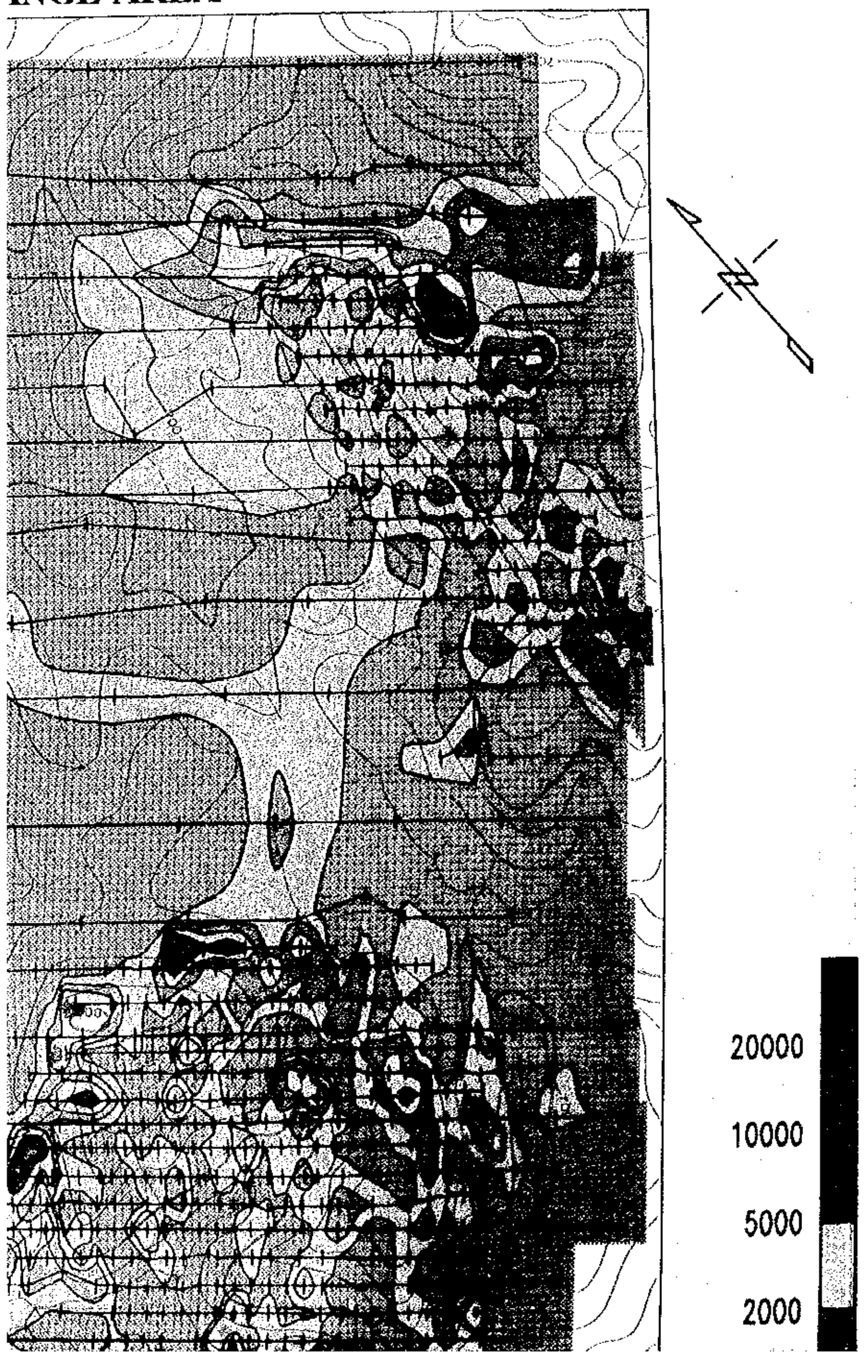
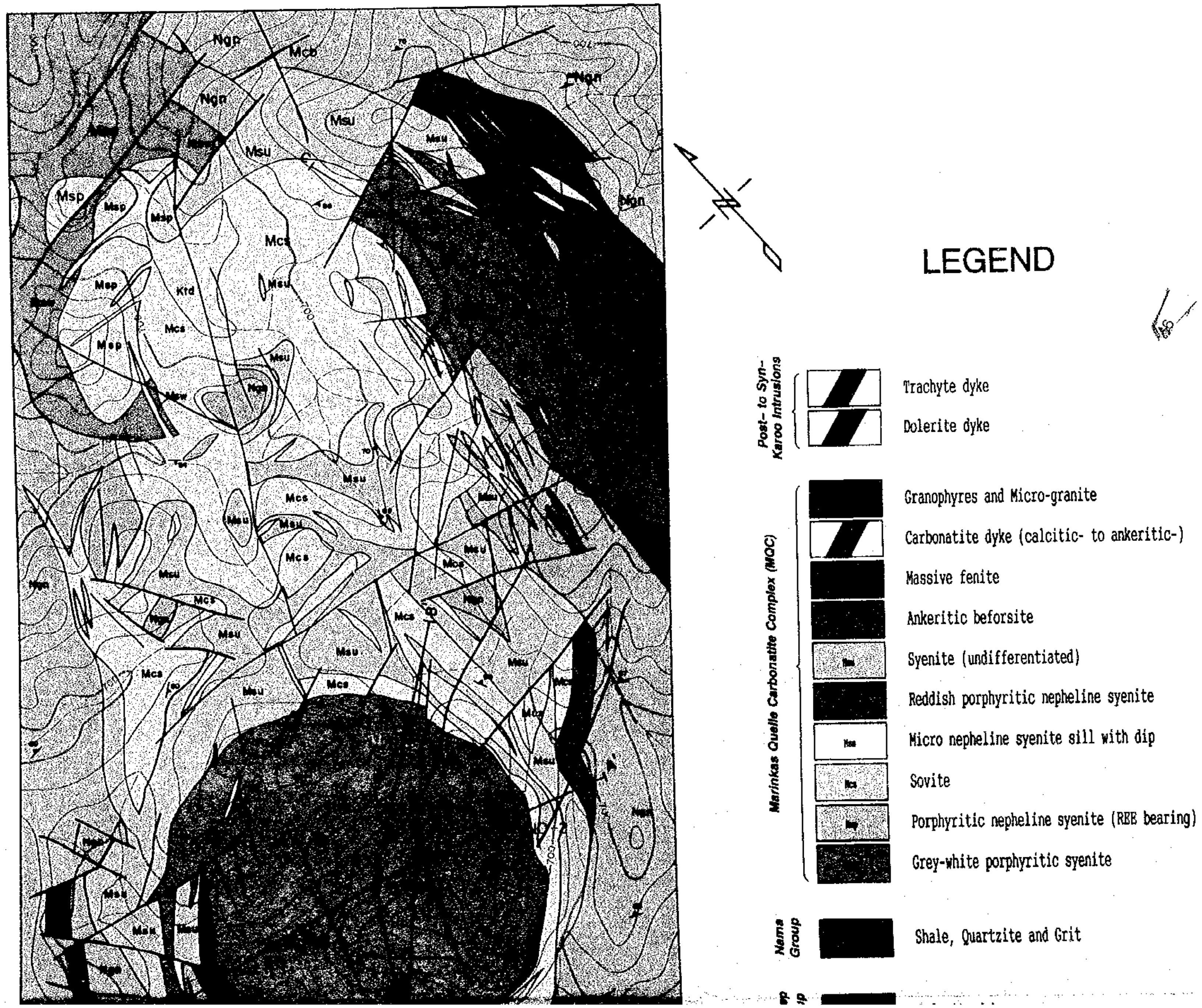
ʌLKFELD AREAS,

