERNMENT 1993

This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland (Overseas Development Administration). The work forms part of the Kenya Government's EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1990 and 1991 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Drs M.Smith and P.N.Dunkley.

Compilation by Dr M.Smith on base map prepared from series Y633 1:100 000 and series Y731 1:50 000 topographic sheets sheet and air photographs.

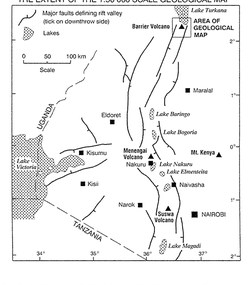
Cartography by S.Bray.

Project leaders:- Dr P.N.Dunkley and J.K.Kinyariro.

NOTE

THERE IS A COMPANION 1:50 000 SCALE MAP OF THE BARRIER VOLCANIC COMPLEX AND ADJACENT AREAS SHOWING SITES OF SURFACE GEOTHERMAL ACTIVITY (FUMAROLES ETC) IN RELATION TO THE STRUCTURE

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1:50 000 SCALE GEOLOGICAL MAP



PRINTED IN ENGLAND BY COOK, HAMMOND & KELL LTD.

93/2000

KENYA

GEOLOGICAL MAP OF PAKA AND KOROSI VOLCANOES, AND ADJACENT AREAS

1:50 000

NOTE
THERE IS A COMPANION 1:50 000 SCALE MAP
SHOWING SITES OF GEOTHERMAL ACTIVITY
(FUMAROLES ETC) IN RELATION TO STRUCTURE

TOPOGRAPHIC SYMBOLS

Contours at 100m intervals

Motorable track

Cliff

Trigonometrical station with height in metres
▽1446

Name of major topographic feature
PAKA

Name of area
KOKORE

Name of village or settlement
Nginyang

Name of local topographic feature
Kotang

Water course (stream or gully) permanent where indicated with name where known
Komoi

Water course (indefinite)

Seasonal swamp (with approximate limit)

GEOLOGICAL SYMBOLS

Geological boundaries

- Solid boundary
- Solid boundary, uncertain
- Drift boundary
- 10 Dip of strata in degrees
- Fault (tick on downthrow side)
- Fault uncertain and/or concealed
- Fault showing change in displacement direction
- Open fracture or minor fault
- Lineament or joint from air photo and/or satellite interpretation
- Ring fracture associated with caldera or large crater
- Landslip scarp

Volcanic landforms

Lava front

Lava flow - internal features and pressure ridges

Lava flow levée

Collapsed lava tube
CLT

Eruption centres

Parasitic volcanic cone, actual size and shape indicated

Minor parasitic volcanic cone

Volcanic crater or depression

Trachyte dome

Eruptive fissure (open) usually basaltic

Grid North
True North
Magnetic North
0°41'

At Sheet Centre Magnetic Variation as at January 1980. Annual Change 6' East

Projection:- Transverse Mercator
Spheroid:- Clarke 1880 (Modified)

Metres 1000 0 1 2 3 4 5 6 7 8 km
Scale 1:50 000

IGNEOUS EXTRUSIVE ROCKS

Age (Ma)

PLEISTOCENE TO RECENT

- b — Young basalts of Gulungul and Nakorkor
- P^v — Volcaniclastic deposits; airfall tuffs, pyroclastic flows and debris flow breccias
- P^{bu} — Upper Basalts
- P^{tu} — Upper Trachytes
- P^{bl} — Lower Basalts
- P^{tl} — Lower Trachytes
- P^m — Mugearites

PAKA VOLCANO

PLEISTOCENE

- K^{tu} — Upper Trachytes
- K^m — Mugearites
- K^b — Basalts
- K^{tl} — Lower Trachytes
- K^v — Air-fall pumice lapilli and ash deposits

KOROSI VOLCANO

INNER TROUGH

- Ok^b — Basalts
- Ok^t — Trachytes

OL KOKWE ISLAND

PLEISTOCENE - RECENT

1.5

- C^{bu} — Upper Basalts
- C^t — Trachytes
- C^v — Mugearites and benmoreites
- Interbedded, welded and non-welded pumice lapilli tuffs with lavas

CHEPCHUK VOLCANO

SEDIMENTARY ROCKS

- l — Lacustrine clays, silts and volcaniclastics (Loiminange Beds)
- c — Fluvial conglomerates and siltstones (Chesowanja Sediments)

PYROCLASTIC ROCKS

- V^b — Unconsolidated to poorly consolidated basalt scoria and spatter
- V^t — Unconsolidated to poorly consolidated trachyte scoria and pumice lapilli deposits
- Agglomerates, welded breccias and pumice lapilli tuffs of Paka caldera

WESTERN MARGIN OF RIFT

PLEISTOCENE

0.57

- B^b — Baringo Basalt
- L^{tp} — Loyamarok Trachyphonolite

0.23

- B^t — Baringo Trachyte

PLIOCENE

3.4

- J^b — Jarota Basalt
- JF — Jamkana Formation
- Pl^b — Basalts (undifferentiated)

MIOCENE

EASTERN MARGIN OF RIFT

0.54

- Kr^p — Phonolites - Karau Volcano

0.56

- LH^{tp} — Lake Hannington Trachyphonolite
- Pt^b — basalts (undifferentiated)
- Kk^b — Kokwabang'a Basalt
- SQ — Secuminus Trachyte

2.5

- O^t — Orus Trachyte

10-11

- RG — Phonolites
- SG — Basalts, trachytes and volcaniclastic rocks

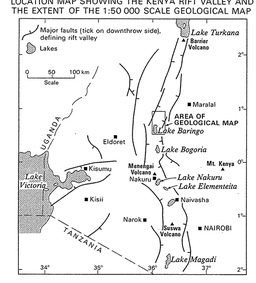
RUMURUTI GROUP

SAMBURU GROUP

DRIFT DEPOSITS

- Landslip
- Alluvium
- Alluvial fan
- Scree/talus

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1:50 000 SCALE GEOLOGICAL MAP



This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland, (Overseas Development Administration). The work forms part of the Kenya Governments' EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1988 and 1990 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Drs M.Smith and P.N.Dunkley.
Compilation by Drs M.Smith and P.N.Dunkley - on base-map prepared from series Y731 1:50 000 topographic sheets and air photos.
Rift margin geology simplified from published 1:125 000 geological maps (EAGRU).
Cartography by S.Bray
Project Team Leaders - Dr P.N.Dunkley and J.K.Kinyariro.

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

PRINTED BY COOK HAMMOND & KELL LTD. MITCHAM & WESTMINSTER

91/2000

KENYA

GEOTHERMAL ACTIVITY OF THE BARRIER VOLCANIC COMPLEX AND ADJACENT AREAS

1:50 000

EXPLANATION OF GEOLOGICAL COLOURS AND SYMBOLS

INNER TROUGH

- K^{m} — Recent mugearite lavas
- K^{tb} — Recent basalt lavas
- K^{pv} — Recent phonolite lavas and lava domes
- K^{bt} — Upper Basalts; including hawaiites
- K — Trachyte lavas and lava domes
- K^{pc} — Pyroclastic deposits; including air-fall tephra and ancestonoly lapilli tuffs with minor welded and unwelded pyroclastic flows
- K^{tr} — Trachyte lava domes
- K^{b} — Lower Basalts; including basanites
- K^{t} — Upper Trachytes; lavas and welded pyroclastic flows (K^{t1}) minor air-fall tuffs
- K^{tl} — Lower Trachytes; lavas and pyroclastic rocks

Ages (Ma): Recent; Younger Volcanics; Younger Trachytes; Pleistocene; Pre-Caldera Basalts; KOKORINYA VOLCANO

- LW^{m} — Hawaiite lavas
- LW^{b} — Basalt lavas
- LW^{x} — Trachyte and phonolite unwelded pyroclastic flows and breccias
- LW^{t} / LW^{tx} — Trachyte, benmoreite and phonolite lavas and lava domes with unwelded pyroclastic flows (LW^{tx})
- N^{b} — Basalts of Namunnyang tuff cone

LIKAIU WEST VOLCANO

- KL^{m} — Mugearite lavas
- KL^{b} — Basalt lavas
- KL^{t} — Trachyte lavas and welded unwelded pyroclastic flows

KALOLENYANG VOLCANO

- LE^{t} — Trachyte lavas and welded unwelded pyroclastic flows

LIKAIU EAST VOLCANO

- B^{b} — Basalt lavas of Logipi and Latarr

Abbreviation: superscript (P) with the above symbols indicates pillows and / or hyaloclastite deposits and breccias (eg K^{bP}, B^{bP}).

