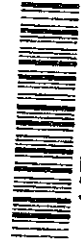


REPORT
ON
THE COOPERATIVE MINERAL EXPLORATION
IN
THE CHILWA ALKALINE AREA
REPUBLIC OF MALAWI

PHASE I



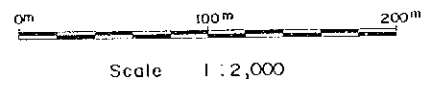
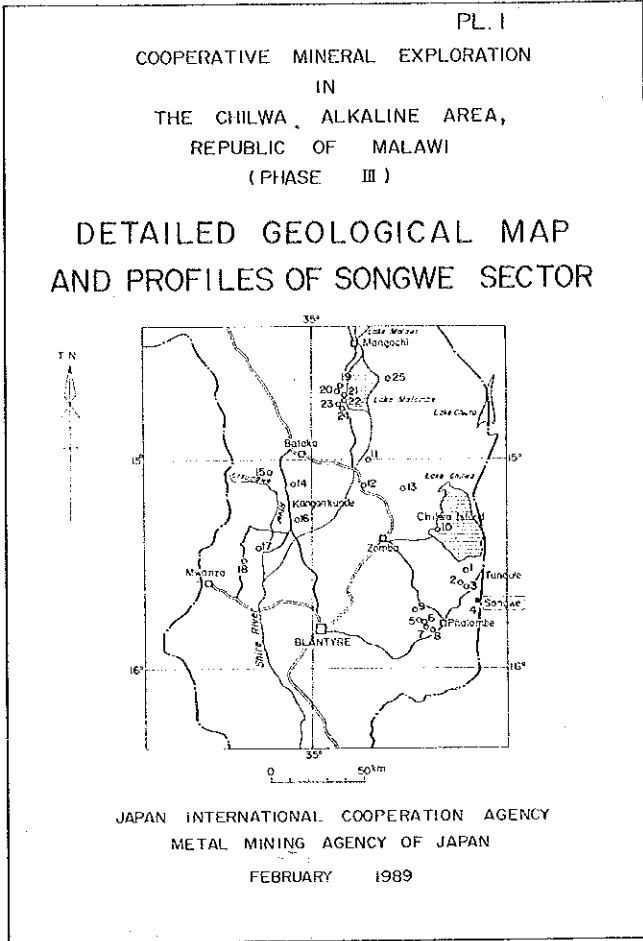
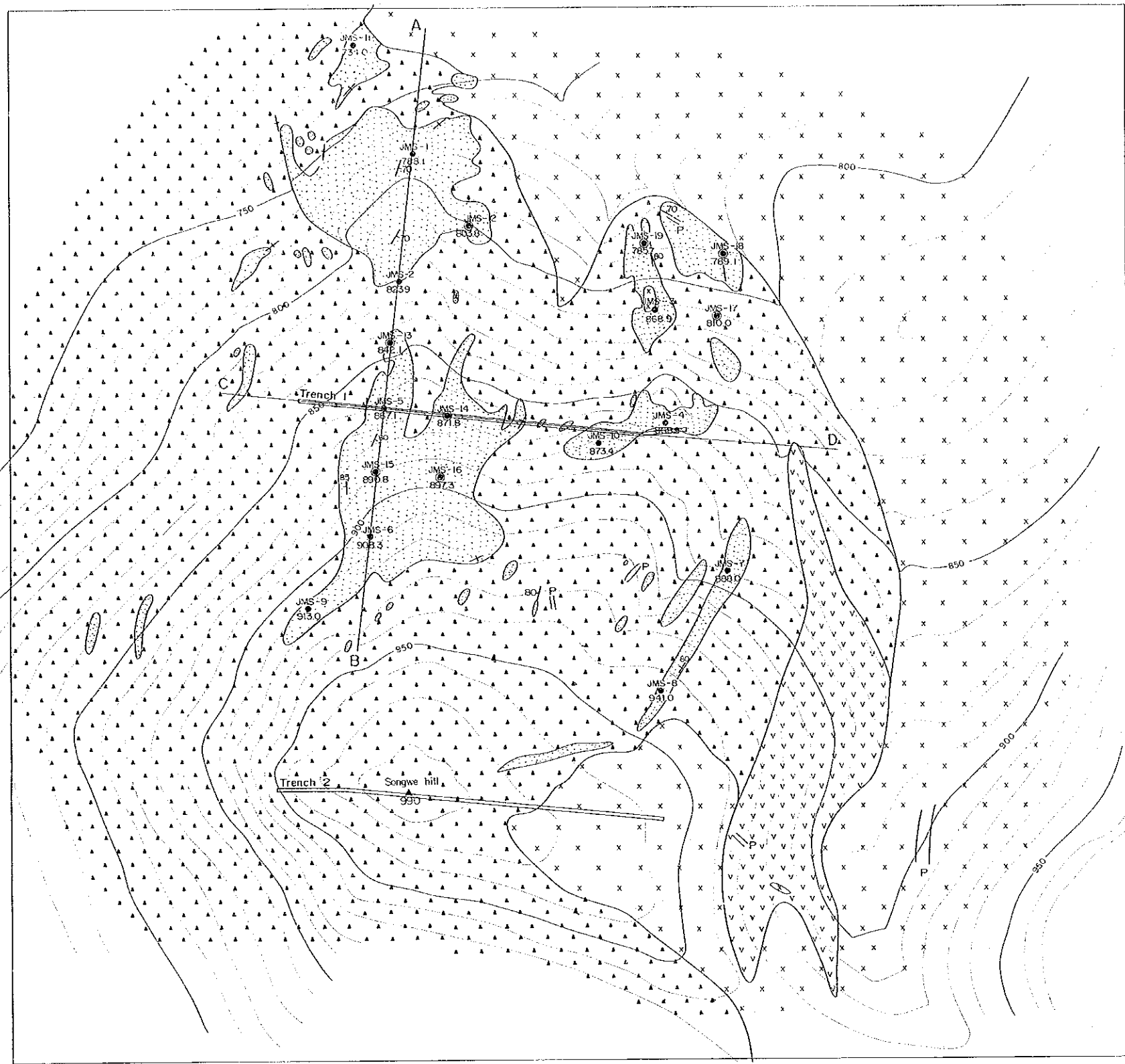
JICA LIBRARY