THE COOPERATIVE MINERAL EXPLORATION BY JICA/MMAJ-GSN, 1993-1994

H OXIDES (R2O3) DISTRIBUTION ʌNGE AREA



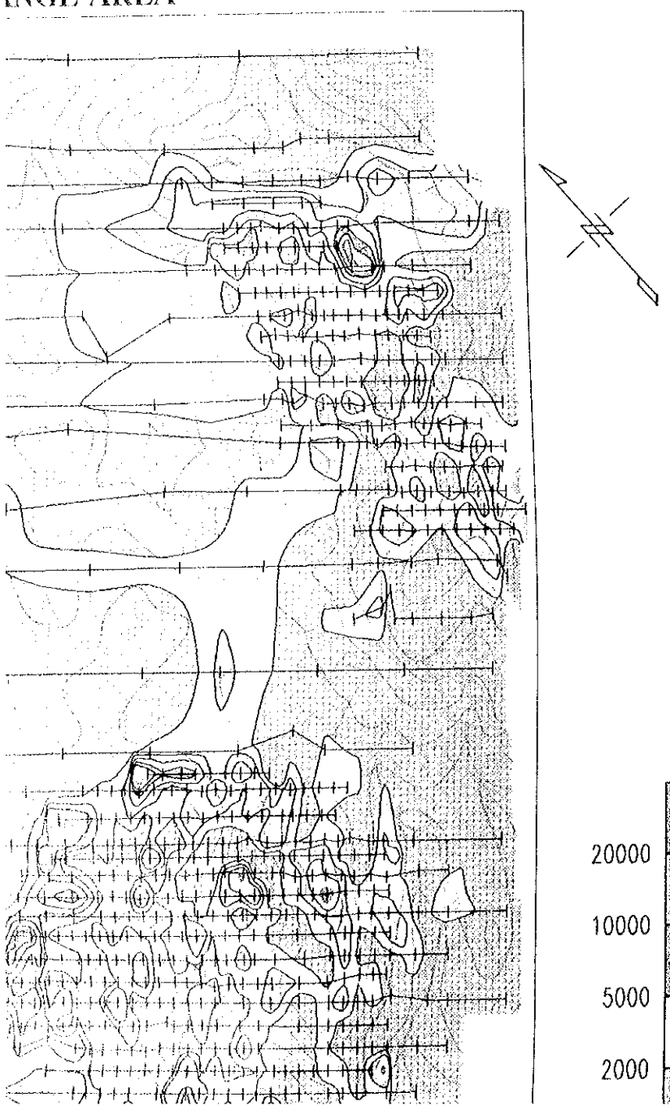
GEOLOGICAL MAP OF THE ORANGE AREA



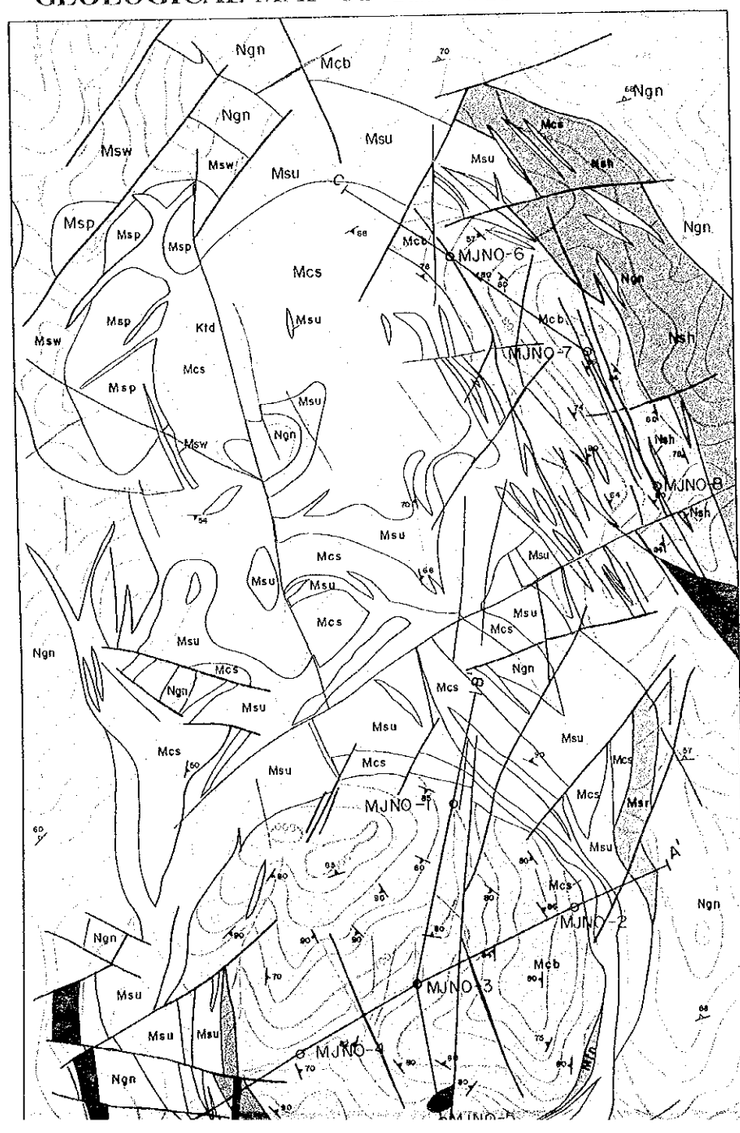
ALKFELD AREAS,

THE COOPERATIVE MINERAL EXPLORATION BY JICA/MMAJ-GSN, 1993-1994

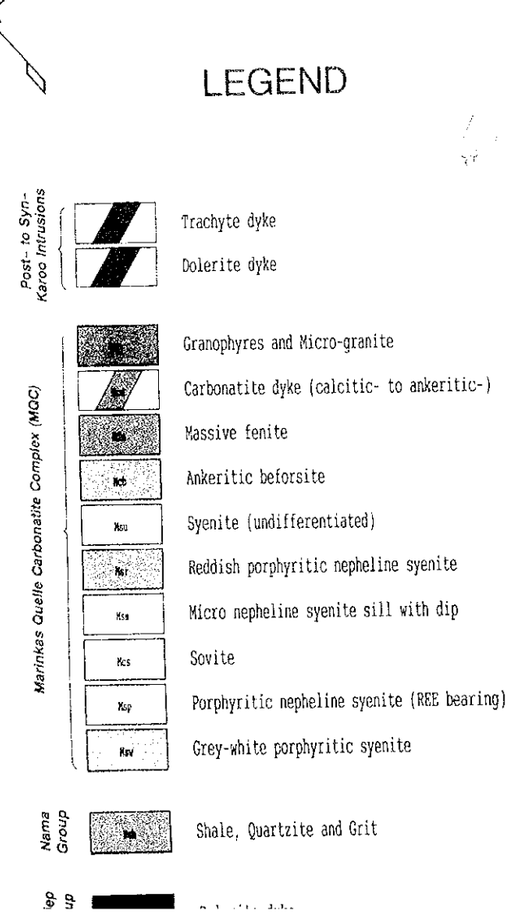
H OXIDES (R2O3) DISTRIBUTION
NGE AREA

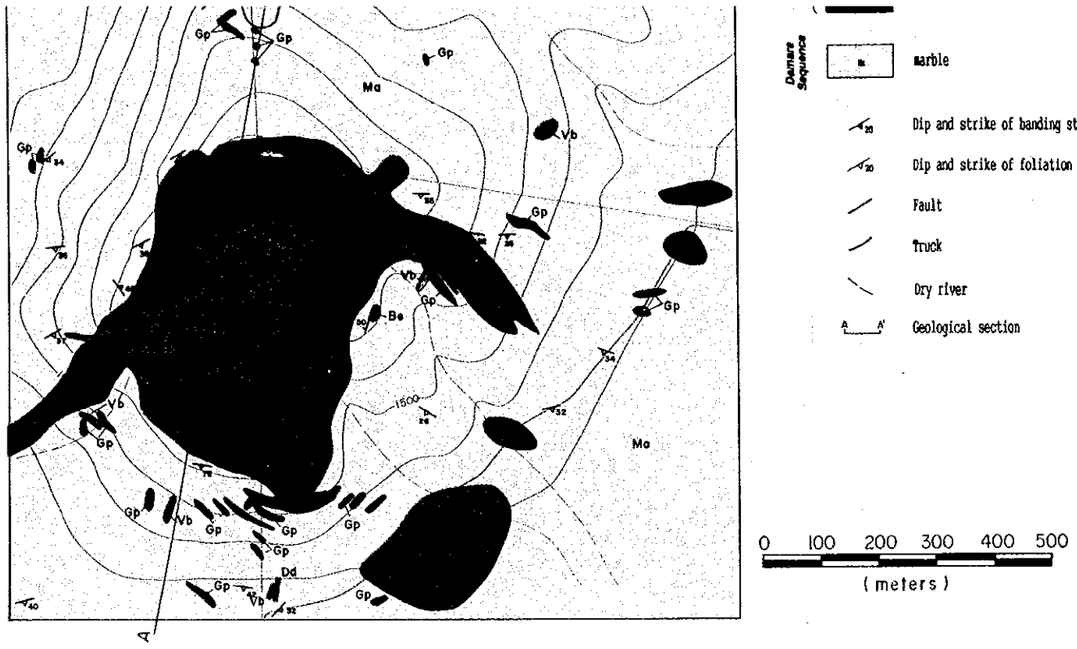


GEOLOGICAL MAP OF THE ORANGE AREA



LEGEND

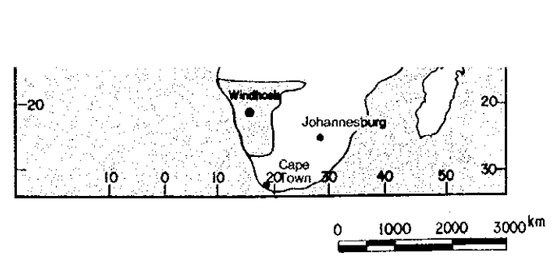




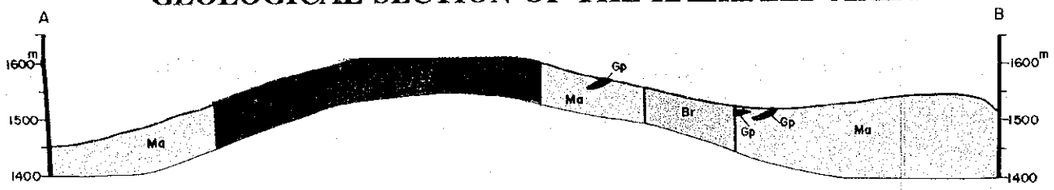
Damara Sequence

- Mk — marble
- Dip and strike of banding structure in carbonatite
- Dip and strike of foliation in marble
- Fault
- Truck
- Dry river
- A — A' Geological section

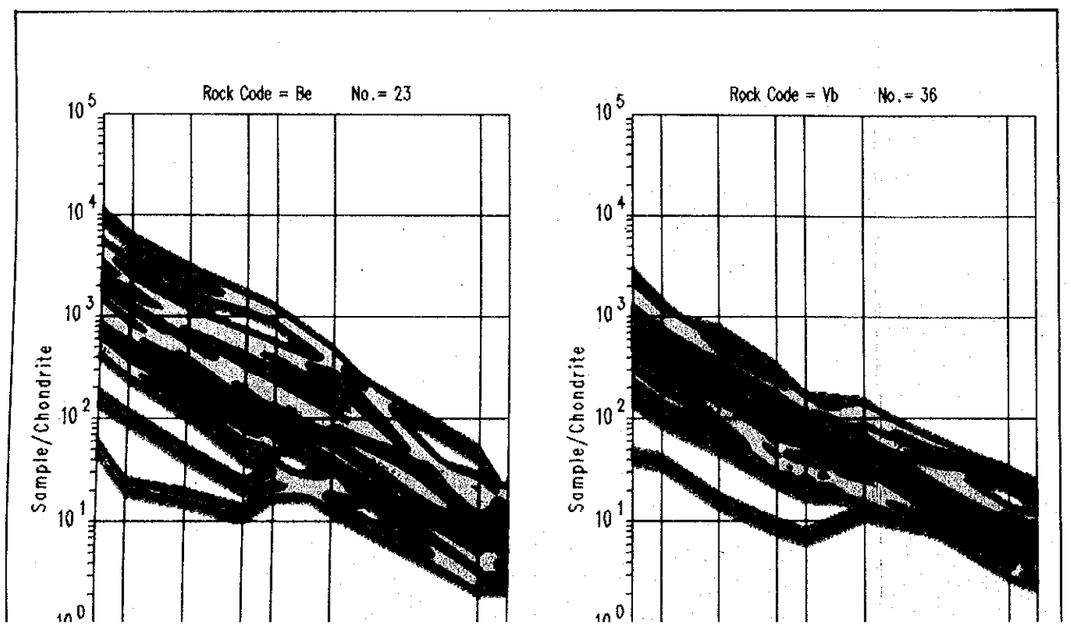
0 100 200 300 400 500 (meters)