WESTERN MARGIN OF RIFT

Ages (Ma): PLIOCENE 4.4 – 3.6; 3.6 – 2.5

- LP^{t} — Lora Plateau trachyte, rhyolite and benmoreite lavas
- LB — Lorikipi Basalts; basalts, hawaiites and minor pyroclastic and sedimentary rocks
- Pc — Precambrian basement; biotite gneisses
- l — Lacustrine sand, silts, clays and diatomites with fluvial sands and gravels. Sizzle indicates where thick gravel deposits overlie

EXTRUSIVE IGNEOUS ROCKS

- V^{b} — Unconsolidated and consolidated basalt scoria spatter and ash
- V^{t} — Unconsolidated and consolidated trachyte scoria and pumice lapilli deposits
- V^{p} — Basaltic deposits of phreatic origin, including paleyonte

INTRUSIVE IGNEOUS ROCKS

- b — basalt
- t — trachyte
- r — foyaite, with associated pyroclastic rocks (f^{py})

Geological boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary
- fault, (tick on downthrow side)
- fault uncertain and/ or concealed
- open fracture or minor fault
- caldera ring fault
- caldera ring fault uncertain and/ or concealed by younger deposits
- landslip scarp
- lineament or joint from air photo/ satellite image
- dyke, b - basaltic, t - trachyte

EASTERN MARGIN OF RIFT

Ages (Ma): PLEISTOCENE 2.5 – 1.8; 4.2 – 4.53; PLIOCENE

- LO^{b} — Longipi Basalts
- TT — Tot Tir Series
- E^{t} — Ejuk trachytes and rhyolites
- P^{b} — Parkati Basalts

DRIFT DEPOSITS

- Landslip
- Alluvium
- Alluvial fan deposits; cobbles, sands and gravels
- Scree or colluvium
- Lacustrine beach deposits; gravels and sands

Geological symbols

- horizontal strata
- dip of strata, in degrees or estimate from air photo; (g) - gentle, (+) - moderate

Volcanic landforms

- Lava front
- Lava flow features; pressure ridges
- Lava levee
- Prominent break of slope

Eruptive centres

- Parasitic pyroclastic scoria cone size and shape indicated. R - Tuff ring T - Tuff cone
- Minor parasitic pyroclastic scoria cone
- Open fissure with spatter ramparts

LAKE TURKANA

Lake level subject to fluctuation. 1972 level shown here at 365 metres a.s.l. Based on published topographical maps.

Lake margin liable to fluctuate

Von Hohnels Bay

LOKIDIRR

Luguruguru

Loguruguruk

Abili Agituk

Nabuyatom Cone

NAKWE

NAKUJAKABON

LOKWEAM

NAGARA MASANIA

Telekis Cone

Neengaul

KALOLENYANG

KAKORINYA

LIKAIU WEST

LIKAIU EAST

Emuruanyangan

Andrews Cone

PARKATI

Namurinyang

Emuhaitit

ALOWALAN

LAKE LOGIPI SPRINGS

LAKE LOGIPI

(Namakat)

Naperito (Cathedral Rock) F50-60

NAPERITO SPRINGS

SUGUTA VALLEY

SUBJECT TO FLOODING

F86.5 G80.8 G93.2 G86.8 G93.8 G78.2 G90.3 F79.1 G87.5 G75.8 G74.8 F74.9 G76.6 G75.6 G95.0 G82.1 F87.2 G94.1 G97.0 G93.7 G97.7 F93.4 F93.2 G82.4 G65.8 G83.5 F95.1 G82.0 F80.6 G72.0 G60.5 F41.1 F51.1 G75.0 G85.3 G65.5 G61.5 G69.3

S68.2 S70.5 S69.7 S55.7 S48.6 S63.1 S50.3 S73.1 S68.4 S70.0 S71.1 S79.9 S70.1

TOPOGRAPHIC SYMBOLS

- Contours at 100m intervals
- Motorable track
- Name of major topographical feature: KAKORINYA
- Name of area: LOKWEAM
- Name of village or settlement: PARKATI
- Name of local feature: Naperito
- Water course (stream or gully) seasonal
- Water course (wide), seasonal with name where known: Neengaul
- Lake margin, broken line where poorly defined. Subject to seasonal fluctuation
- Old shoreline-bench or standline

1000 metres 0 1 2 3 4 5km

Scale 1:50 000

EXPLANATION OF GEOTHERMAL COLOURS AND SYMBOLS

GEOTHERMAL ACTIVITY

- F90.4 — Area of fumarolic (F) and/or hot steaming ground (G) and associated alteration. Maximum recorded temperature indicated in °C
- S63.1 — Isolated hot spring (S) with little associated alteration. Maximum recorded temperature in °C
- Area of hydrothermal alteration and/or brecciation. Accompanied by silicification, carbonate or silica sinters and/or sulphur. Ground temperatures at ambient.

LOCATION OF SITE SAMPLED FOR GEOTHERMAL FLUIDS

(Sampling carried out by W.G.Darling).

190 BGS sample site number

Grid North / True North / Magnetic North 0° 35'

At Sheet Centre: Magnetic Variation as at 1979, Annual change 9' East

Projection:- Transverse Mercator. Spheroid:-Clarke 1880 (Modified)

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

KENYA GOVERNMENT 1993

This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland (Overseas Development Administration). The work forms part of the Kenya Government's EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1990 and 1991 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Drs M.Smith and P.N.Dunkley.

Compilation by Dr M.Smith on base map prepared from series Y633 1:100 000 and series Y731 1:50 000 topographic sheets sheet and air photographs.

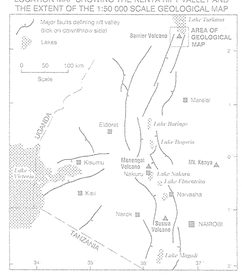
Cartography by S.Bray.

Project leaders:- Dr P.N.Dunkley and J.K.Kinyairo.

NOTE

THERE IS A COMPANION 1:50 000 SCALE MAP OF THE GEOLOGY OF THE BARRIER VOLCANIC COMPLEX AND ADJACENT AREAS

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1:50 000 SCALE GEOLOGICAL MAP



PRINTED IN ENGLAND BY COOK, HAMMOND & KELL LTD.

93/1000

KENYA

GEOTHERMAL ACTIVITY OF EMURUANGOGOLAK AND ADJACENT AREAS

1: 50 000

EXPLANATION OF GEOLOGICAL COLOURS AND SYMBOLS

INNER TROUGH — EMURUANGOGOLAK VOLCANO — UPPER PLEISTOCENE TO RECENT

- b — Basalt Lava undifferentiated
- V^t — Trachytic scoria, spatter, lava, breccias, and pumice: Deposits of Upper Trachyte cones
- V^p — Basaltic pyroclastic deposits of phreato magmatic origin
- V^b — Basaltic pyroclastic cone deposits, scoria, spatter and ash
- l — Lascustrine Sediments diatomites, sands and silts
- b^u — Upper Basaltic Lavas, hawaiites and basalts (p) where pillowed
- t^u — Upper Trachyte Lavas
- p^u — Upper Pyroclastic Deposits trachytic pumice deposits
- t^m — Middle Trachyte Lavas
- b^l — Lower Basaltic Lavas, hawaiite and mugearite
- p^l — Lower Pyroclastic Deposits trachytic airfall pumice deposits, ashes and tuffs
- t^l — Lower Trachyte Lavas (b) where benmoreitic

WESTERN MARGIN OF RIFT — MIOCENE PLIOCENE

- Pl^b — Pleistocene basalts (Lorikipi and Kamuge basalts)
- Pl^t — Pliocene trachyte lavas, tuffs, minor benmorite and mugearite

EASTERN MARGIN OF RIFT

- E^t — Emuruagiring Trachytes
- V^t — Volcaniclastic deposits and sediments; age uncertain
- SG — Samburu Group basalt lavas

DRIFT DEPOSITS

- Landslip
- Alluvium
- Alluvial Fan

Volcanic Landforms

- lava front
- lava flow-internal features, pressure ridges and levées
- lava flow levée
- collapsed lava tube

Geological Boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary
- fault, tick on downthrow side
- fault, uncertain and/or concealed
- open fissure or minor fault
- caldera ring fault
- landslip scarp
- lineament or joint from air photo
- dyke
- old lake shorelines-benches

Eruptive Centres

- open fissure with spatter ramparts
- parasitic pyroclastic cone, size and shape indicated T-Tuff cone, R-Tuff ring, M-Maar
- parasitic pyroclastic cone with breached crater
- minor pyroclastic cone, size and shape too small to illustrate
- trachyte lava cone
- pit crater
- trachyte domes

GEOTHERMAL ACTIVITY

- F 95.6 — Area of fumarolic and/or hot steaming ground (G) and associated alteration. Maximum recorded temperature indicated in °C.
- F 71.8 — Isolated fumarole with little associated alteration. Maximum recorded temperature indicated in °C.
- S 69.2 — Isolated hot spring with little associated alteration. Maximum recorded temperature indicated in °C.
- Isolated spring at ambient temperature.
- 228 — Location of site sampled for thermal and ambient fluids. Details of each site are listed in the accompanying report.