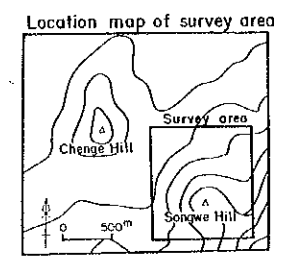
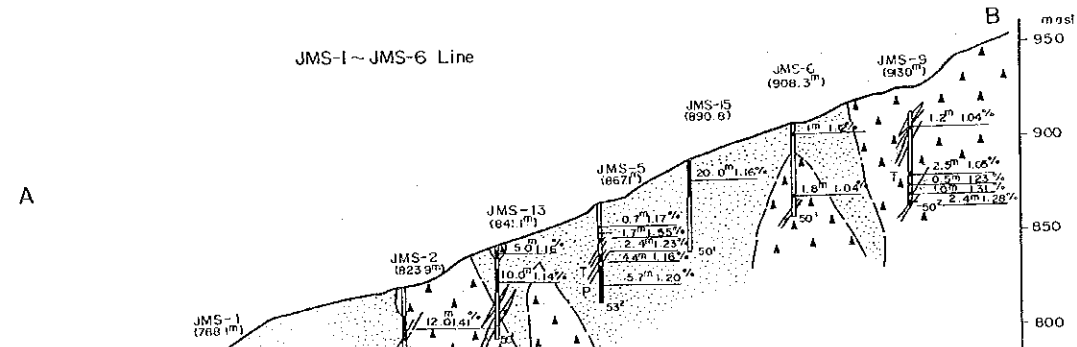
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