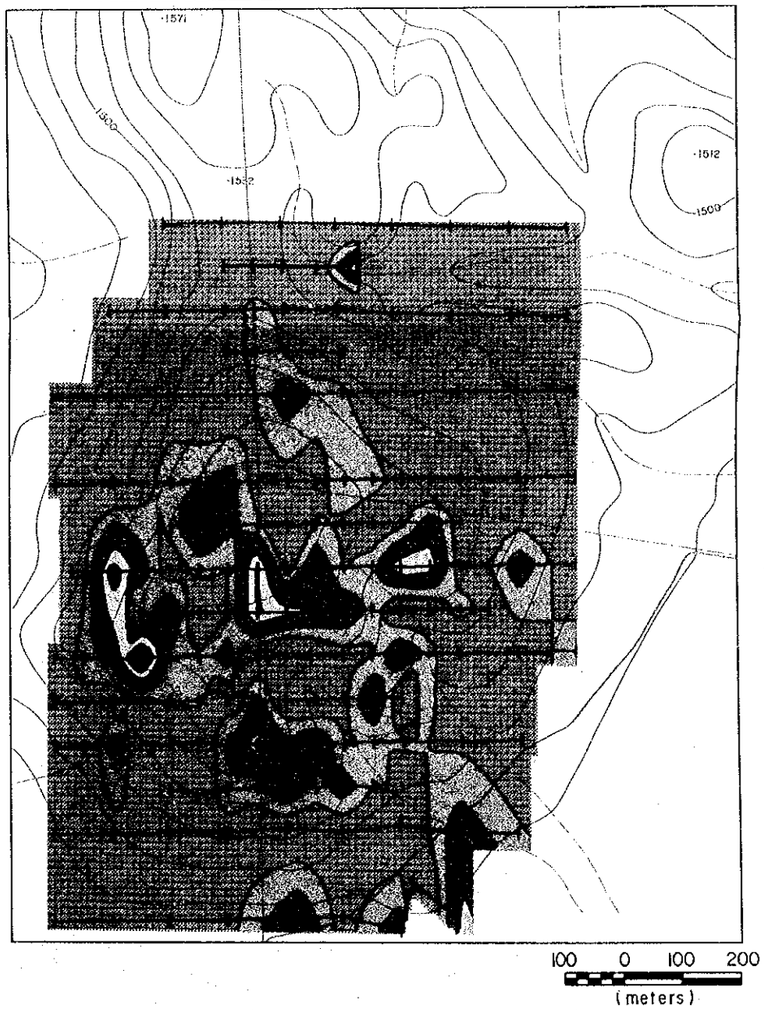
GEOLOGICAL SECTION OF THE KALKFELD AREA

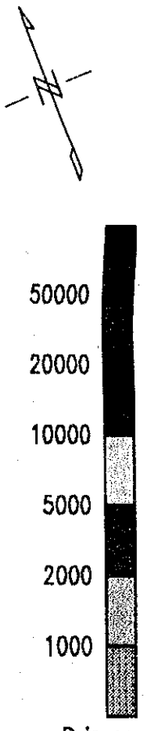


RARE EARTH ELEMENTS PATTERNS OF THE KALKFELD AREA

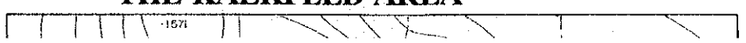


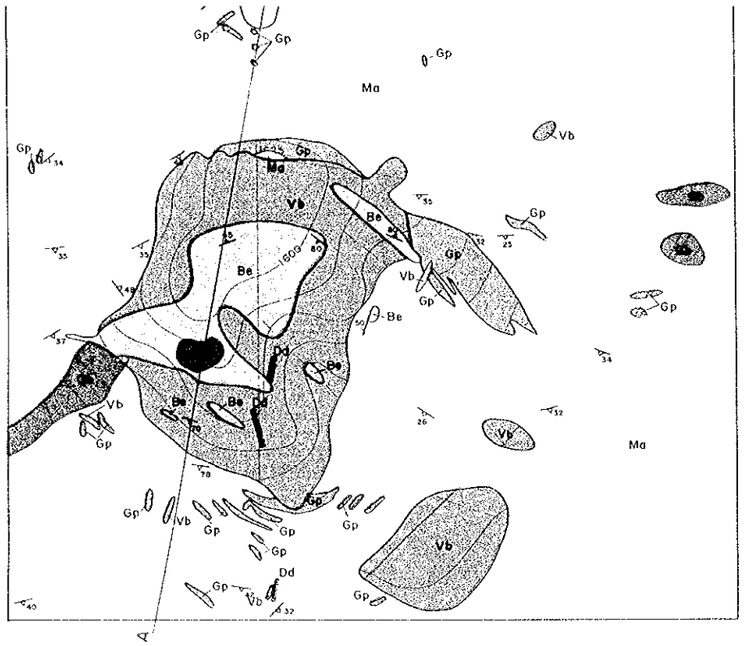
PHOSPHOROUS (P) DISTRIBUTUION OF THE KALKFELD AREA

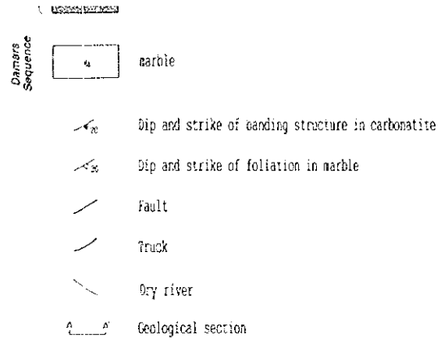


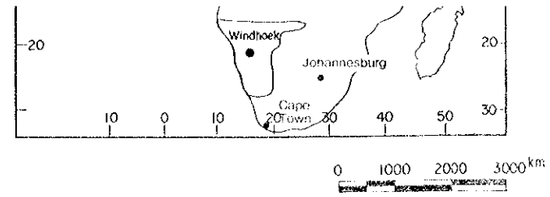


STRONTIUM (Sr) DISTRIBUTION OF THE KALKFELD AREA



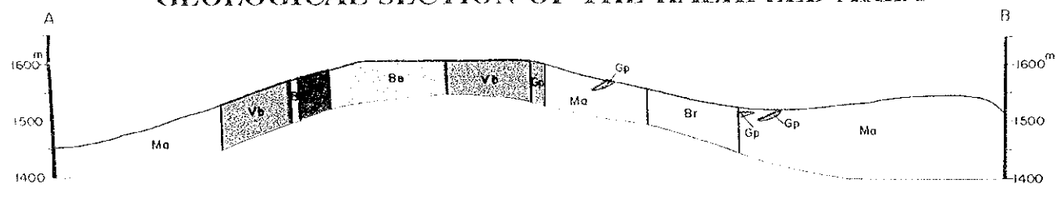




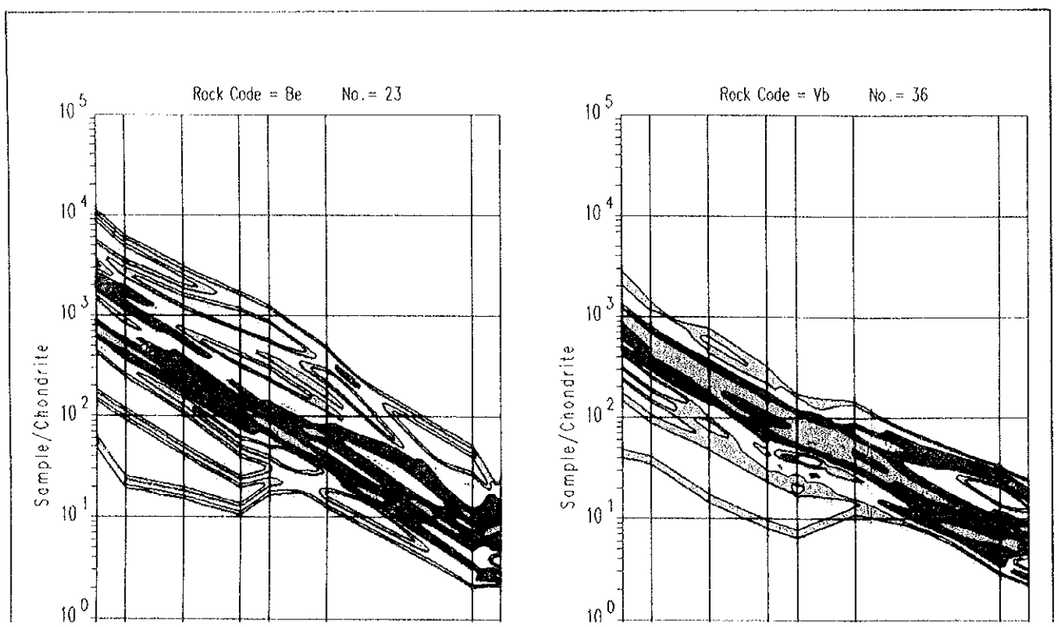


0 100 200 300 400 500 (meters)

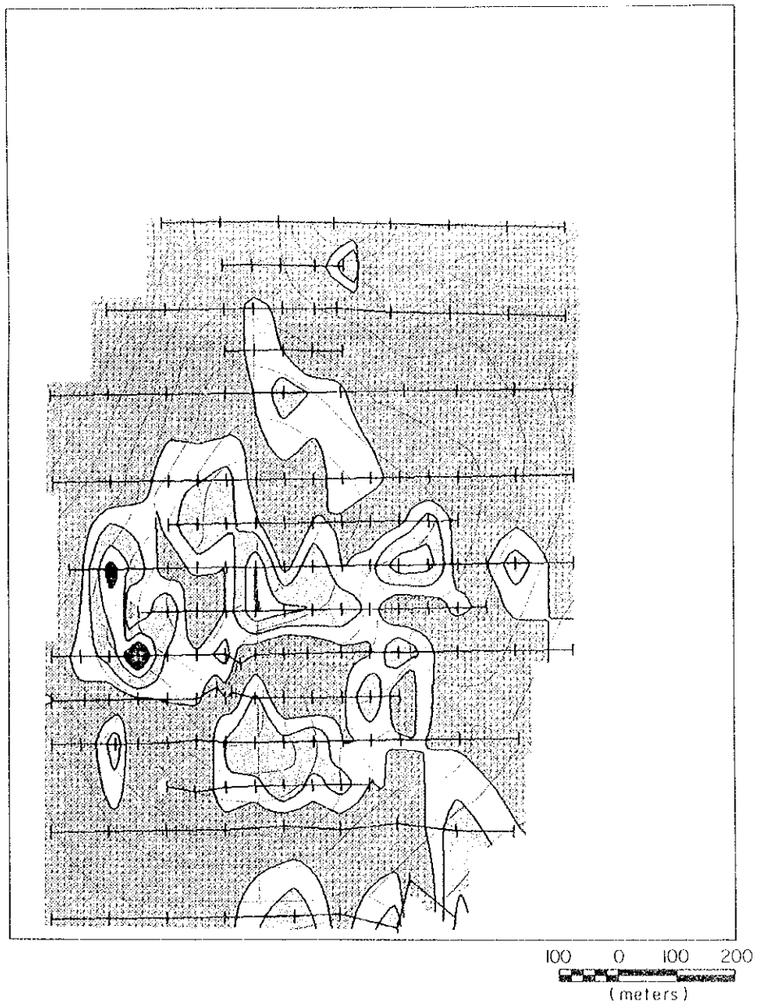
GEOLOGICAL SECTION OF THE KALKFELD AREA



RARE EARTH ELEMENTS PATTERNS OF THE KALKFELD AREA



PHOSPHOROUS (P) DISTRIBUTUION OF THE KALKFELD AREA



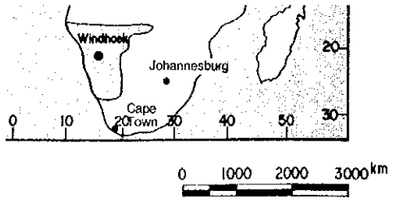
100 0 100 200 (meters)

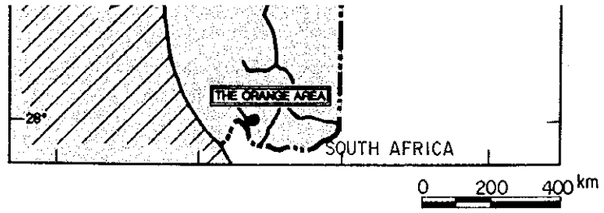
50000
20000
10000
5000
2000
1000
P in ppm