Sampling carried out by D.J. Allen, H. Andambi, W.G. Darling, D. Lemu, B. Macharia and P. Mwangi.

KAMUGE SPRINGS 187 S 50.4

KAGE/NYA SPRINGS 188 S 69.2

G 51.3

S 38.1

197

S 57.0 209 186 S 62.8 185 S 69.7 208

206

207

210

AMAKAT POOLS 196

G 73.3 F 58.7 G 55.7 F 81.2 F 62.5 G 72.4 F 83.3 F 79.5 F 71.6 G 46.6 F 70.1 F 93.1 227 F 93.0 228 F 94.0 229 F 56.5 F 77.7 230 231 F 65.7 F 83.4 F 91.2 226 G 53.0 F 87.5 F 90.7 F 80.2 F 73.0 F 63.2 F 95.6 F 69.9 F 71.8 232 233 234 F 46.6 G 46.7

SUGUTA (permanent)

SUGUTA

Lomelo

NANGARABAT

KANGARINYANG

LOSETUM

EMURUANGOGOLAK

EMURUAGIRING PLATEAU

NATURTUR

LORENG

ADUMIT

Lomelo

Losetum

Emuruagiring

Walkot

Ekwakwabo

Ekwakwa Kolu

NOTE
THERE IS A COMPANION 1: 50 000 SCALE MAP OF THE GEOLOGY OF EMURUANGOGOLAK VOLCANO.

TOPOGRAPHIC SYMBOLS

Contours at 100m intervals

Cliff

Motorable track

Motorable track, approximate alignment

Name of major topographic feature: EMURUANGOGOLAK

Name of area: NATURTUR

Name of local feature: Losetom

Name of Village or settlement: Lomelo

Water course (stream or gully), with waterfall

Water course (wide), permanent where indicated, with name where known: SUGUTA

Water course (indefinite)

1000 metres 0 1 2 3 4 5km

Scale 1: 50 000

Grid North / True North / Magnetic North

At Sheet Centre
Magnetic Variation as at January 1980
Annual change 6'East

Projection:-Transverse Mercator
Spheroid :- Clarke 1880 (Modified)

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland, (Overseas Development Administration). The work forms part of the Kenya Government's EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1988 and 1990 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Dr P.N. Dunkley and Dr M. Smith.

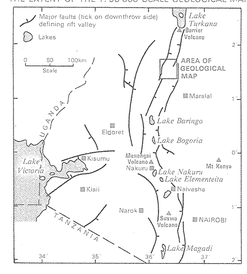
Compilation by Dr P.N. Dunkley- on base map prepared from series Y731 1:50 000 topographic sheets and air photographs.

Rift margin geology simplified from published 1: 125 000 geological maps (EAGRU).

Cartography by E.J. Charles.

Project Team Leaders-Dr P.N. Dunkley and J.K. Kinyariro

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1: 50 000 SCALE GEOLOGICAL MAP



PRINTED BY COOK HAMMOND & KELL LTD. MITCHAM & WESTMINSTER

91/1000

KENYA

GEOLOGICAL MAP OF EMURUANGOGOLAK AND ADJACENT AREAS

1: 50 000

EXPLANATION OF GEOLOGICAL COLOURS AND SYMBOLS

INNER TROUGH

UPPER PLEISTOCENE TO RECENT — EMURUANGOGOLAK VOLCANO

- b — Basalt Lava undifferentiated
- V^t — Trachytic scoria, spatter, lava, breccias, and pumice: Deposits of Upper Trachyte cones
- V^p — Basaltic pyroclastic deposits of phreato magmatic origin
- Basaltic pyroclastic cone deposits, scoria, spatter and ash.
- l — Lascustrine Sediments diatomites, sands and silts
- b^u — Upper Basaltic Lavas, hawaiites and basalts (p) where pillowed
- t^u — Upper Trachyte Lavas
- p^u — Upper Pyroclastic Deposits trachytic pumice deposits
- t^m — Middle Trachyte Lavas
- b^l — Lower Basaltic Lavas, hawaiite and mugearite
- p^l — Lower Pyroclastic Deposits trachytic air-fall pumice deposits, ashes and tuffs
- t^l — Lower Trachyte Lavas (b) where benmoreitic

MIOCENE - PLIOCENE

WESTERN MARGIN OF RIFT

- Pl^u — Pleistocene basalts (Lorikipi and Kamuge basalts)
- Pl^l — Pliocene trachyte lavas, tuffs, minor benmorite and mugearite

EASTERN MARGIN OF RIFT

- E^t — Emuruagiring Trachytes
- V^s — Volcaniclastic deposits and sediments; age uncertain
- SG — Samburu Group basalt lavas

DRIFT DEPOSITS

- Landslip
- Alluvium
- Alluvial Fan

Volcanic Landforms

- lava front
- lava flow-internal features, pressure ridges and levées
- lava flow levée
- collapsed lava tube

Eruptive Centres

- open fissure with spatter ramparts
- parasitic pyroclastic cone, size and shape indicated T-Tuff cone, R-Tuff ring, M-Maar
- parasitic pyroclastic cone with breached crater
- minor pyroclastic cone, size and shape too small to illustrate
- trachyte lava cone
- pit crater
- trachyte domes

Geological Boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary
- fault, tick on downthrow side
- fault, uncertain and/or concealed
- open fissure or minor fault
- caldera ring fault
- landslip scarp
- lineament or joint from air photo
- dyke
- old lake shorelines-benches

NOTE

THERE IS A COMPANION 1:50 000 SCALE MAP SHOWING SITES OF SURFACE GEOTHERMAL ACTIVITY (FUMAROLES ETC) IN RELATION TO STRUCTURE

TOPOGRAPHIC SYMBOLS

- Contours at 100m intervals
- Cliff
- Motorable track
- Motorable track, approximate alignment
- Name of major topographic feature: EMURUANGOGOLAK
- Name of area: NATURTUR
- Name of local feature: Losetom
- Name of Village or settlement: Lomelo
- Water course (stream or gully), with waterfall
- Water course (wide), permanent where indicated, with name where known: SUGUTA
- Water course (indefinite)

1000 metres 0 1 2 3 4 5km

Scale 1: 50 000

Grid North / True North / Magnetic North

At Sheet Centre
Magnetic Variation as at January 1980
Annual change 6'East

Projection:- Transverse Mercator
Spheroid:- Clarke 1880 (Modified)

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland, (Overseas Development Administration). The work forms part of the Kenya Government's EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1988 and 1990 by the British Geological Survey (Natural Environment Reasearch Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Dr P.N. Dunkley and Dr M. Smith.

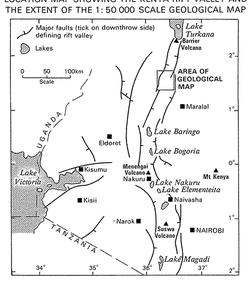
Compilation by Dr P.N. Dunkley on base map prepared from series Y731 1:50 000 topographic sheets and air photographs.

Rift margin geology simplified from published 1: 125 000 geological maps (EAGRU).

Cartography by E.J. Charles.