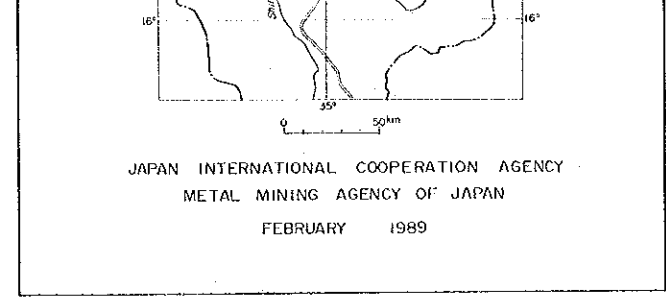
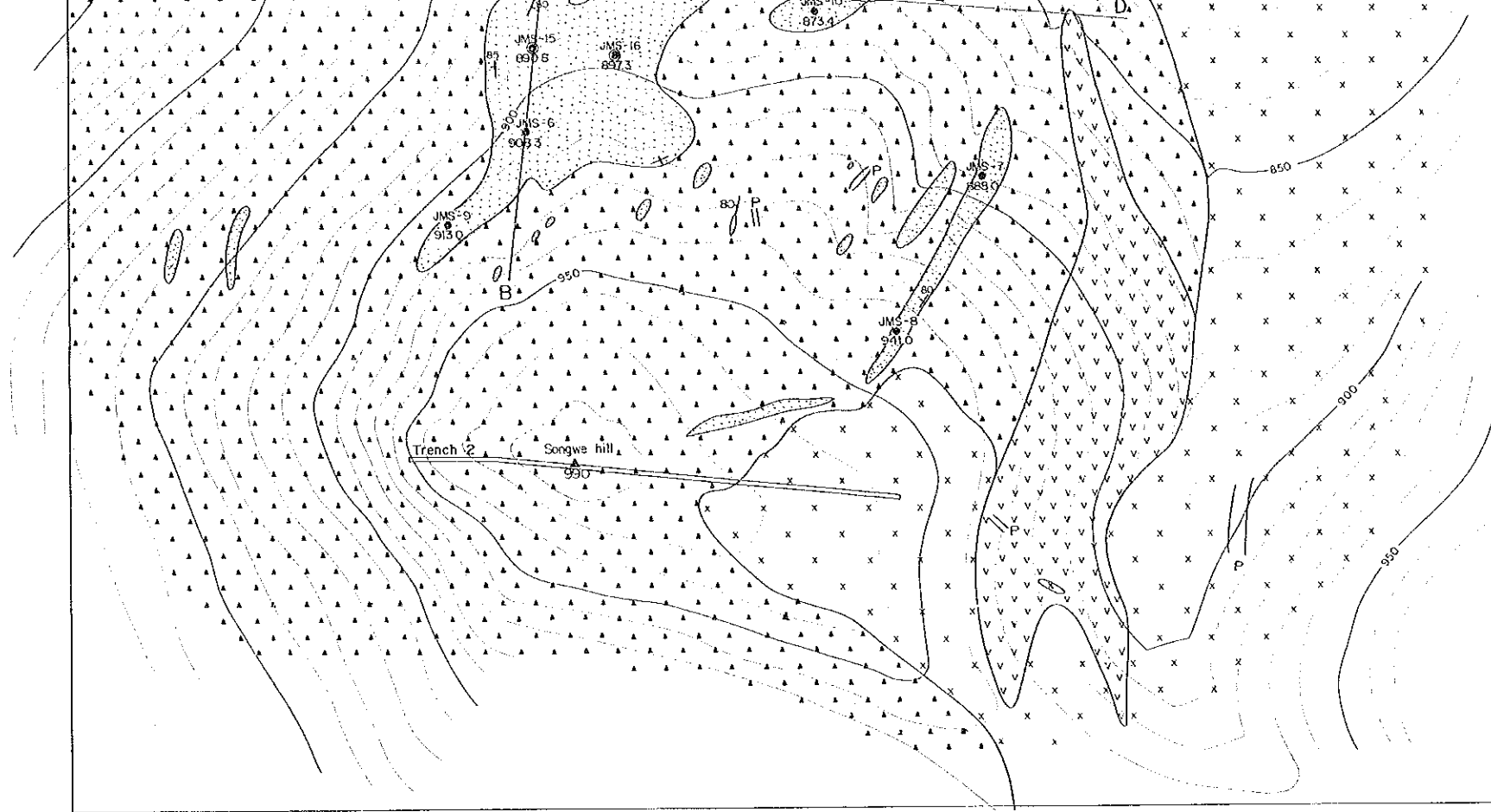
国際協力事業団