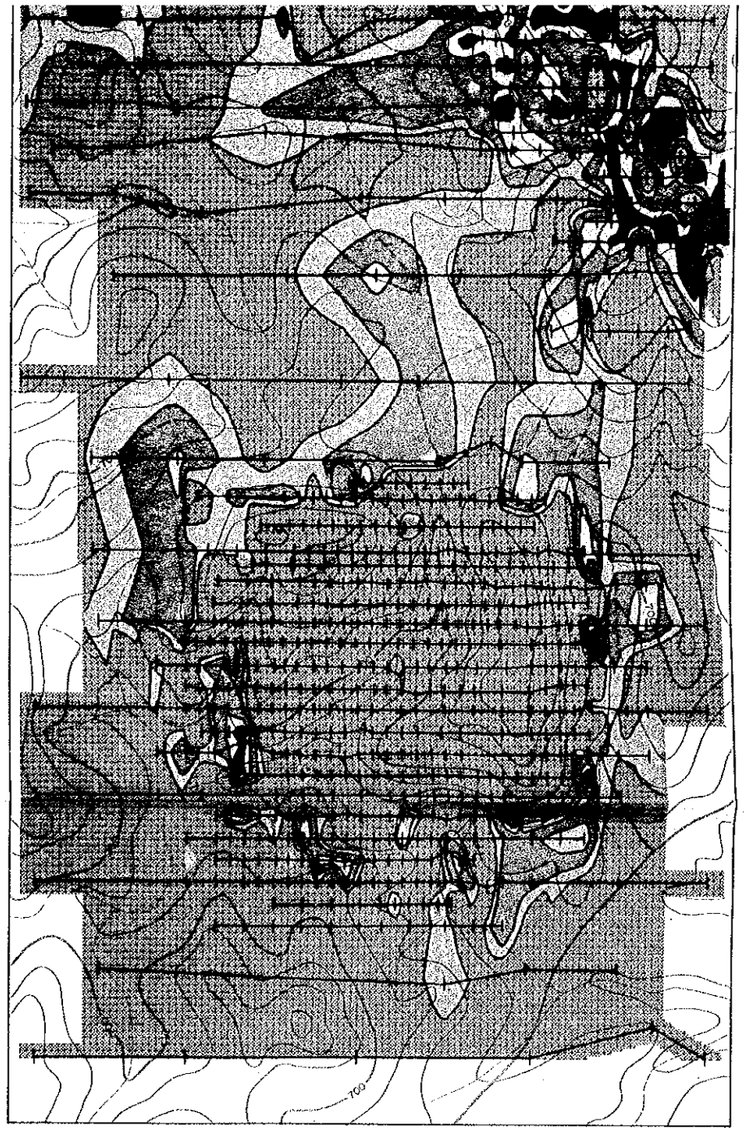
Survey line & Sampling site

STRONTIUM (Sr) DISTRIBUTION OF THE KALKFELD AREA

RARE E
THE KA







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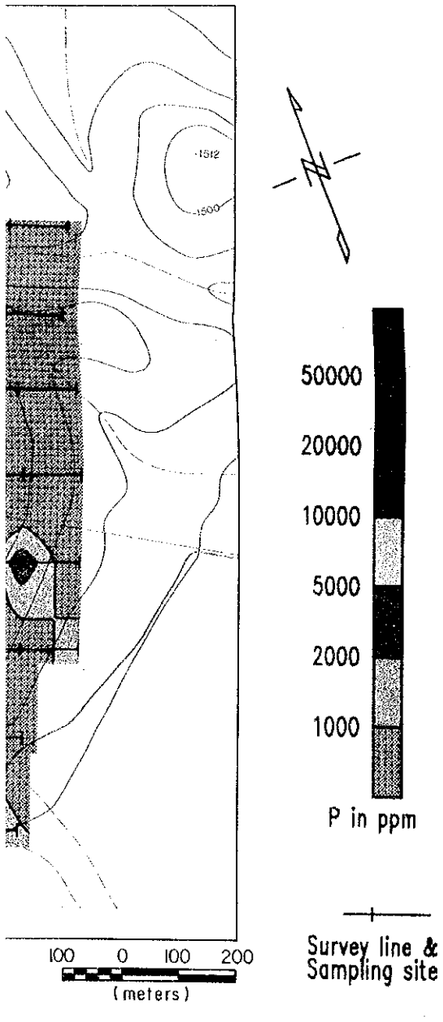
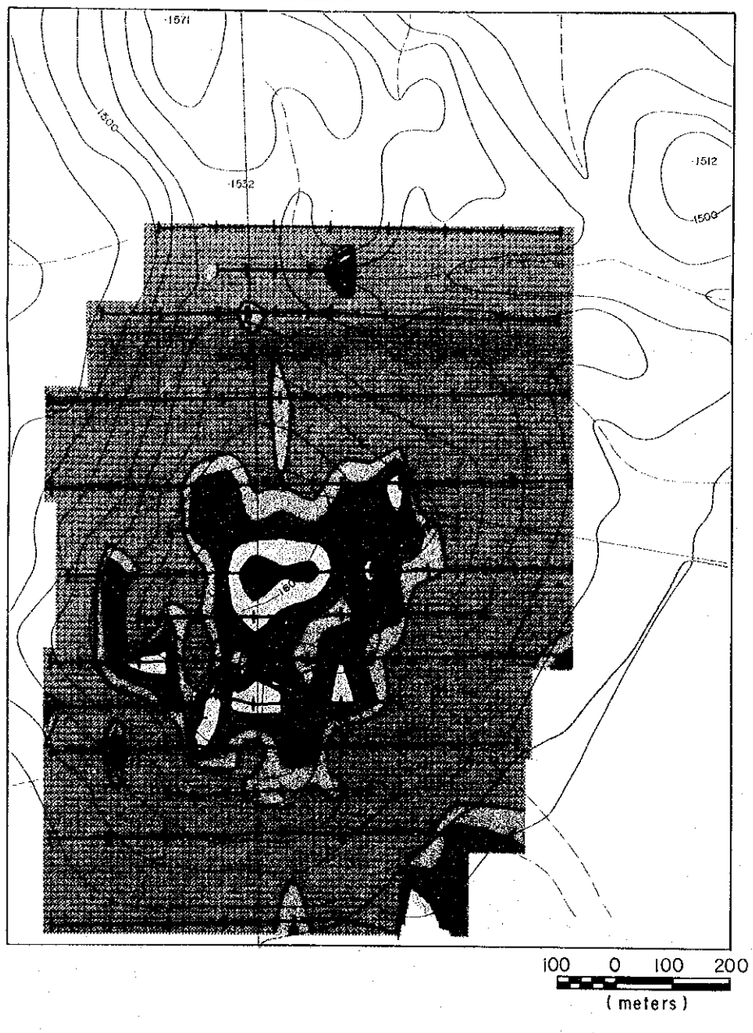
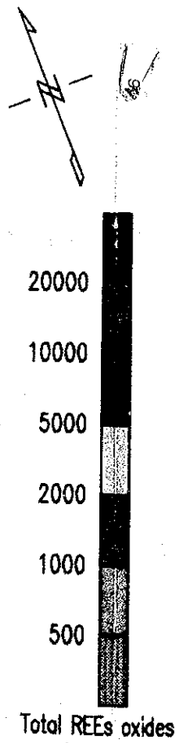
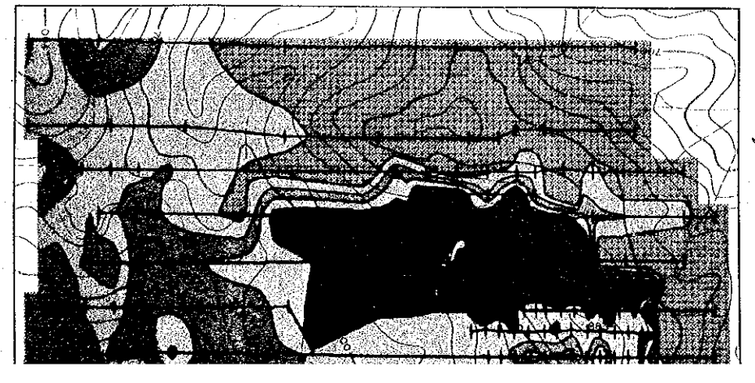