Project Team Leaders-Dr P.N. Dunkley and J.K. Kinyariro

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1: 50 000 SCALE GEOLOGICAL MAP



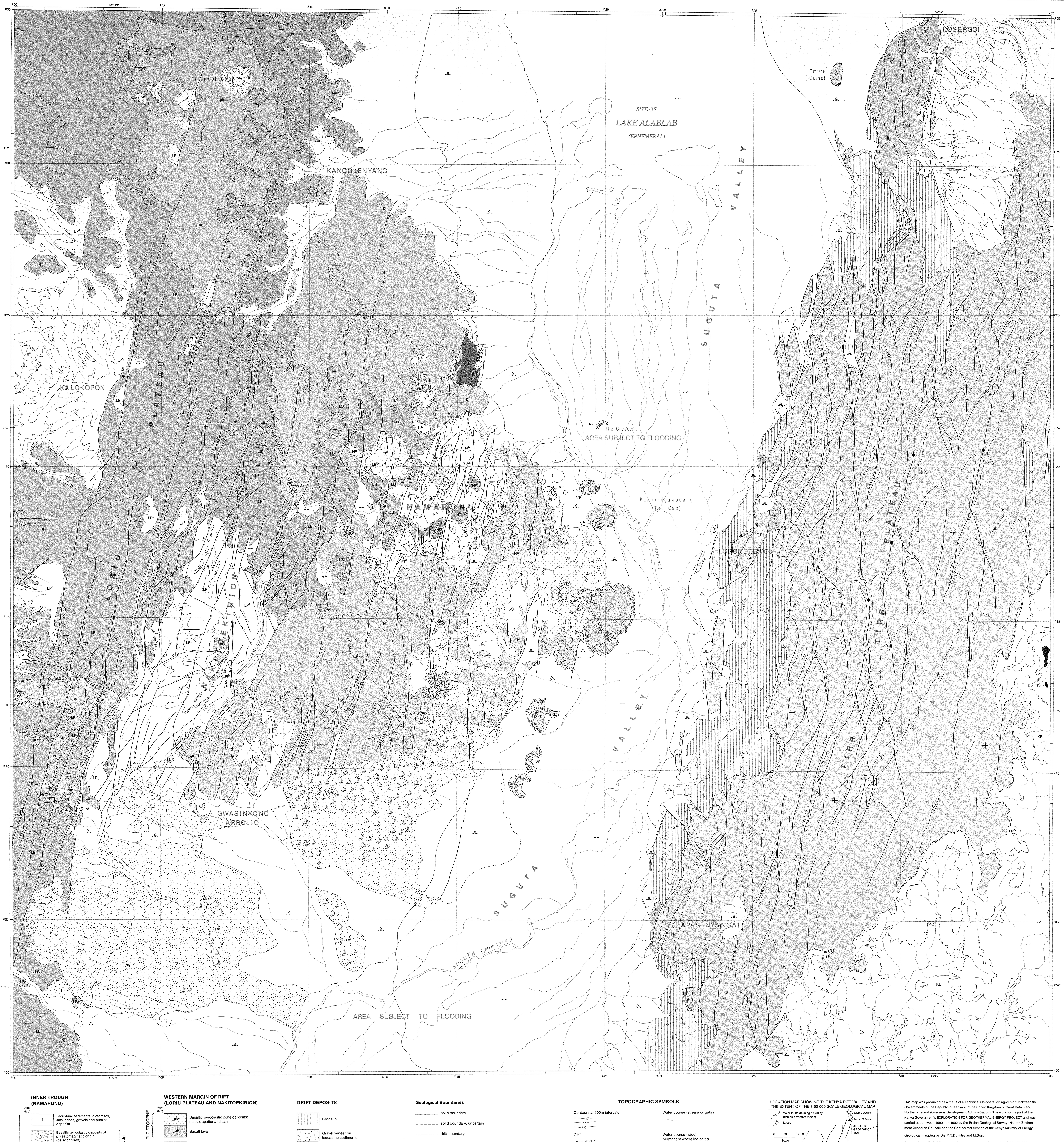
PRINTED BY COOK HAMMOND & KELL LTD. MITCHAM & WESTMINSTER

91/2000

KENYA

GEOLOGICAL MAP OF NAMARUNU AND ADJACENT AREAS

1: 50 000



INNER TROUGH (NAMARUNU)

Age (Ma)

QUATERNARY

- l — Lacustrine sediments: diatomites, silts, sands, gravels and pumice deposits
- Upper Basalts:
  - Vp — Basaltic pyroclastic deposits of phreatomagmatic origin (palagonitised)
  - Vb — Basaltic pyroclastic cone deposits: scoria, spatter and ash
  - b — Basalt lavas: in places pillow lavas and hyaloclastites (bp)
- 0.51 — Ntp — Trachytic pumice lapilli tuffs and breccias, grading at top into basaltic tuffs and scoria
- 0.84 — Ntm — Melanocratic trachyte lava
- 0.87 — Nrt — Rhyolitic and trachytic lavas and pyroclastic rocks

PLIOCENE

- Lorikipi Basalts:
  - LBtv — Trachytic pumice lapilli tuffs
  - LBbv — Basaltic pyroclastic cone deposits: scoriaceous breccias, tuffs and spatter
  - LBf — Basaltic lava: feldspathic
  - LB — Basaltic lavas: aphyric and feldsparphyric basalts and hawaiites
- Ni — Benmoreitic and mugearitic lavas, where mapped
- Ntv — Trachyte lavas and pyroclastic rocks, undifferentiated
- s — Microsyenite

WESTERN MARGIN OF RIFT (LORIU PLATEAU AND NAKITOEKIRION)

Age (Ma)

PLEISTOCENE

- LPbv — Basaltic pyroclastic cone deposits: scoria, spatter and ash
- LPb — Basalt lava

PLIOCENE

- 2.33-2.74 — LPtm — Melanocratic trachyte lava (where mapped)
- LPtv — Trachytic pumice lapilli tuff, welded and unwelded
- 1.86-4.0 — LB / LPt — Lorikipi Basalts: basalts and hawaiite lavas, with intercalations of trachyte lavas and tuffs
- LPt — Trachyte lavas and pyroclastic rocks, undifferentiated
- s — Microsyenite

EASTERN MARGIN OF RIFT

- l — Lacustrine and fluvial sediments
- PLIOCENE 2.3-4.2 — TT — Tirr Tirr Series: basalt lavas with subordinate trachyte lavas
- MIOCENE — KB — Kamolingaran basalts: lavas with lacustrine sediments
- PRECAMBRIAN — Pc — Basement gneisses

DRIFT DEPOSITS

- Landslip
- l — Gravel veneer on lacustrine sediments
- Windblown sand: barchan and sief dunes
- Alluvium
- Alluvial fan deposits: coarse gravel
- Scree

Volcanic Landforms

- lava front
- lava flow-internal features, pressure ridges and levees

Eruptive Centres

- parasitic pyroclastic cone size and shape indicated T-Tuff cone, R-Tuff ring

Geological Boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary
- fault, tick on downthrow side
- fault, uncertain and/or concealed
- fault showing change in displacement direction
- dyke: b - basaltic, t - trachytic, s - syenite
- landslip scarp

Geological Symbols

- dip of strata in degrees
- horizontal strata

TOPOGRAPHIC SYMBOLS

- Contours at 100m intervals
- Cliff
- Name of major topographic feature — NAMARUNU
- Name of area — LOSERGOI
- Name of local feature — Aruba Rock
- Water course (stream or gully)
- Water course (wide) permanent where indicated with name where known
- Water course (indefinite)
- Old lake shoreline-benches

Grid North / True North / Magnetic North — 23' / 6'

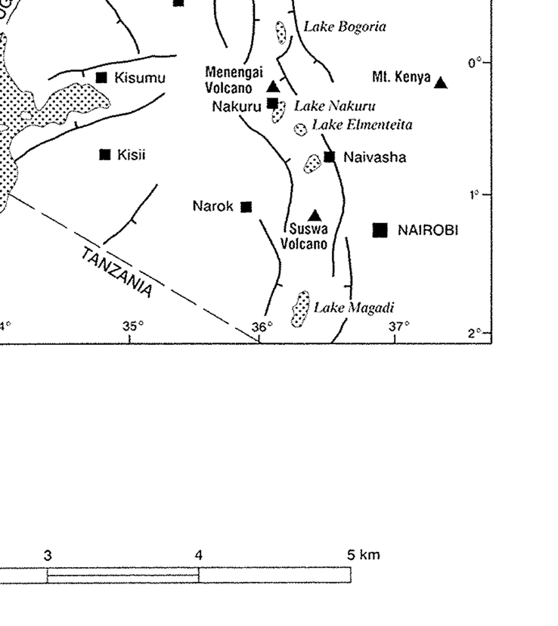
At Sheet Centre
Magnetic Variation as of January 1980
Annual change 6' East

Projection:- Transverse Mercator
Spheroid:- Clarke 1880 (modified)

1000 metres 0 1 2 3 4 5 km

Scale 1:50 000

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1:50 000 SCALE GEOLOGICAL MAP



This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland (Overseas Development Administration). The work forms part of the Kenya Government's EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1990 and 1992 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Drs P.N.Dunkley and M.Smith

Compilation by Dr P.N.Dunkley on base map prepared from series Y371 1:50 000 and series Y633 1:100 000 topographic sheets and air photographs.