18730

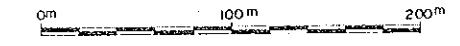


- LEGEND**
- Dyke
 - Carbonatite
 - Agglomerate feldspathic rock
 - Calc-silicate rock
 - Nepheline syenite
 - P : phonolite
- Drilling site (1987)
⊙ Drilling site (1988)
- | Thickness ^m | REO% |
|------------------------|----------------------|
| 50.1 | (La, Ce, Nd, Sm, Eu) |
| (Depth ^m) | Tb, Y |
- Trench
 Profile line





JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1989



Scale 1 : 2,000

LEGEND

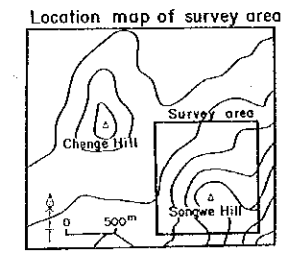
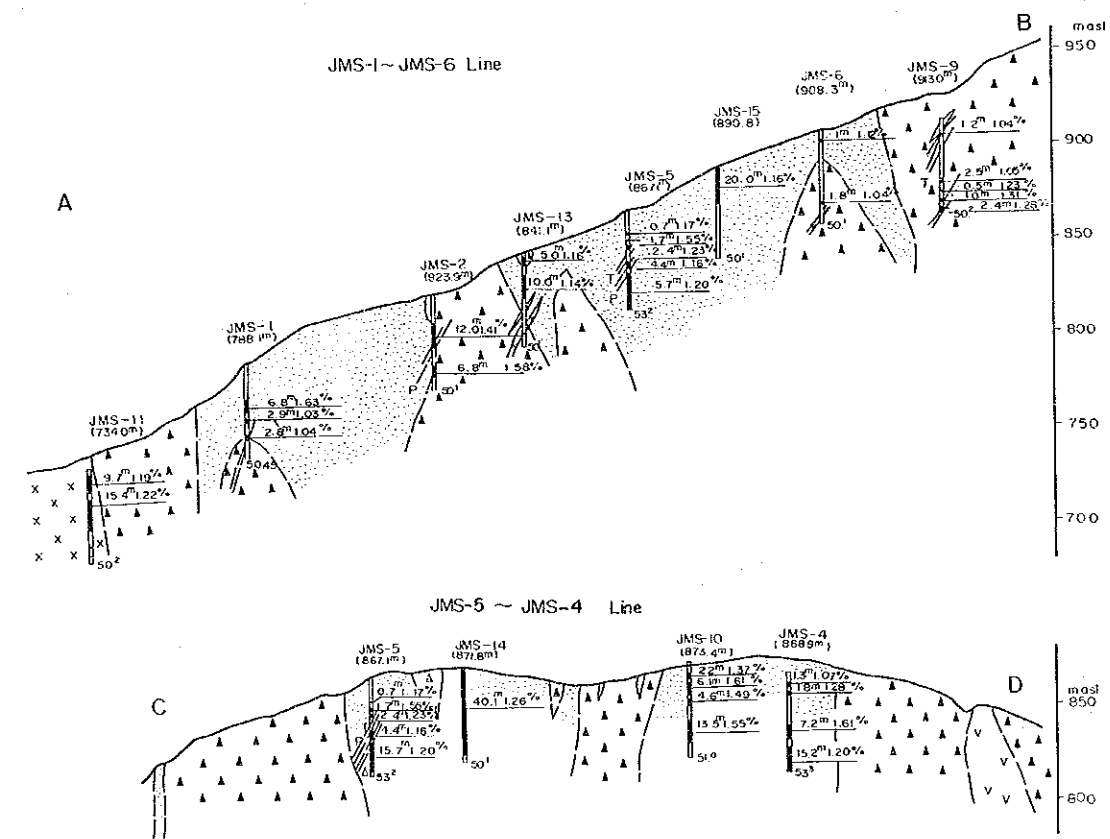
- Chilwa Alkaline Complex
- Dyke
 - Carbonatite
 - Agglomerate feldspathic rock
 - Calc-silicate rock
 - Nepheline syenite