RARE EARTH OXIDES (R2O3) DISTRIBUTION OF THE KALKFELD AREA



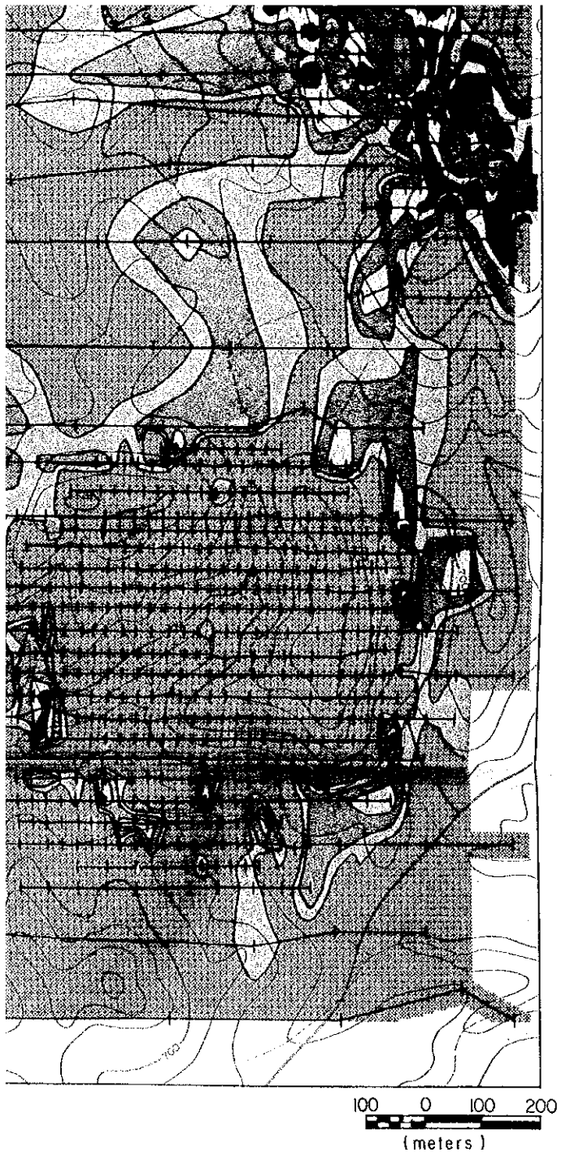


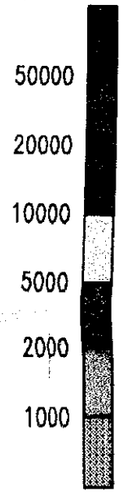
STRONTIUM (Sr) DISTRIBUTION OF THE ORANGE AREA

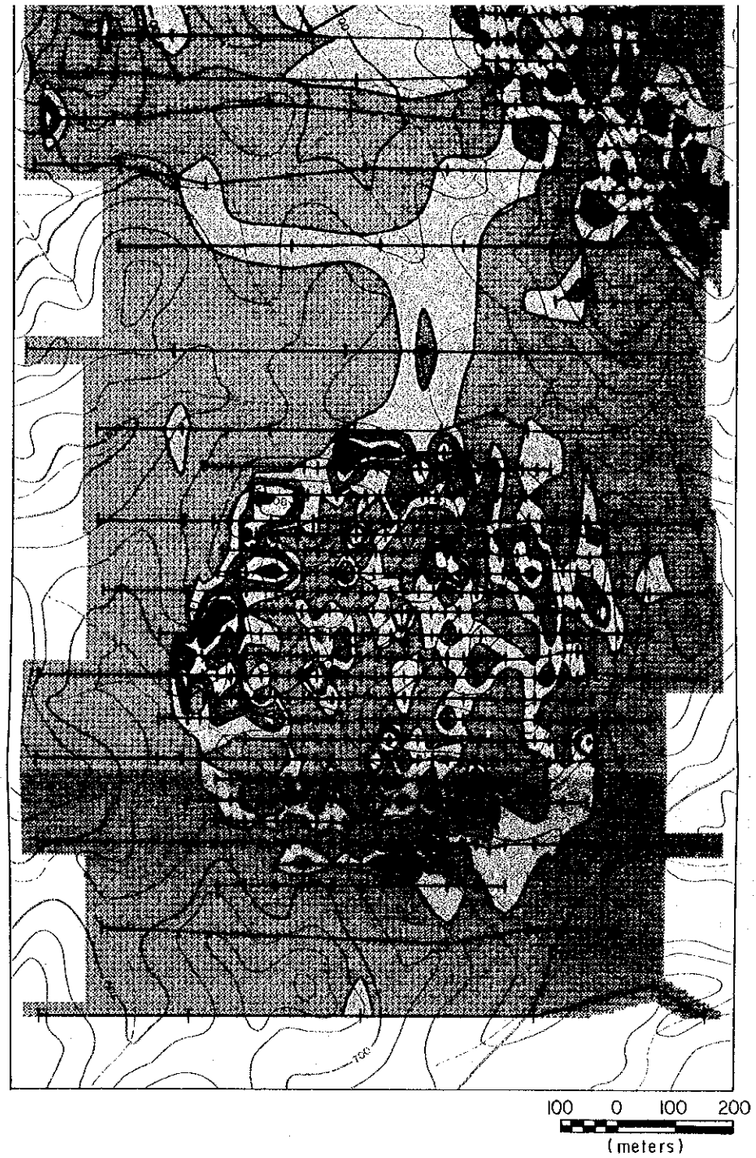


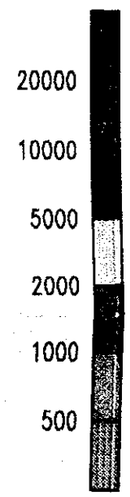
;UTION OF

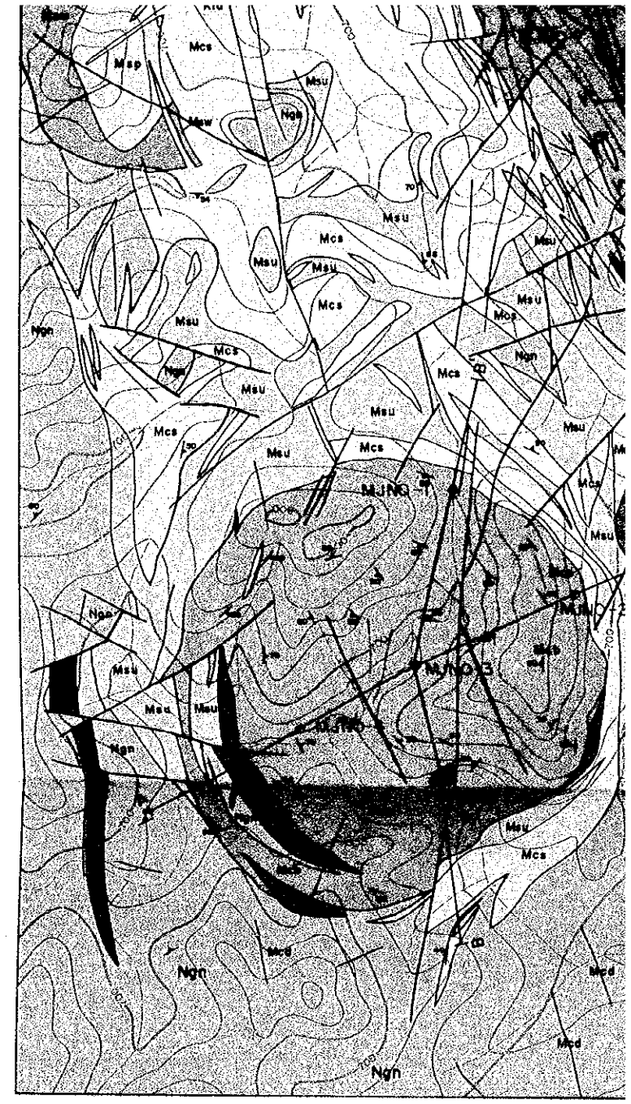
THORIUM (Th) DISTRIBUTUION OF THE KALKFELD AREA



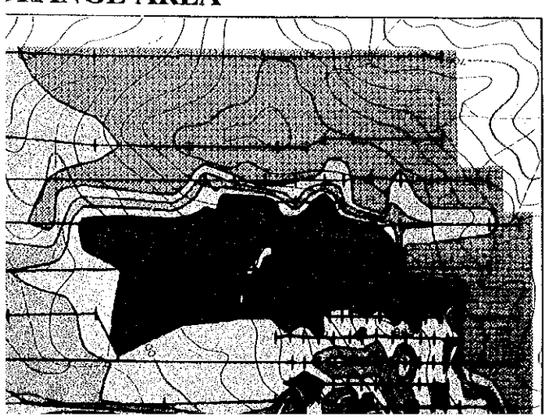






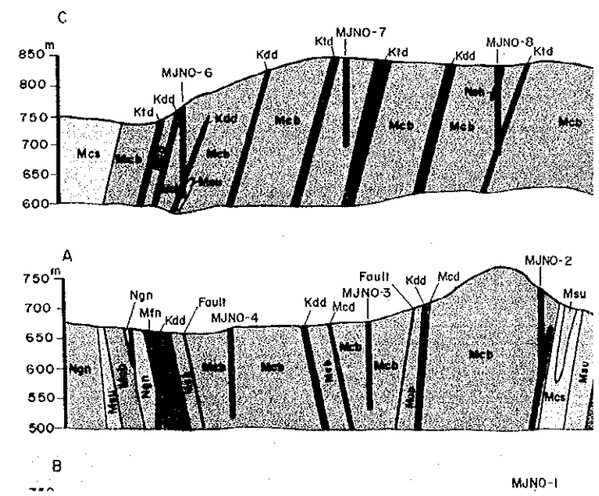


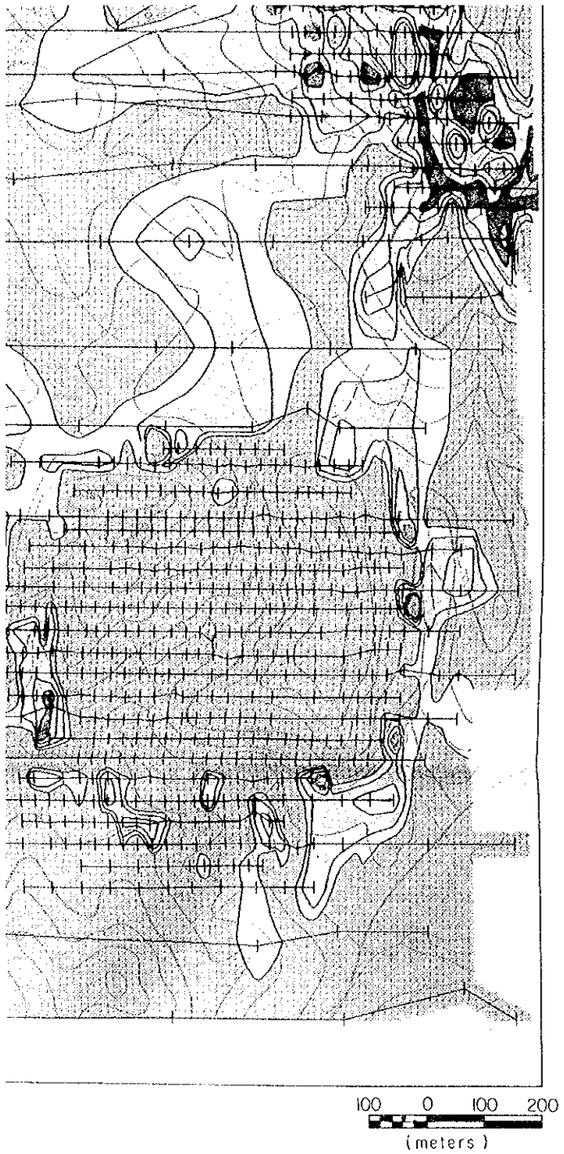
NTIUM (Sr) DISTRIBUTION OF ORANGE AREA

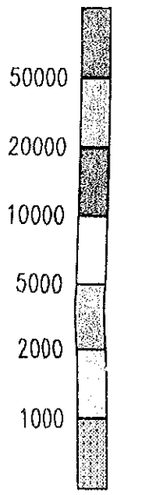


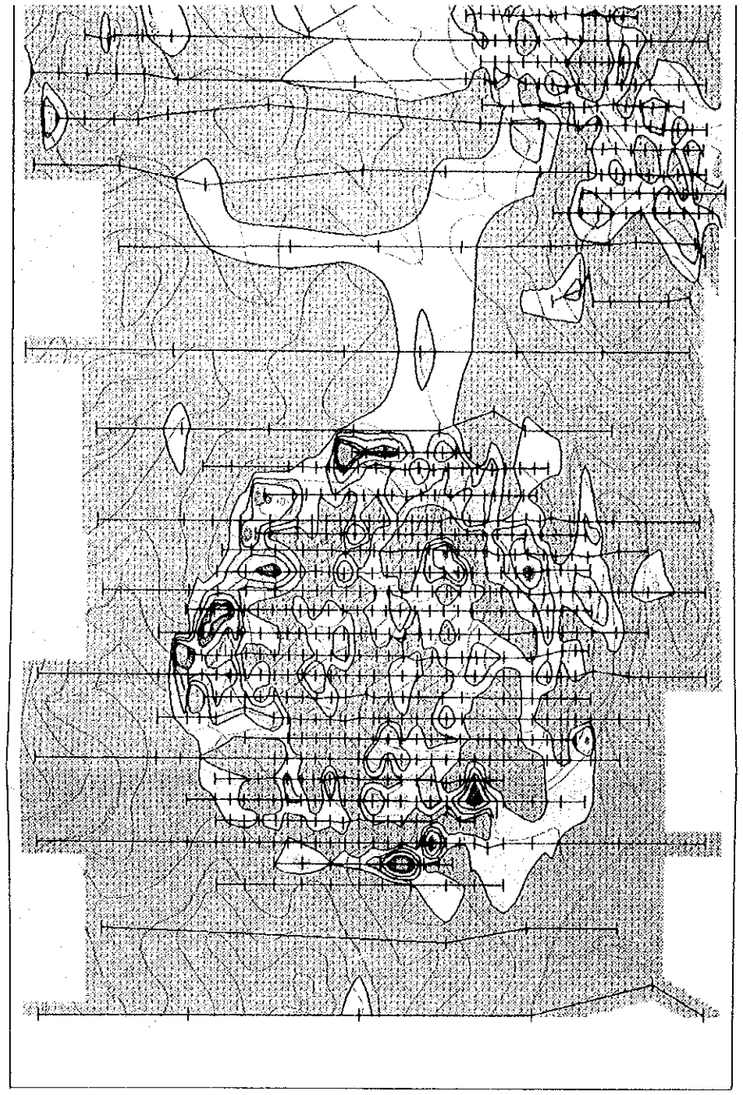
NIOBIUM (Nb) DISTRIBUTUION OF THE ORANGE AREA

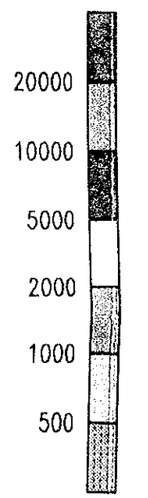
GEOLOGICAL SECTIONS OF THE ORANG

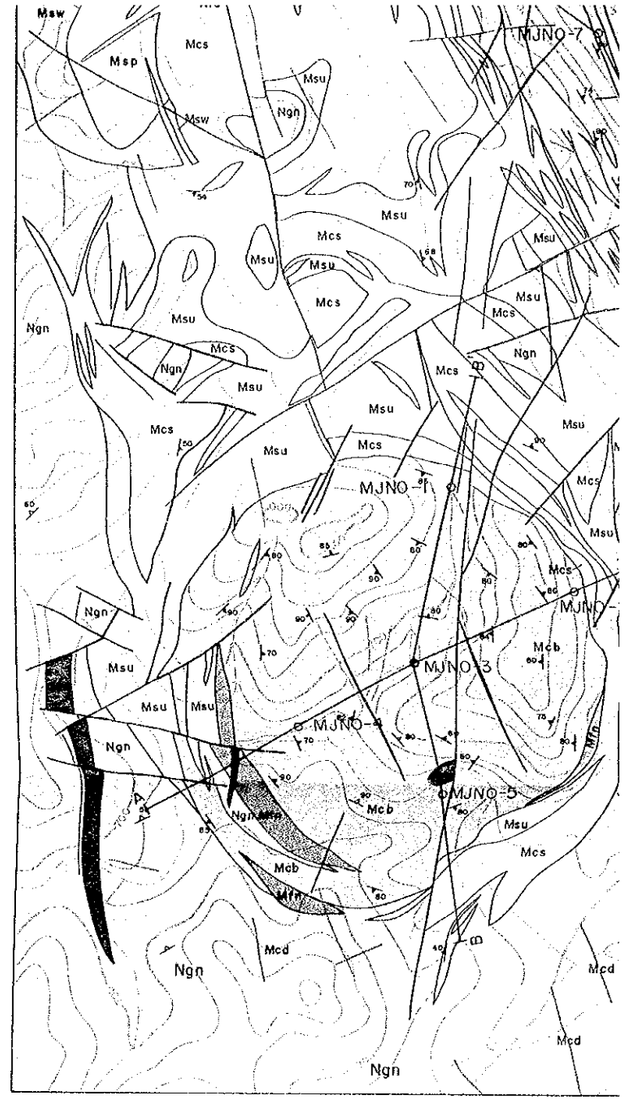




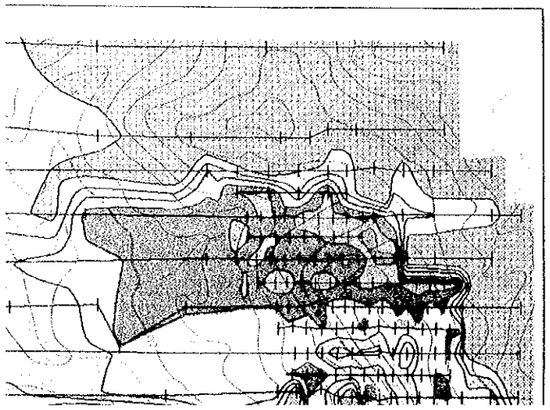




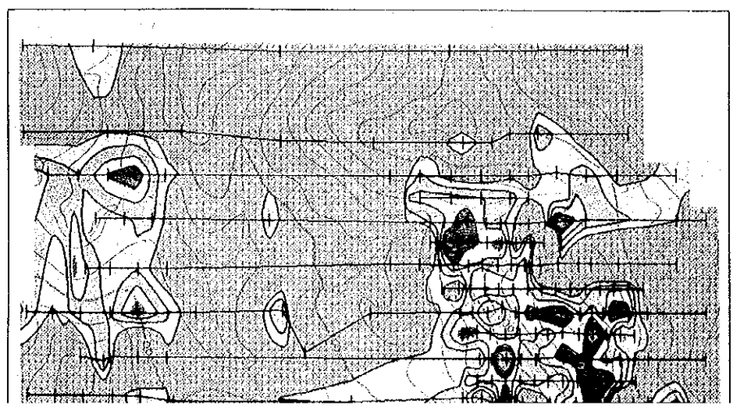




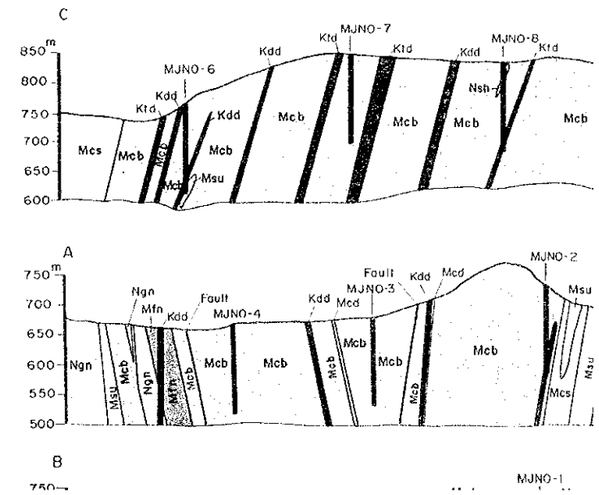
NTIUM (Sr) DISTRIBUTION OF
ORANGE AREA



NIOBIUM (Nb) DISTRIBUTUION OF
THE ORANGE AREA



GEOLOGICAL SECTIONS OF THE ORANG

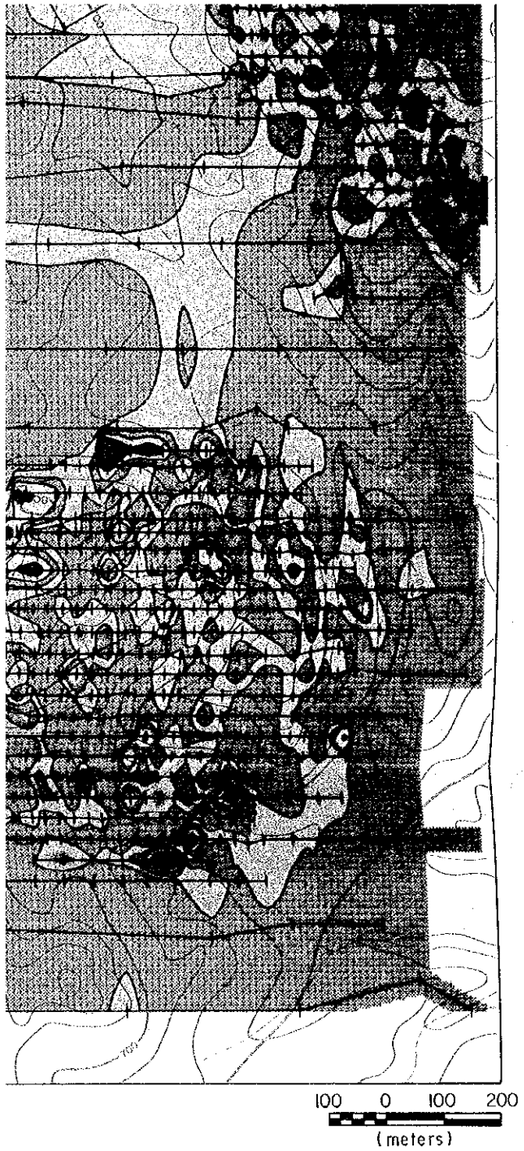


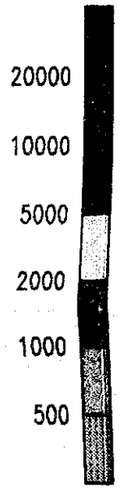
100 0 100 200
(meters)