Cartography by P.Turner.

Project leaders:- Dr P.N.Dunkley and J.K.Kinyariro.

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

KENYA GOVERNMENT 1993

NOTE:

THERE IS A COMPANION 1:50 000 SCALE MAP OF NAMARUNU AND ADJACENT AREAS SHOWING SITES OF SURFACE GEOTHERMAL ACTIVITY (FUMAROLES ETC) IN RELATION TO THE STRUCTURE

PRINTED IN ENGLAND BY COOK, HAMMOND & KELL LTD.

93/2000

KENYA

GEOTHERMAL ACTIVITY OF NAMARUNU AND ADJACENT AREAS

1:50 000

KAILONGOLIAKO

KANGOLENYANG

SITE OF
LAKE ALABLAB
(EPHEMERAL)

SUGUTA VALLEY

Emuru Gumol

LOSERGOI

Losergoi

ELORITI

KALOKOPON

PLATEAU

S55.7
S67.3
S89.3
S89.3

S62.4
S64.1
The Crescent
S64.9
S39.0
S65.5

AREA SUBJECT TO FLOODING

S96.3
S90.2
S97.1
S97.2
237

ELBOITONG SPRINGS

S98.6
S100.2
236
S89.6

S69.0
189
S66.7
S66.2
S37.2
S35.0

Kaminanguwadang (The Gap)

SUGUTA (permanent)

LOBOKETEWOI

NAMARUNU

LORIU PLATEAU

NAKITOEKIRION

G42.2

G60.3
F55.1
G57.9

Aruba Rock

TIRR PLATEAU

VALLEY

GWASINYONO ARROLIO

SUGUTA

APAS NYANGAI

SUGUTA (permanent)

AREA SUBJECT TO FLOODING

Suguta

EXPLANATION OF GEOTHERMAL COLOURS AND SYMBOLS

GEOTHERMAL ACTIVITY

F55.1 — Area of fumerolic (F) and /or hot steaming ground (G) and associated alteration. Maximum recorded temperature indicated in °C.

S98.6 — Hot spring (S). Maximum recorded temperature in °C

Area of hydrothermal alteration and silica sinter veins. Ground temperatures at ambient

LOCATION OF SITES SAMPLED FOR GEOTHERMAL FLUIDS
(Sampling carried out by W.G.Darling)

237 — BGS sample site number

INNER TROUGH (NAMARUNU)

Age (Ma)			
QUATERNARY		I	Lacustrine sediments: diatomites, silts, sands, gravels and pumice deposits
		V^p	Basaltic pyroclastic deposits of phreatomagmatic origin (palagonitised)
		V^c	Basaltic pyroclastic cone deposits: scoria, spatter and ash
		b	Basalt lavas: in places pillow lavas and hyaloclastites (b^p)
	0.57	N^{tp}	Trachytic pumice lapilli tuffs and breccias, grading at top into basaltic tuffs and scoria
	0.84	N^{tm}	Melanocratic trachyte lava
	0.87	N^{rl}	Rhyolitic and trachytic lavas and pyroclastic rocks
PLIOCENE		LB^{tv}	Trachytic pumice lapilli tuffs
		LB^{bv}	Basaltic pyroclastic cone deposits: scoriaceous breccias, tuffs and spatter
		LB^{l}	Basaltic lava: feldspathic
		LB	Basaltic lavas: aphyric and feldsparphyric basalts and hawaiites
		N^{r}	Benmoreitic and mugearitic lavas, where mapped
		N^{tr}	Trachyte lavas and pyroclastic rocks, undifferentiated
		s	Microsyenite

Upper Basalts

Lokipi Basalts

WESTERN MARGIN OF RIFT (LORIU PLATEAU AND NAKITOEKIRION)

Age (Ma)			
PLEISTOCENE		LP^{bv}	Basaltic pyroclastic cone deposits: scoria, spatter and ash
		LP^{b}	Basalt lava
	2.33 – 3.74	LP^{tm}	Melanocratic trachyte lava (where mapped)
		LP^{tv}	Trachytic pumice lapilli tuff, welded and unwelded
PLIOCENE	1.86 – 4.6	LB	Lokipi Basalts: basalts and hawaiite lavas, with intercalations of trachyte lavas and tuffs
		LP^{l}	Trachyte lavas and pyroclastic rocks, undifferentiated
		s	Microsyenite

EASTERN MARGIN OF RIFT

		I	Lacustrine and fluvial sediments
PLIOCENE	2.3 – 4.2	TT	Tirr Tirr Series: basalt lavas with subordinate trachyte lavas
MIOCENE		KB	Kamolingaran basalts: lavas with lacustrine sediments
PRECAMBRIAN		Pc	Basement gneisses

DRIFT DEPOSITS

- Landslip
- I — Gravel veneer on lacustrine sediments
- Windblown sand: barchan and sief dunes
- Alluvium
- Alluvial fan deposits: coarse gravel
- Scree

Volcanic Landforms

- lava front
- lava flow-internal features, pressure ridges and levees

Eruptive Centres

- parasitic pyroclastic cone size and shape indicated T-Tuff cone, R-Tuff ring

Geological Boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary
- fault, tick on downthrow side
- fault, uncertain and/or concealed
- fault showing change in displacement direction
- dyke: b - basaltic, t - trachytic, s - syenite
- landslip scarp

Geological Symbols

- dip of strata in degrees
- horizontal strata

TOPOGRAPHIC SYMBOLS

Contours at 100m intervals (600, 700, 800)

Cliff

Name of major topographic feature: NAMARUNU

Name of area: LOSERGOI

Name of local feature: Aruba Rock

Water course (stream or gully)

Water course (wide) permanent where indicated with name where known

Water course (indefinite)

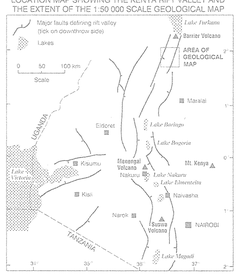
Old lake shoreline-benches

Grid North / True North / Magnetic North — 23° 6'

At Sheet Centre
Magnetic Variation as of January 1980
Annual change 6' East

Projection:- Transverse Mercator Spheroid:- Clarke 1880 (modified)

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1:50 000 SCALE GEOLOGICAL MAP



1000 metres 0 1 2 3 4 5 km

Scale 1:50 000

This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland (Overseas Development Administration). The work forms part of the Kenya Government's EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1990 and 1992 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Drs P.N.Dunkley and M.Smith

Compilation by Dr P.N.Dunkley on base map prepared from series Y371 1:50 000 and series Y633 1:100 000 topographic sheets and air photographs.

Cartography by P.Turner.

Project leaders:- Dr P.N.Dunkley and J.K.Kinyariro

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

KENYA GOVERNMENT 1993

NOTE:

THERE IS A COMPANION 1:50 000 SCALE MAP OF THE GEOLOGY OF NAMARUNU AND ADJACENT AREAS

PRINTED IN ENGLAND BY COOK, HAMMOND & KELL LTD.

93/1000

KENYA

GEOLOGICAL MAP OF SILALI VOLCANO

1:50 000

NOTE
THERE IS A COMPANION 1:50 000 SCALE MAP SHOWING SITES OF SURFACE GEOTHERMAL ACTIVITY (FUMAROLES ETC) IN RELATION TO STRUCTURE.