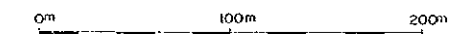
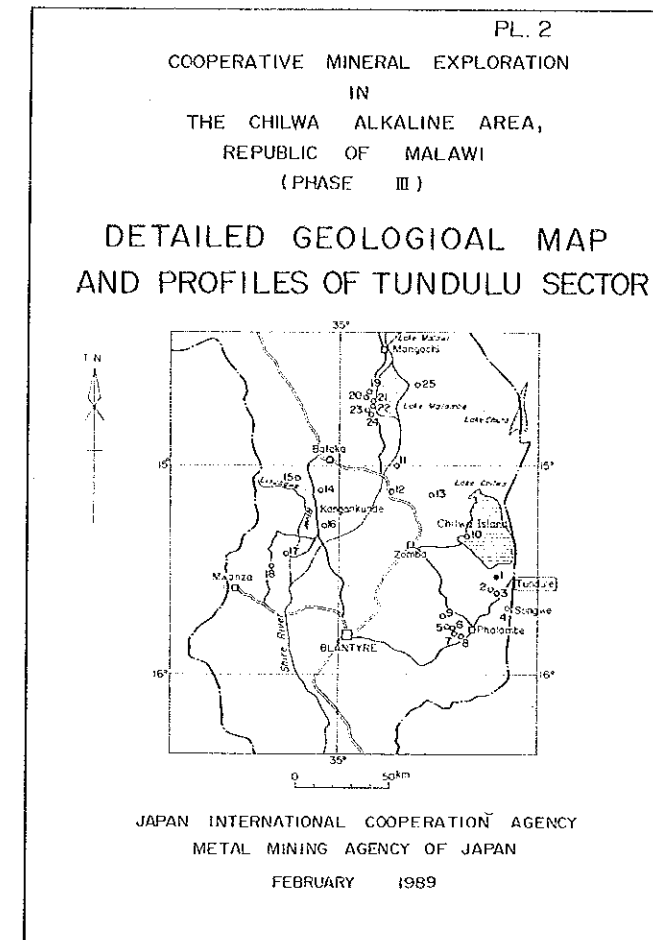
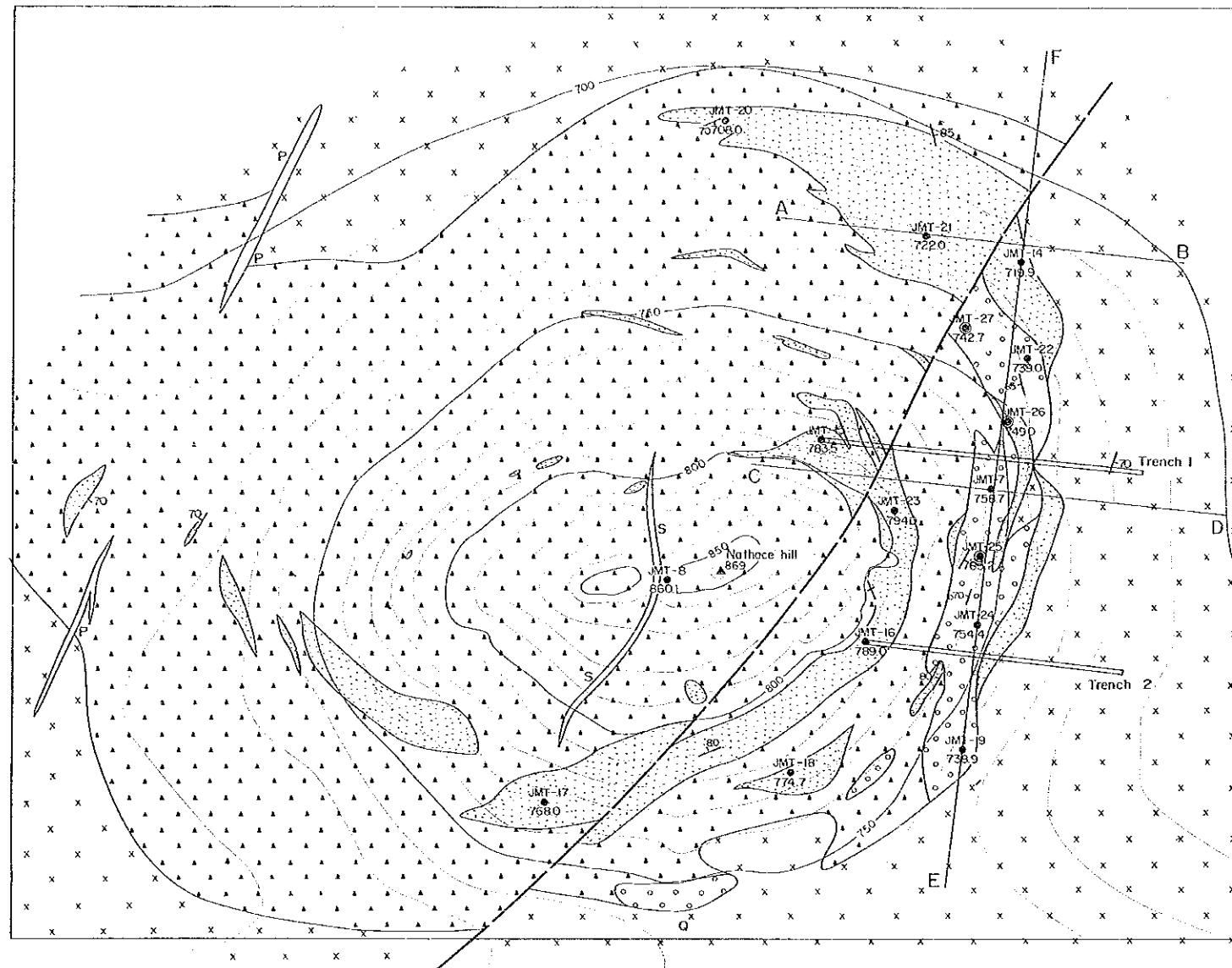
- Drilling site (1987)
- ⊙ Drilling site (1988)