Survey line &
Sampling site

100 0 100 200
(meters)

Survey line &
Sampling site





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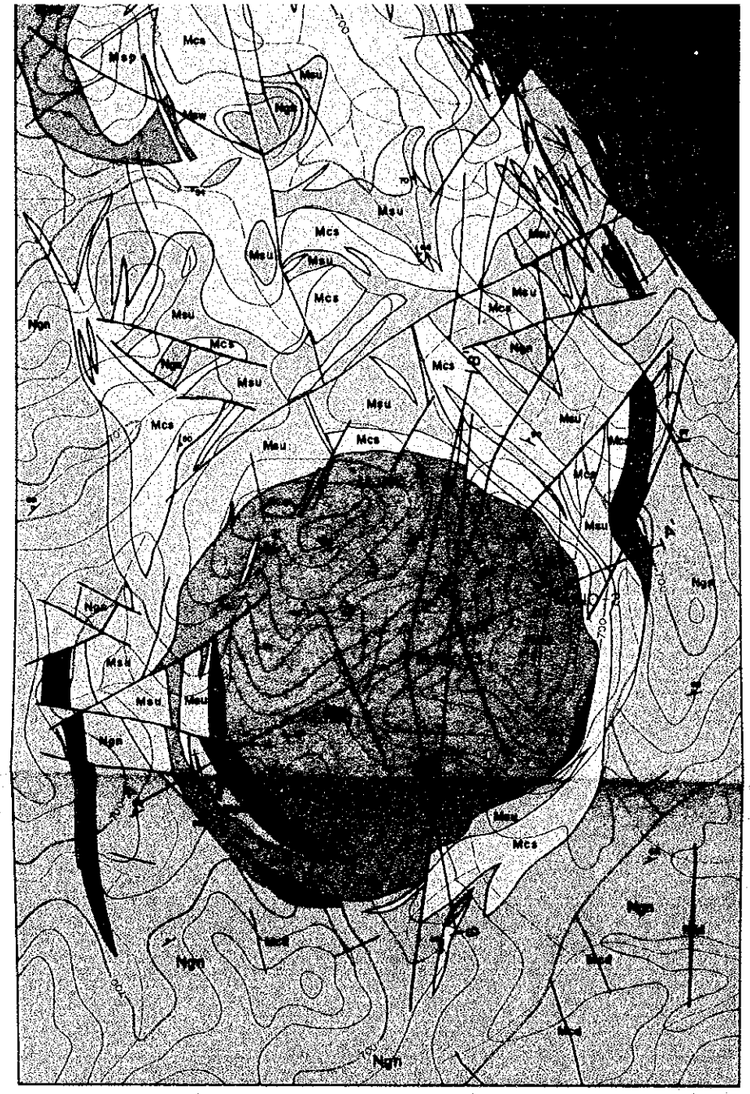
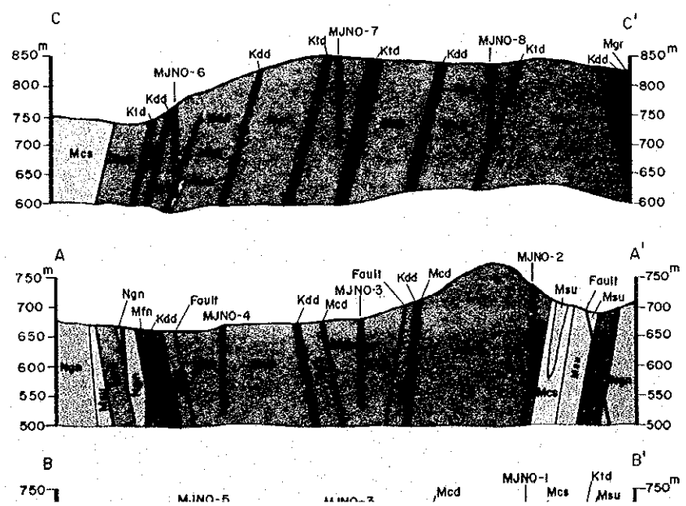
(meters)

(Nb) DISTRIBUTUION OF NGE AREA



GEOLOGICAL SECTIONS OF THE ORANGE AREA



Post- to Syn-Karoo Intrusions
- Trachyte dyke
- Dolerite dyke

Marinkas Quelle Carbonatite Complex (MQC)
- Granophyres and Micro-granite
- Carbonatite dyke (calcitic- to ankeritic-)
- Massive fenite
- Ankeritic beforsite
- Syenite (undifferentiated)
- Reddish porphyritic nepheline syenite
- Micro nepheline syenite sill with dip
- Sovite
- Porphyritic nepheline syenite (REE bearing)
- Grey-white porphyritic syenite

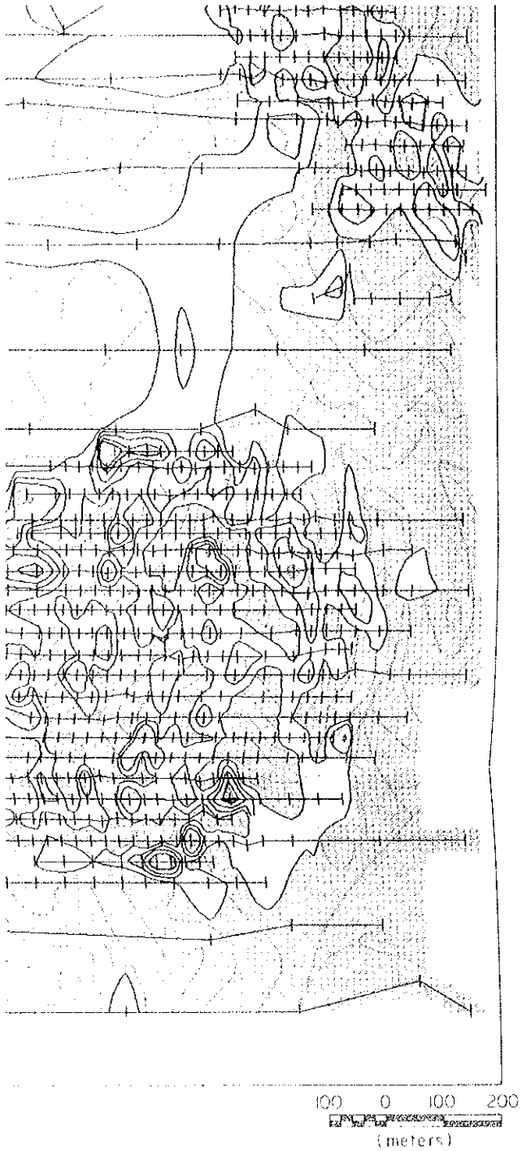
Nama Group
- Shale, Quartzite and Grit

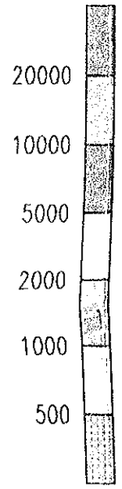
Gariep Group
- Dolerite dyke

Namaqua Metamorphic Complex
- Quartz-feldspar gneiss

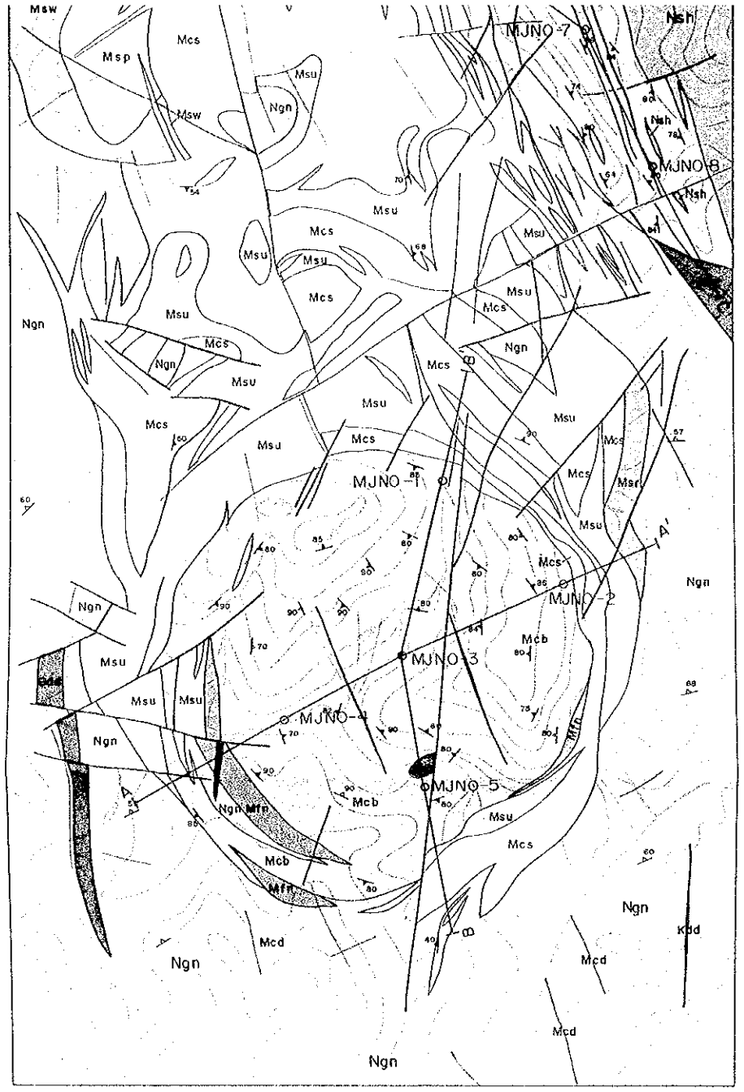
- Fault
- Strike and Dip and strike of banding structure of the MQC
- Strike and Dip of foliation and cleavage in gneiss
- Truck
- Dry river
- A — A' Geological section
- Drilling site

0 100 200 300 400 500
(meters)

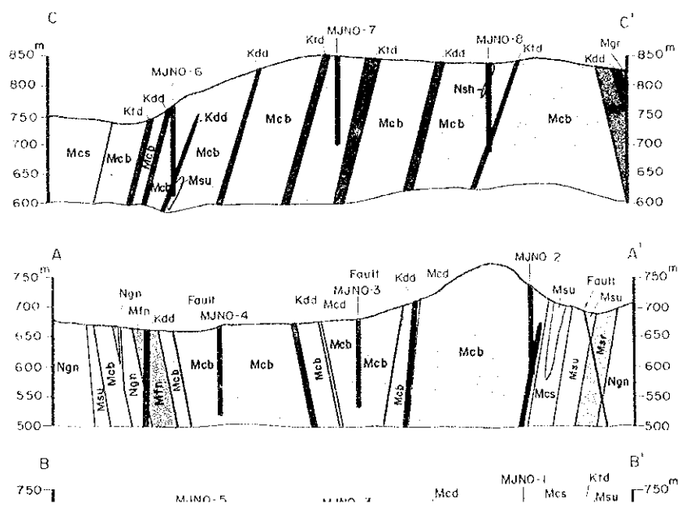




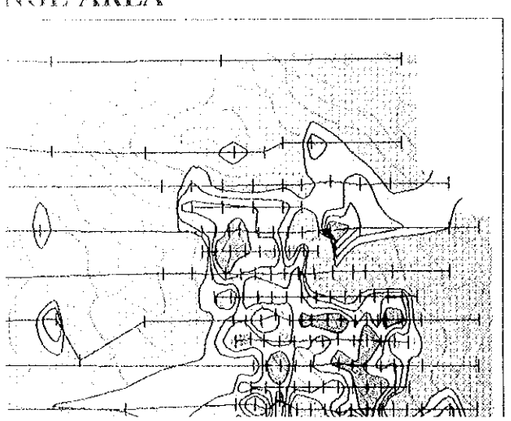
Survey line & Sampling site

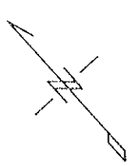


GEOLOGICAL SECTIONS OF THE ORANGE AREA



(Nb) DISTRIBUTUION OF NGE AREA





Post- to Syn-Karoo Intrusions
- Trachyte dyke
- Dolerite dyke

Marinkas Quelle Carbonatite Complex (MQC)
- Granophyres and Micro-granite
- Carbonatite dyke (calcitic- to ankeritic-)
- Massive fenite
- Mcb — Ankeritic beforsite
- Msu — Syenite (undifferentiated)
- Msr — Reddish porphyritic nepheline syenite
- Msn — Micro nepheline syenite sill with dip
- Mcs — Sovite
- Msp — Porphyritic nepheline syenite (REE bearing)
- Msw — Grey-white porphyritic syenite