INNER TROUGH

EXTRUSIVE IGNEOUS ROCKS

- S^t Young basalt lavas
- BH^t Black Hill Trachyte Lavas including benmoreites and phonolites
- P^{vt} Late Pyroclastic Deposits ; pumice lapilli breccias
- b^u Upper Basalt Lavas
- t^u Upper Trachyte Lavas

Post-Caldera Lavas

- KT^b Upper Basalt Member
- KT^t Lower Trachyte Member
- b^f Flank Fissure Basalts

Katenmening Lavas

- S^t Summit Trachyte
- A^v Arzett Tuffs and Lavas
- d Discoid Trachyte Lavas

Western Flank eruptions

- K^{vu} Upper Pyroclastic Deposits : pumice lapilli breccias and welded tuffs.
- K^I Intermediate lavas ; trachytes mugearites and benmoreites
- K^{vl} Lower Pyroclastic Deposits : massive lithic breccias and lavas
- t^l Lower Trachyte Lavas

Kapedo Tuffs (Kt) — Caldera Sequence

SILALI VOLCANO

RECENT TO PLEISTOCENE

- M^b Mission Basalt

INTRUSIVE IGNEOUS ROCKS

- Pk^b Paka volcano basalts
- Pk^t Paka volcano trachytes
- Trachyte
- Sc^t Secumius Trachyte

DRIFT DEPOSITS

- V^b Unconsolidated to poorly consolidated basalt scoria and spatter
- V^t Unconsolidated to poorly consolidated trachyte scoria and pumice lapilli deposits
- $V^{b?}$ Basaltic and trachytic deposits of phreatomagmatic origin
- Landslip
- Alluvium
- Alluvial fan
- G Scree/talus deposits

WESTERN MARGIN OF RIFT

PLIOCENE
- Pl^b Plio-Pleistocene basalts undifferentiated
- Pl^t Pliocene trachytes and pyroclastic deposits undifferentiated

EASTERN MARGIN OF RIFT

Age (Ma.)
9.0 / 9.4 MIOCENE
- Lp^b Lopogno Trachyte
- Nb^s Nasorut Basalt
- M^v Miocene volcaniclastics undifferentiated

GEOLOGICAL SYMBOLS

Geological boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary, uncertain
- dip of strata in degrees
- fault (tick on downthrow side)
- fault uncertain and/or concealed
- fault showing change in displacement direction
- open fracture or minor fault
- lineament or joint from air photo and/or satellite interpretation
- ring fracture associated with caldera or large crater
- ring fracture, uncertain and/or concealed by younger deposits
- landslip scarp
- dyke
- borehole (Losikiriomoi)

Volcanic landforms

- lava front
- lava flow-internal features and pressure ridges
- lava flow levée
- collapsed lava tube
- prominent break of slope

Eruptive centres

- parasitic volcanic cone, actual size and shape indicated
- T, Tuff cone
- R, Tuff ring
- minor parasitic volcanic cone
- volcanic crater or depression
- P, Pit Crater
- trachyte dome
- eruptive fissure (open), usually basaltic with spatter ramparts

Grid North / True North / Magnetic North 0° 39'

At Sheet Centre Magnetic Variation as of January 1980 Annual Change 6' East

Projection:- Transverse mercator
Spheroid:- Clarke 1880 (modified)

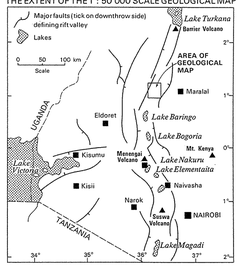
METRES 1000 0 1 2 3 4 5 6 km

SCALE 1 : 50 000

TOPOGRAPHIC SYMBOLS

- Contours at 100m intervals
- Motorable track
- Cliff
- Trigonometrical station with height in metres ▽1830
- Name of major topographic feature: SILALI
- Name of area: NAKOKO
- Name of village or settlement: Kapedo
- Name of local topographic feature: Lorusio
- Water course (stream or gully),permanent where indicated,with name where known: Amaya
- Watercourse (indefinite)

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1 : 50 000 SCALE GEOLOGICAL MAP



This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland (Overseas Development Administration). The work forms part of the Kenya Governments EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1988 and 1990 by the British Geological Survey (Natural Environment Research Council) and the Geothermal section of the Kenya Ministry of Energy.

Geological mapping by Drs M. Smith and P.N.Dunkley
Compilation by Dr. M.Smith on base map prepared from series Y731 1 : 50 000 topographic sheets and air photos.
Rift margin geology simplified from published 1:125 000 geological maps (EAGRU)
Cartography by J.D.Hodgson
Project team leaders:- Dr P.N.Dunkley and J.K.Kinyariro.