Thickness^m REO%
(Depth^m) (La, Ce, Nd, Sm, Eu, Tb, Y)

— Trench

A-B Profile line





Scale 1 : 2,000

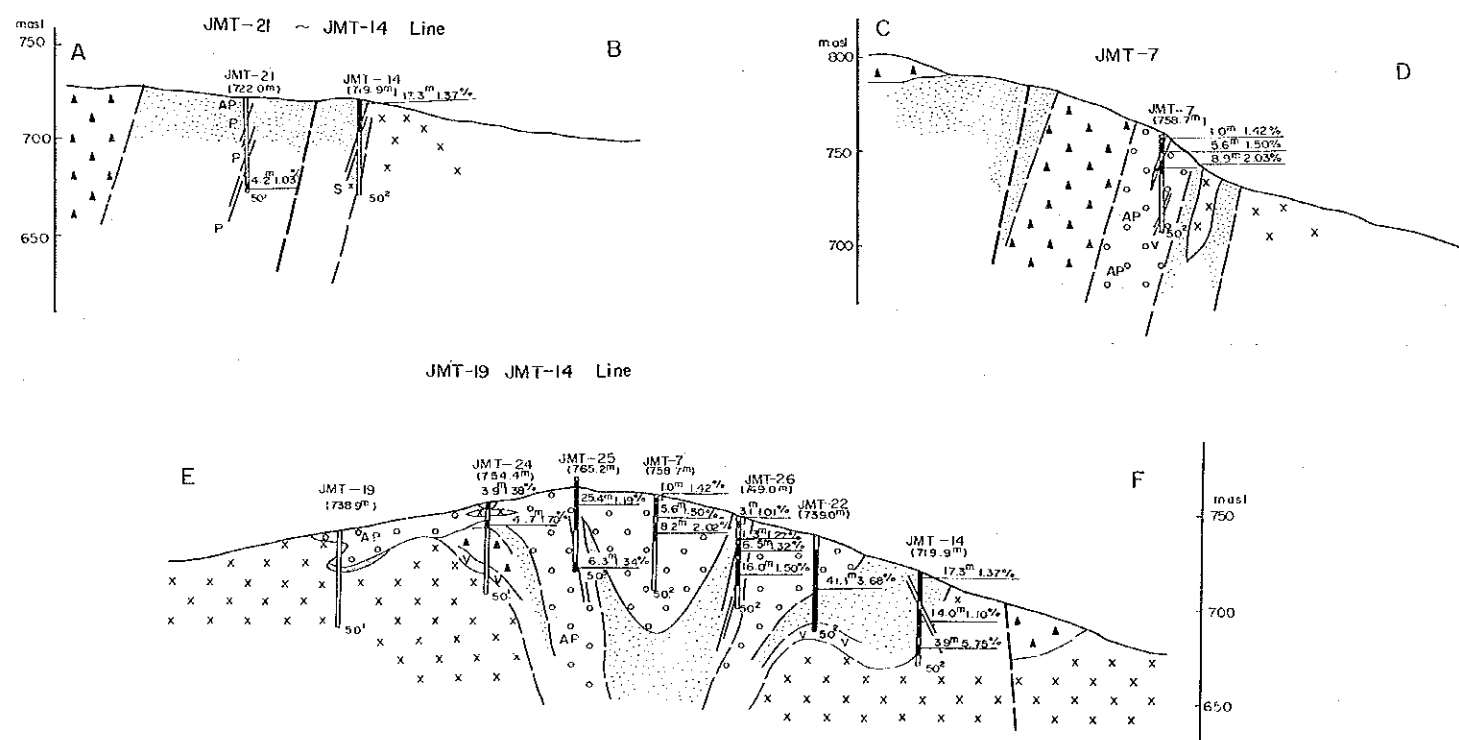
LEGEND

- Chilwa Alkaline Complex
- Dyke plug
 - Carbonatite
 - Apatite rock
 - Agglomerate / feldspathic rock
 - Calc-silicate rock
 - Nepheline syenite
- P : phonolite
 S : solvsbergite

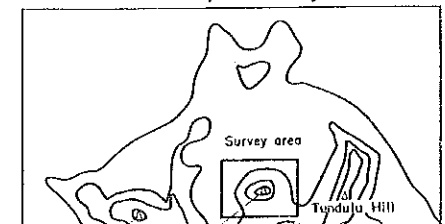
- Drilling site (1987)
- ⊙ Drilling site (1980)