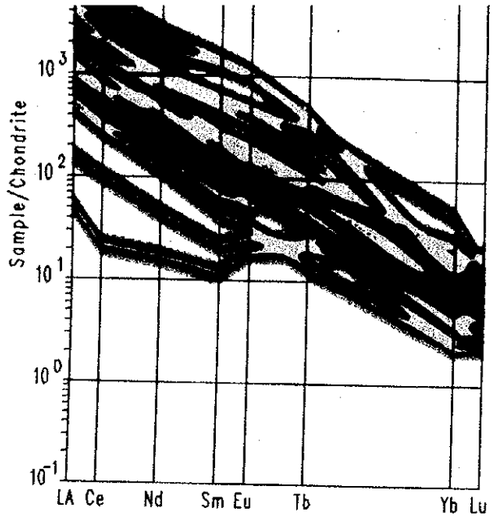
Nama Group
- Shale, Quartzite and Grit

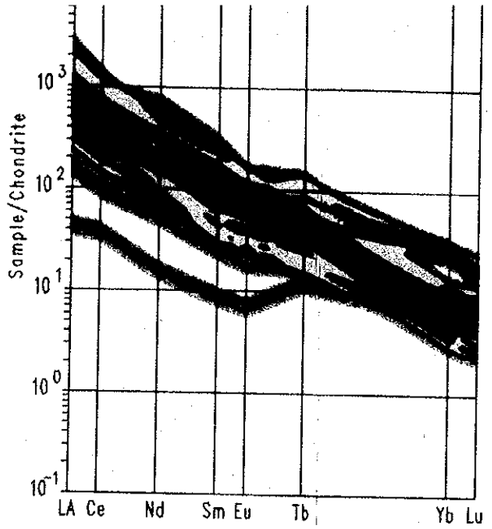
Gariep Group
- Dolerite dyke

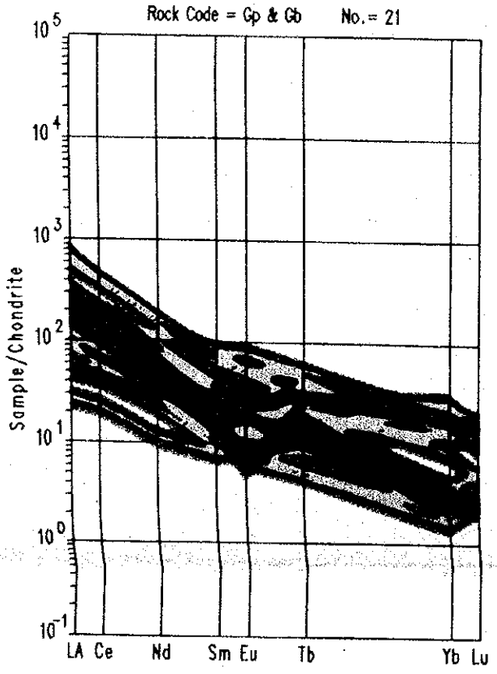
Namaqua Metamorphic Complex
- Ngn — Quartz-feldspar gneiss

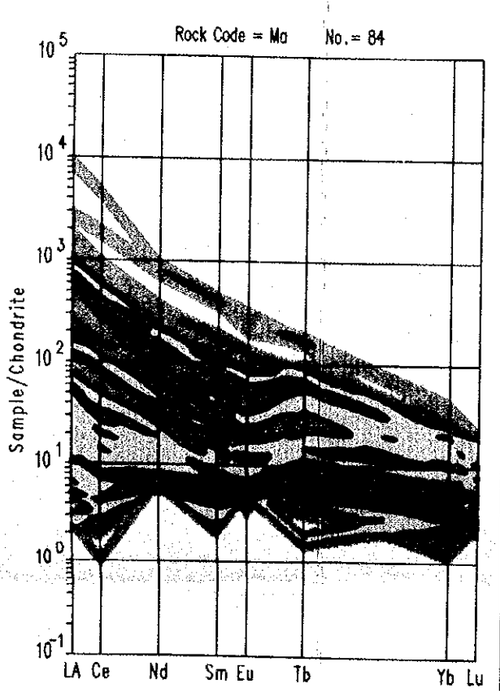
- Fault
- Strike and Dip and strike of banding structure of the MQC
- Strike and Dip of foliation and cleavage in gneiss
- Truck
- Dry river
- A — A' Geological section
- Drilling site

0 100 200 300 400 500
(meters)

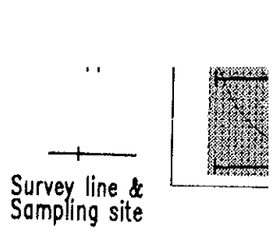




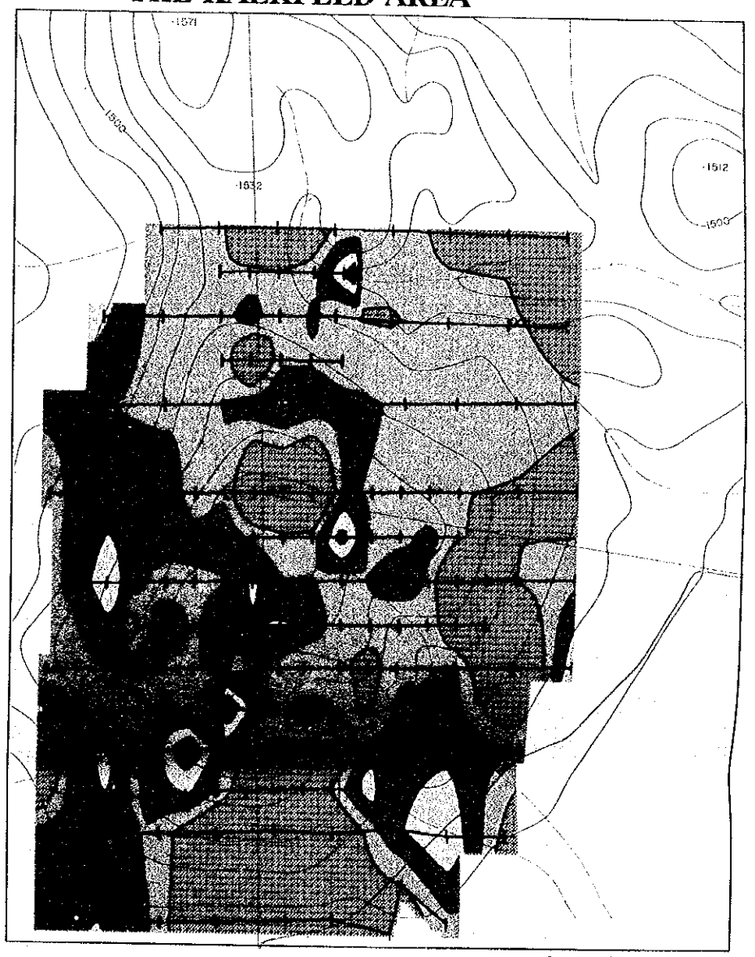


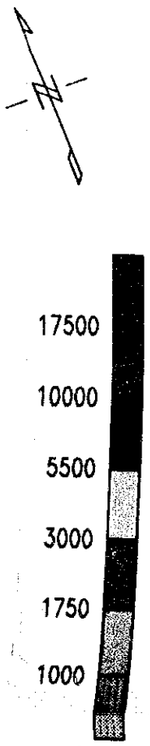


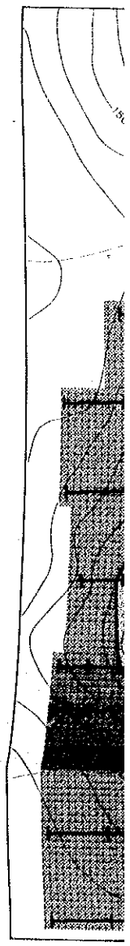
Rock codes are same as in the geological map of the Kalkfeld area.



STRONTIUM (Sr) DISTRIBUTION OF THE KALKFELD AREA







GEOCHEMICAL STATISTICS OF THE KALKFELD AREA

GEOCHEMICAL STA

Rock Code	Nos.	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu		

100 0 100 200
(meters)

Survey line &
Sampling site

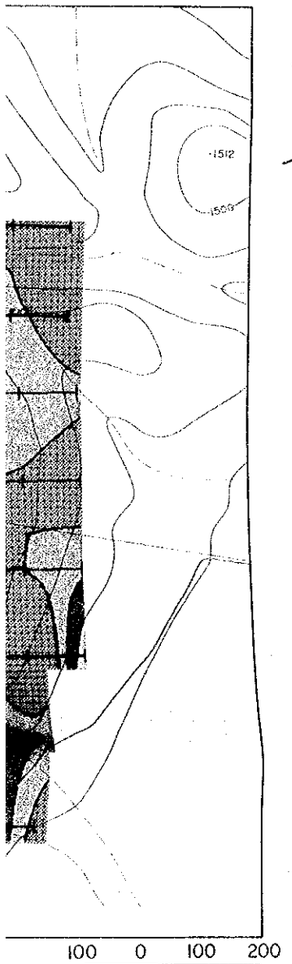
in ppm

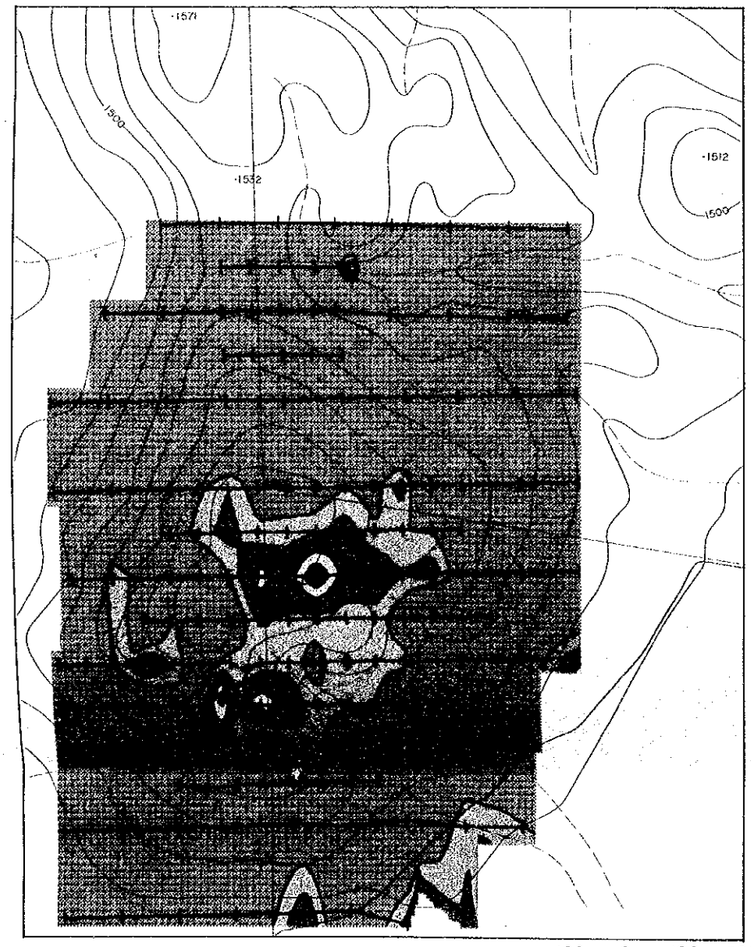
100 0 100 200
(meters)