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

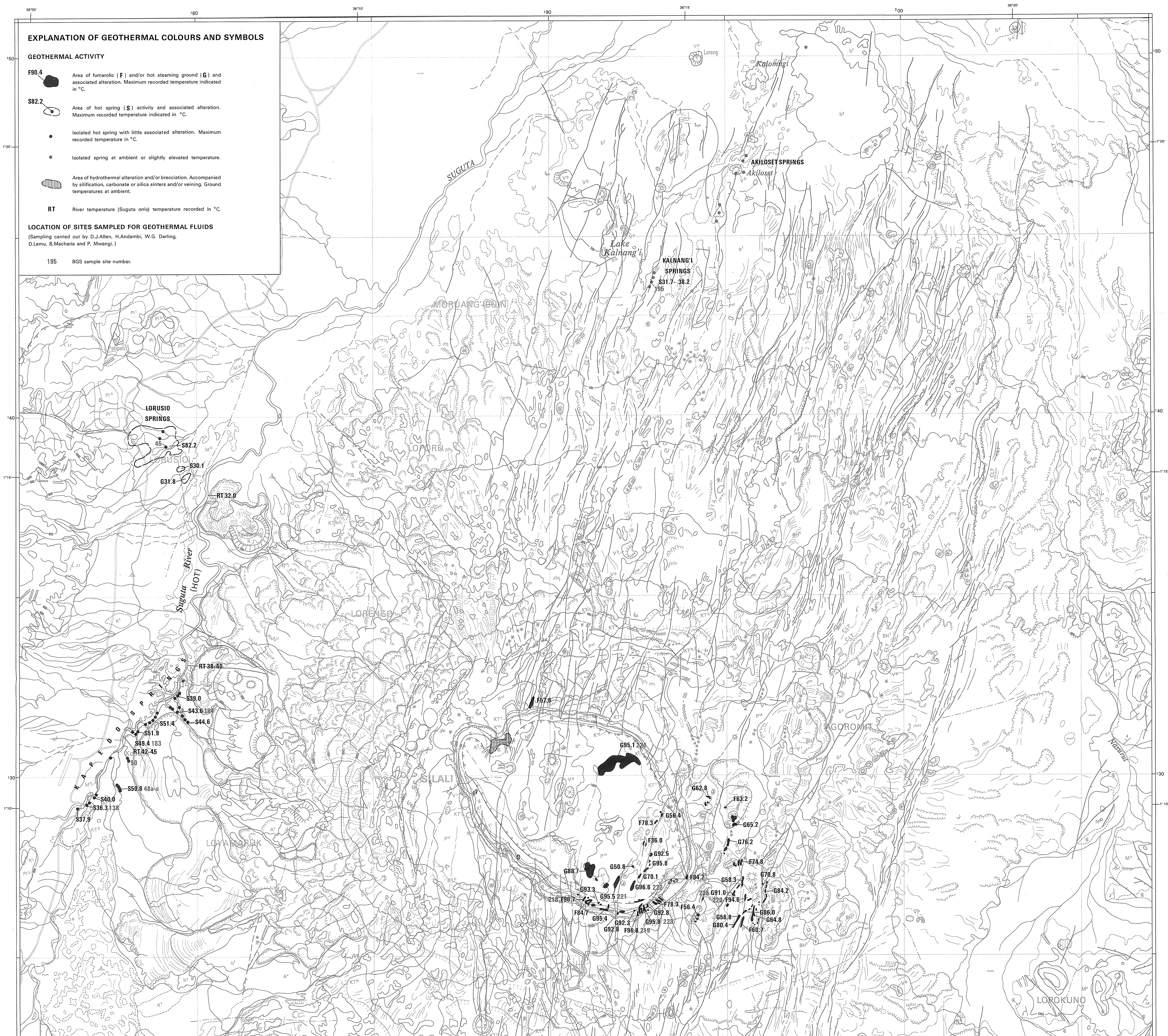
PRINTED BY COOK HAMMOND & KELL LTD. MITCHAM & WESTMINSTER

91/2000

KENYA

GEOTHERMAL ACTIVITY OF SILALI VOLCANO

1: 50 000



EXPLANATION OF GEOTHERMAL COLOURS AND SYMBOLS
GEOTHERMAL ACTIVITY
F90.4
Area of fumarolic (F) and/or hot steaming ground (G) and associated alteration. Maximum recorded temperature indicated in °C.
S82.2
Area of hot spring (S) activity and associated alteration. Maximum recorded temperature indicated in °C.
Isolated hot spring with little associated alteration. Maximum recorded temperature in °C.
Isolated spring at ambient or slightly elevated temperature.
Area of hydrothermal alteration and/or brecciation. Accompanied by silification, carbonate or silica sinters and/or veining. Ground temperatures at ambient.
RT
River temperature (Suguta only) temperature recorded in °C.
LOCATION OF SITES SAMPLED FOR GEOTHERMAL FLUIDS
(Sampling carried out by D.J.Allen, H.Andambi, W.G. Darling, D.Lemu, B.Macharia and P. Mwangi.)
195
BGS sample site number.
SUGUTA
Loreng
Kalomngi
AKILOSET SPRINGS
Akiloset
Lake Kalnang'i
KALNANG'I SPRINGS
S31.7- 38.2
195
MORUANG'IBUIN
Patipati
LORUSIO SPRINGS
45
S82.2
LORUSIO
S30.1
G31.8
LOPORU
RT 32.0
Kaveterong
Suguta River (HOT)
LORENGO
RT 38-40
KAPEDO SPRINGS
S39.0
S43.6 184
S44.6
S51.4
S51.9
S49.4 183
RT 42-45
50
S50.8 48a-c
S40.0
S36.3 138
S37.9
LOYAMARUK
SILALI
F57.6
G95.1 224
G62.8
F63.2
G65.2
G56.4
F78.3
F36.0
G92.5
G95.8
G76.2
G50.8
G88.7
G70.1
F74.8
F84.2
G70.8
G58.3
G96.6 222
G93.3
G95.5 221
G91.0
G84.2
218 F96.7
225
220 F94.6
F78.3
F56.4
F84.7
G92.8
G86.0
G95.4
G92.3
G95.8 223
G56.8
G64.8
G92.8
F96.8 219
G80.4
F60.7
AGOROMIT
Nasurut
KAILALE
LOROKUNO
CHEPTIMET
Kasitet
NAKOKO
NAUDU
NATAN
Amaya
Kawatacom
Murulen
LOIYAMAROK
NOTE
THERE IS A COMPANION 1:50 000 SCALE MAP OF THE GEOLOGY OF SILALI VOLCANO
INNER TROUGH

EXTRUSIVE IGNEOUS ROCKS

SILALI VOLCANO

RECENT TO PLEISTOCENE

Post-Caldera Lavas:
- b^y Young basalt lavas
- BH^t Black Hill Trachyte Lavas including benmoreites and phonolites
- P^{vl} Late Pyroclastic Deposits; pumice lapilli breccias
- b^u Upper Basalt Lavas
- t^u Upper Trachyte Lavas

Katenmening Lavas:
- KT^b Upper Basalt Member
- KT^t Lower Trachyte Member

- b^f Flank Fissure Basalts

Western Flank eruptions:
- S^t Summit Trachyte
- A^v Arzett Tuffs and Lavas
- t^d Discoid Trachyte Lavas

Caldera Sequence — Kapedo Tuffs (Kt):
- K^{vu} Upper Pyroclastic Deposits: pumice lapilli breccias and welded tuffs.
- K^I Intermediate lavas; trachytes mugearites and benmoreites
- K^{vl} Lower Pyroclastic Deposits: massive lithic breccias and lavas
- t^l Lower Trachyte Lavas

- M^b Mission Basalt

INTRUSIVE IGNEOUS ROCKS

- Pk^b Paka volcano basalts
- Pk^t Paka volcano trachytes
- Sc^t Secumius Trachyte
- Trachyte

DRIFT DEPOSITS

- V^b Unconsolidated to poorly consolidated basalt scoria and spatter
- V^t Unconsolidated to poorly consolidated trachyte scoria and pumice lapilli deposits
- V^p Basaltic and trachytic deposits of phreatomagmatic origin
- Landslip
- Alluvium
- Alluvial fan
- Scree/talus deposits

WESTERN MARGIN OF RIFT

PLIOCENE
- Pl^b Plio-Pleistocene basalts undifferentiated
- Pl^t Pliocene trachytes and pyroclastic deposits undifferentiated

EASTERN MARGIN OF RIFT

MIOCENE — Age (Ma.)
- 9.0 L^t Lopogno Trachyte
- 9.4 N^b Nasorut Basalt
- M^v Miocene volcaniclastics undifferentiated

GEOLOGICAL SYMBOLS

Geological boundaries

- solid boundary
- solid boundary, uncertain
- drift boundary, uncertain
- dip of strata in degrees
- fault (tick on downthrow side)
- fault uncertain and/or concealed
- fault showing change in displacement direction
- open fracture or minor fault
- lineament or joint from air photo and/or satellite interpretation
- ring fracture associated with caldera or large crater
- ring fracture, uncertain and/or concealed by younger deposits
- landslip scarp
- dyke
- borehole (Losikiriomoi)

Volcanic landforms

- lava front
- lava flow-internal features and pressure ridges
- lava flow levée
- collapsed lava tube
- prominent break of slope

Eruptive centres

- parasitic volcanic cone, actual size and shape indicated — T, Tuff cone; R, Tuff ring
- minor parasitic volcanic cone
- volcanic crater or depression — P, Pit Crater
- trachyte dome
- eruptive fissure (open), usually basaltic with spatter ramparts

Grid North / True North / Magnetic North 0° 39'

At Sheet Centre Magnetic Variation as of January 1980 Annual Change 6' East

Projection:- Transverse mercator

Spheroid:- Clarke 1880 (modified)

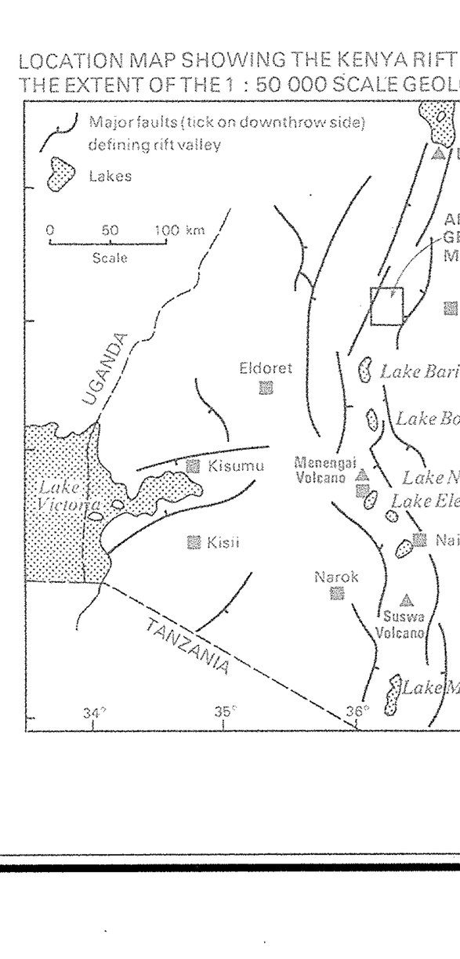
METRES 1000 0 1 2 3 4 5 6 km

SCALE 1 : 50 000

TOPOGRAPHIC SYMBOLS

- Contours at 100m intervals
- Motorable track
- Cliff
- Trigonometrical station with height in metres ▽1830
- Name of major topographic feature: SILALI
- Name of area: NAKOKO
- Name of village or settlement: Kapedo
- Name of local topographic feature: Lorusio
- Water course (stream or gully), permanent where indicated, with name where known: Amaya
- Watercourse (indefinite)

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1 : 50 000 SCALE GEOLOGICAL MAP



Major faults (tick on downthrow side) defining rift valley
Lakes
0 50 100 km
Scale
Lake Turkana
Barrier Volcano
AREA OF GEOLOGICAL MAP
Maralal
UGANDA
Eldoret
Lake Baringo
Lake Bogoria
Kisumu
Menengai Volcano
Mt. Kenya
Lake Nakuru
Lake Elementaita
Lake Victoria
Kisii
Naivasha
Narok
Suswa Volcano
NAIROBI
TANZANIA
Lake Magadi
34° 35° 36° 37°

This map was produced as a result of a Technical Co-operation agreement between the Goverments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland (Overseas Development Administration). The work forms part of the Kenya Governments EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1988 and 1990 by the British Geological Survey (Natural Environment Research Council) and the Geothermal section of the Kenya Ministry of Energy.