Survey line &
Sampling site

BUTION OF

THORIUM (Th) DISTRIBUTUION OF
THE KALKFELD AREA





17500
10000
5500
3000
1750
1000

Sr in ppm

5000
2000
1000
500
200
100

Th in ppm

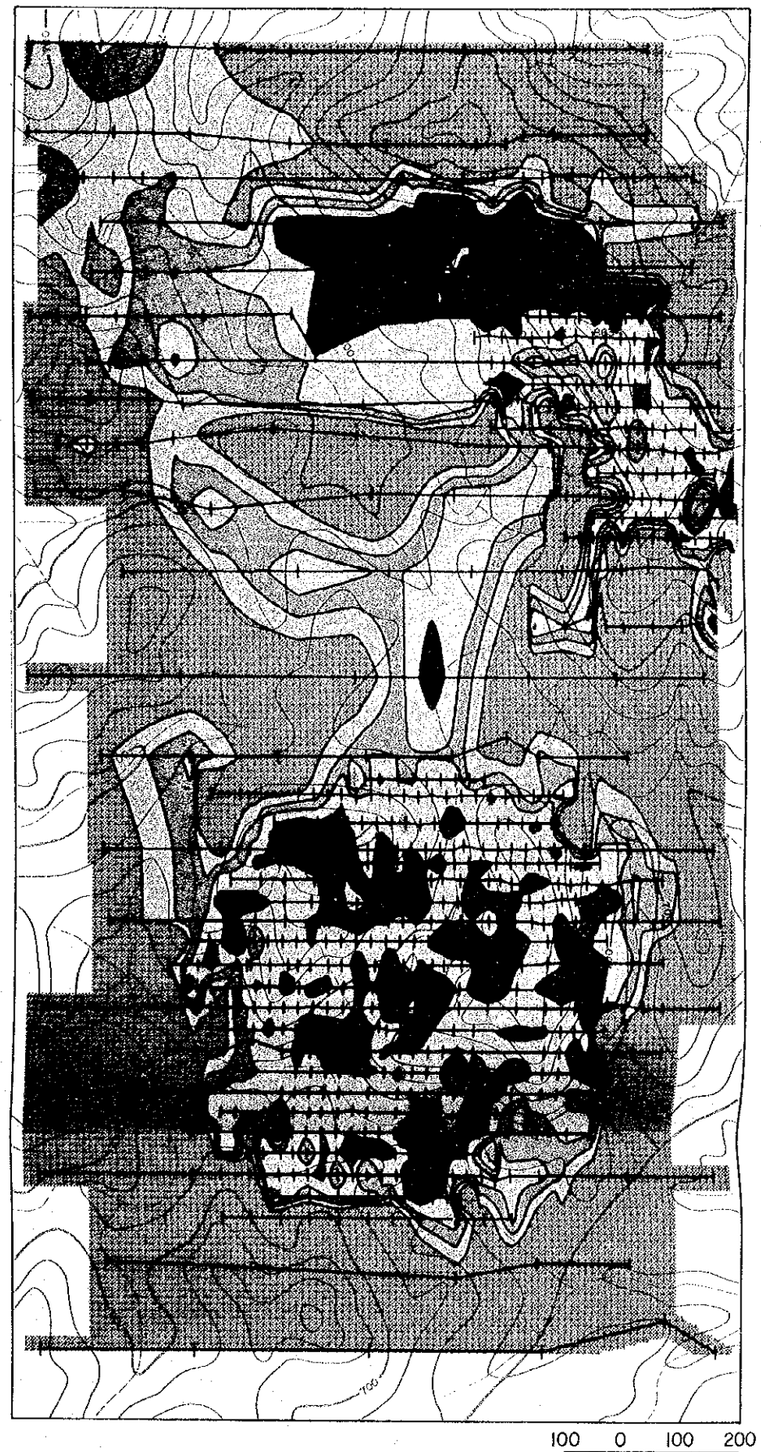
100 0 100 200
(meters)

Survey line &
Sampling site

100 0 100 200
(meters)

Survey line &
Sampling site

THE ORANGE AREA



1750
1000
550
300
175
100

Sr

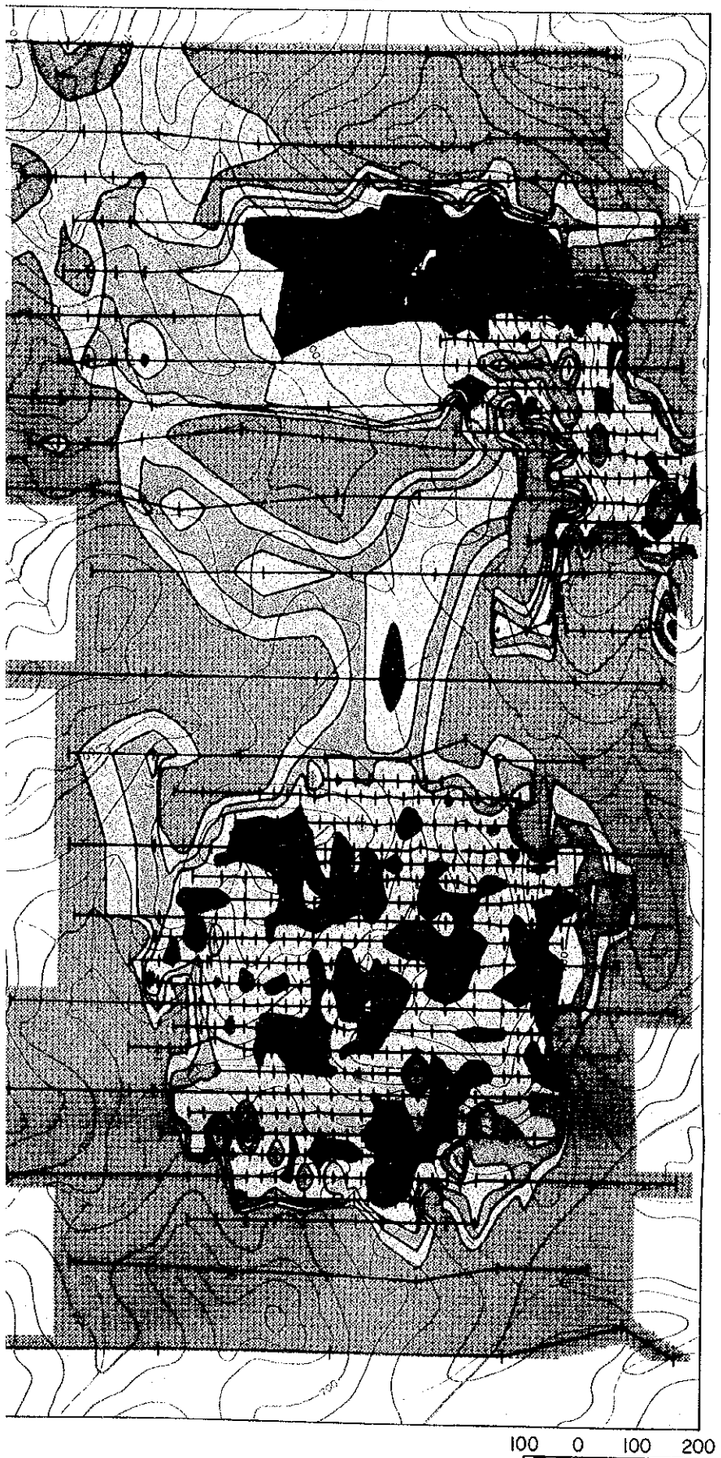
Surv
Sam

100 0 100 200
(meters)

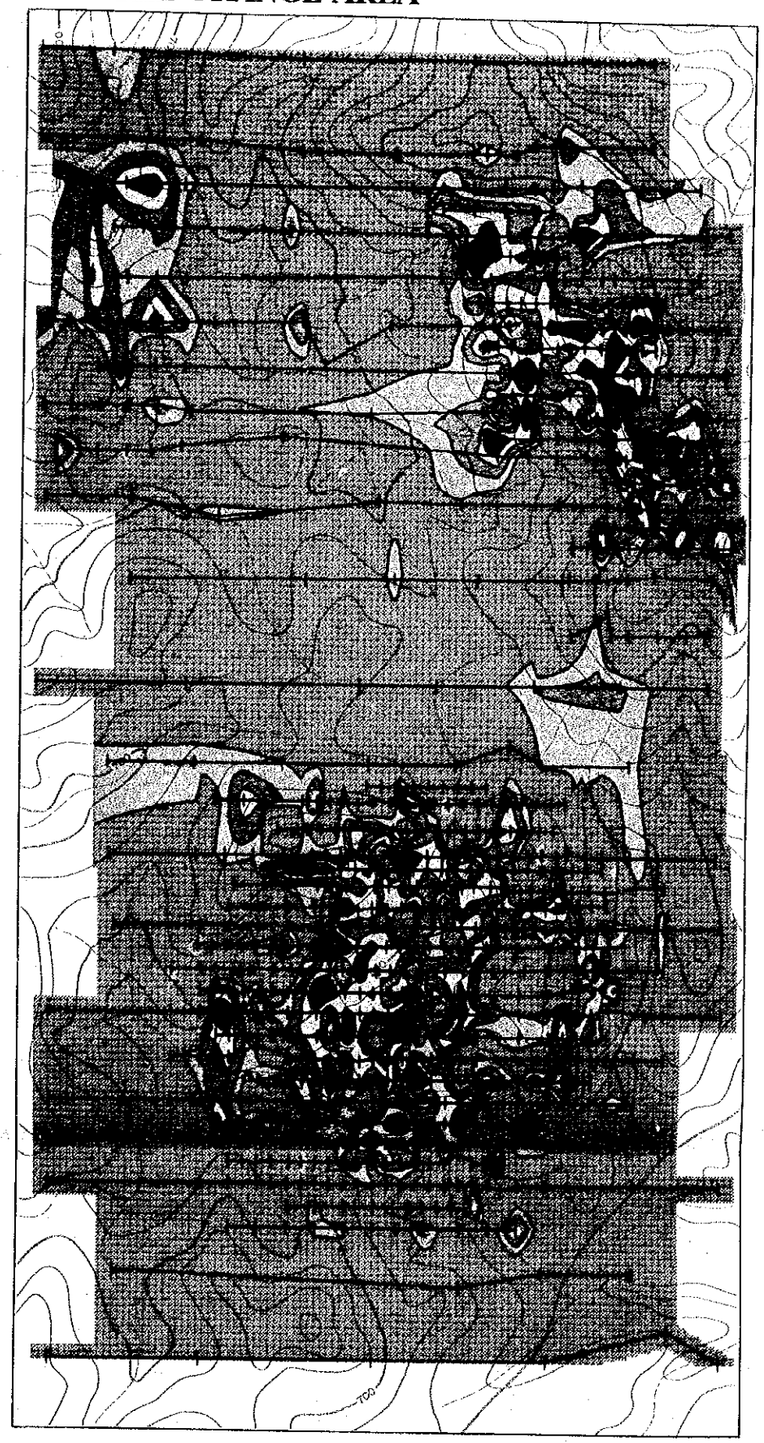
GEOCHEMICAL STATISTICS OF THE ORANGE AREA

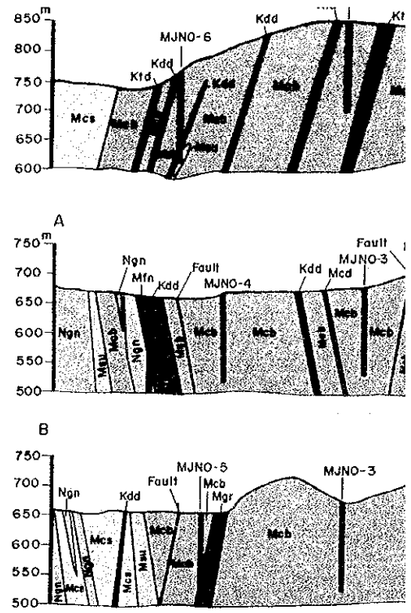
GEOCHEMICAL DISTRIBUTION ALONG I

THE ORANGE AREA

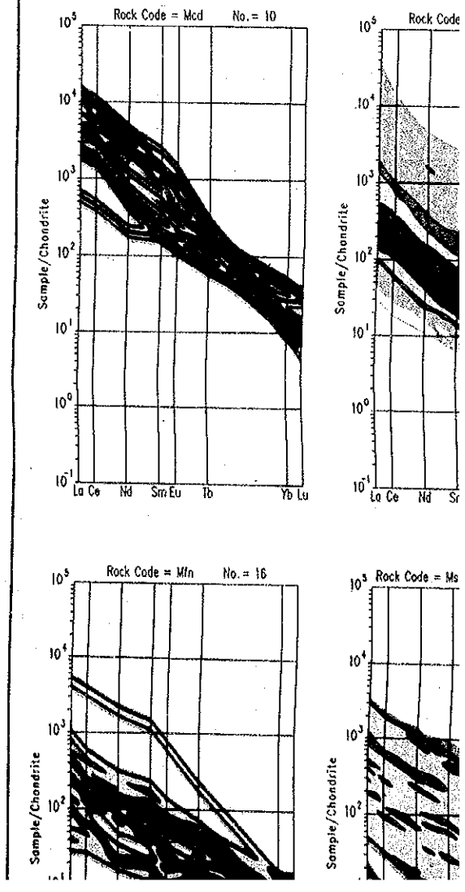


THE ORANGE AREA





RARE EARTH ELE



GEOCHEMICAL DISTRIBUTION ALONG DRILLING CORES OF THE ORANGE AREA