Geological mapping by Drs M. Smith and P.N.Dunkley
Compilation by Dr M. Smith on base map prepared from series Y731 1 : 50 000 topographic sheets and air photos.
Rift margin geology simplified from published 1:125 000 geological maps (EAGRU)
Cartography by J.D.Hodgson
Project team leaders:- Dr P.N. Dunkley and J.K. Kinyariro.

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

PRINTED BY COOK HAMMOND & KELL LTD. MITCHAM & WESTMINSTER

91/1000

KENYA

GEOTHERMAL ACTIVITY OF PAKA AND KOROSI VOLCANOES, AND ADJACENT AREAS

1:50 000

EXPLANATION OF GEOTHERMAL COLOURS AND SYMBOLS

GEOTHERMAL ACTIVITY

F90.4 — Area of fumerolic (F) and/or hot steaming ground (G) and associated alteration. Maximum recorded temperature indicated in °C

F67.3 + — Isolated fumerole with little associated alteration. Maximum recorded temperature indicated in °C

S82.2 — Area of hot spring(s) activity and associated alteration. Maximum recorded temperature indicated in °C

• — Isolated hot spring(s) with little associated alteration. Maximum recorded temperature in °C

Area of hydrothermal alteration and/or brecciation. Accompanied by silification, carbonate or silica sinters and/or veining. Ground temperatures at ambient

LOCATION OF SITES SAMPLED FOR GEOTHERMAL FLUIDS

(sampling carried out by D.J.Allen, H.Adambi, W.G.Darling, D.Lemu, B.Macharia and P.Mwangi)

176 BGS sample site number

○ Surface water sample

⊕ Borehole sample with name indicated. Temperature at ambient or slightly elevated

NOTE

THERE IS A COMPANION 1:50 000 SCALE MAP OF THE GEOLOGY OF PAKA AND KOROSI VOLCANOES AND ADJACENT AREAS

TOPOGRAPHIC SYMBOLS

Contours at 100m intervals

Motorable track

Cliff

Trigonometrical station with height in metres ▽1448

Name of major topographic feature: PAKA

Name of area: KOKORE

Name of village or settlement: Nginyang

Name of local topographic feature: Kotang

Water course (stream or gully) permanent where indicated with name where known: Komol

Water course (indefinite)

Seasonal swamp (with approximate limit)

GEOLOGICAL SYMBOLS

Geological boundaries

Solid boundary

Solid boundary, uncertain

Drift boundary

Dip of strata in degrees

Fault (tick on downthrow side)

Fault uncertain and/or concealed

Fault showing change in displacement direction

Open fracture or minor fault

Lineament or joint from air photo and/or satellite interpretation

Ring fracture associated with caldera or large crater

Landslip scarp

Volcanic landforms

Lava front

Lava flow - internal features and pressure ridges

Lava flow levée

Collapsed lava tube

Eruption centres

Parasitic volcanic cone, actual size and shape indicated

Minor parasitic volcanic cone

Volcanic crater or depression

Trachyte dome

Eruptive fissure (open) usually basaltic

Grid North / True North / Magnetic North 0° 41'

At Sheet Centre Magnetic Variation as at January 1990. Annual Change 6' East

Projection:- Transverse Mercator
Spheroid:- Clarke 1880 (Modified)

Metres 1000 0 1 2 3 4 5 6 7 8 km

Scale 1:50 000

IGNEOUS EXTRUSIVE ROCKS

Age (Ma)

PLEISTOCENE TO RECENT

- b^v Young basalts of Gulungul and Nakorkor
- P^{sv} Volcaniclastic deposits; airfall tuffs, pyroclastic flows and debris flow breccias
- P^{bu} Upper Basalts
- P^{tu} Upper Trachytes
- P^{bl} Lower Basalts
- P^{tl} Lower Trachytes
- P^m Mugearites

PAKA VOLCANO

INNER TROUGH

- K^{tu} Upper Trachytes
- K^m Mugearites
- K^b Basalts
- K^{tl} Lower Trachytes
- K^v Air-fall pumice lapilli and ash deposits

KOROSI VOLCANO

- Ok^b Basalts
- Ok^t Trachytes

OL KOKWE ISLAND

PLEISTOCENE — RECENT — 1.5

- C^{bu} Upper Basalts
- C^t Trachytes
- C^l Mugearites and benmoreites Interbedded, welded and non-welded pumice lapilli tuffs with lavas
- C^v

CHEPCHUK VOLCANO

WESTERN MARGIN OF RIFT

PLEISTOCENE — 0.57 — 0.23

- B^b Baringo Basalt
- L^{tp} Loyamarok Trachyphonolite
- B^t Baringo Trachyte

PLIOCENE — 3.4

- J^b Jarota Basalt
- JF Jamkana Formation
- Pl^b Basalts (undifferentiated)

MIOCENE

EASTERN MARGIN OF RIFT

- 0.54 Kr^p Phonolites - Karau Volcano
- LH^{tp} Lake Hannington Trachyphonolite
- 0.56 Pl^b basalts (undifferentiated)
- Kk^b Kokwabang'a Basalt
- Sc^t Securninus Trachyte
- 2.5 O^t Orus Trachyte

10-11 .RG Phonolites — RUMURUTI GROUP

SG Basalts, trachytes and volcaniclastic rocks — SAMBURU GROUP

SEDIMENTARY ROCKS

- l Lacustrine clays, silts and volcaniclastics (Loiminange Beds)
- c Fluvial conglomerates and siltstones (Chesowanja Sediments)

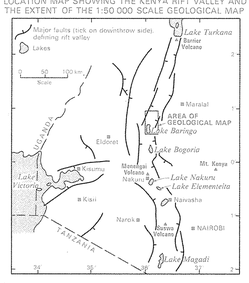
PYROCLASTIC ROCKS

- V^b Unconsolidated to poorly consolidated basalt scoria and spatter
- V^t Unconsolidated to poorly consolidated trachyte scoria and pumice lapilli deposits
- Agglomerates, welded breccias and pumice lapilli tuffs of Paka caldera

DRIFT DEPOSITS

- Landslip
- Alluvium
- Alluvial fan
- Scree/talus

LOCATION MAP SHOWING THE KENYA RIFT VALLEY AND THE EXTENT OF THE 1:50 000 SCALE GEOLOGICAL MAP



This map was produced as a result of a Technical Co-operation agreement between the Governments of the Republic of Kenya and the United Kingdom of Great Britain and Northern Ireland, (Overseas Development Administration). The work forms part of the Kenya Governments' EXPLORATION FOR GEOTHERMAL ENERGY PROJECT and was carried out between 1988 and 1990 by the British Geological Survey (Natural Environment Research Council) and the Geothermal Section of the Kenya Ministry of Energy.

Geological mapping by Drs M.Smith and P.N.Dunkley.
Compilation by Drs M.Smith and P.N.Dunkley - on base-map prepared from series Y731 1:50 000 topographic sheets and air photos.
Rift margin geology simplified from published 1:125 000 geological maps (EAGRU).
Cartography by S.Bray
Project Team Leaders - Dr P.N.Dunkley and J.K.Kinyariro.

GOVERNMENT OF KENYA
MINISTRY OF ENERGY
GEOTHERMAL SECTION

PRINTED BY COOK HAMMOND & KELL LTD. MITCHAM & WESTMINSTER

91/1000