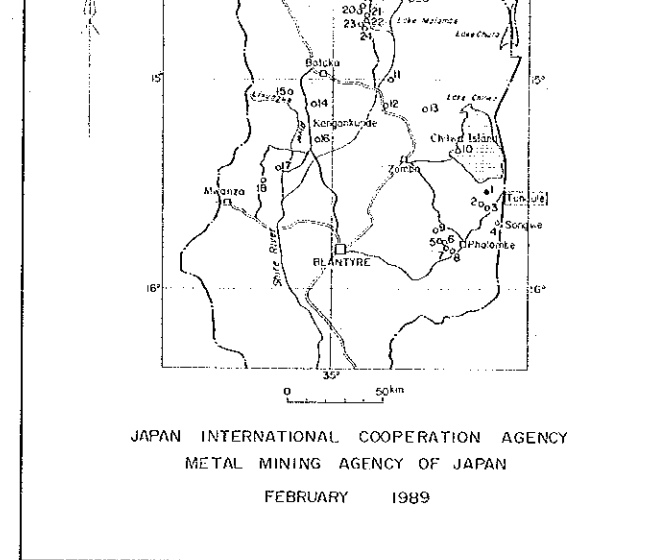
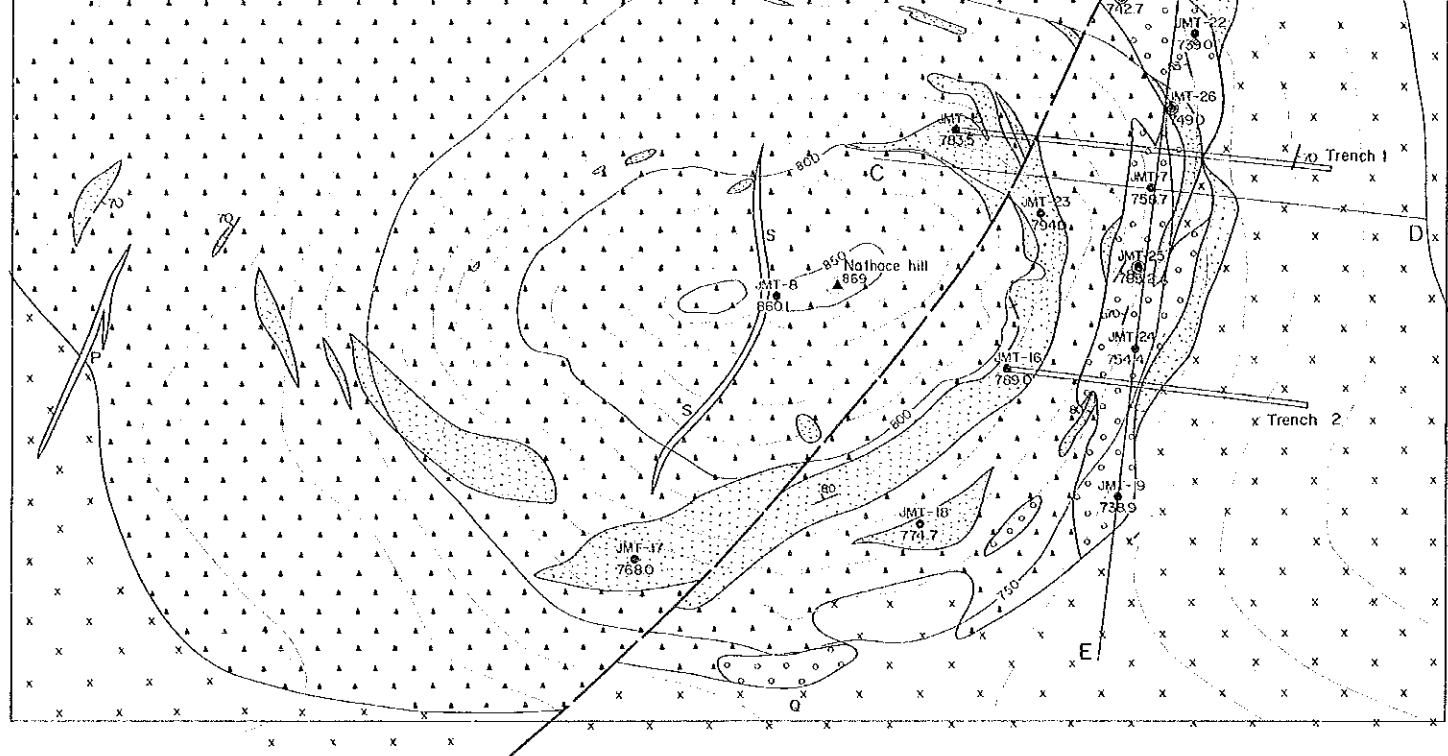
Thickness, m REO%
 50.1 (La, Ce, Nd, Sm, Eu)
 (Depth^m)
 Trench

A B Profile line



Location map of survey area





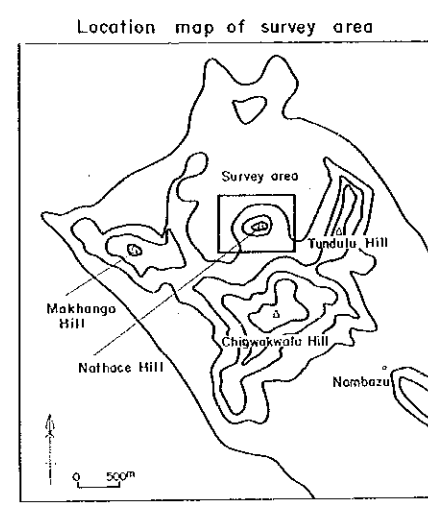
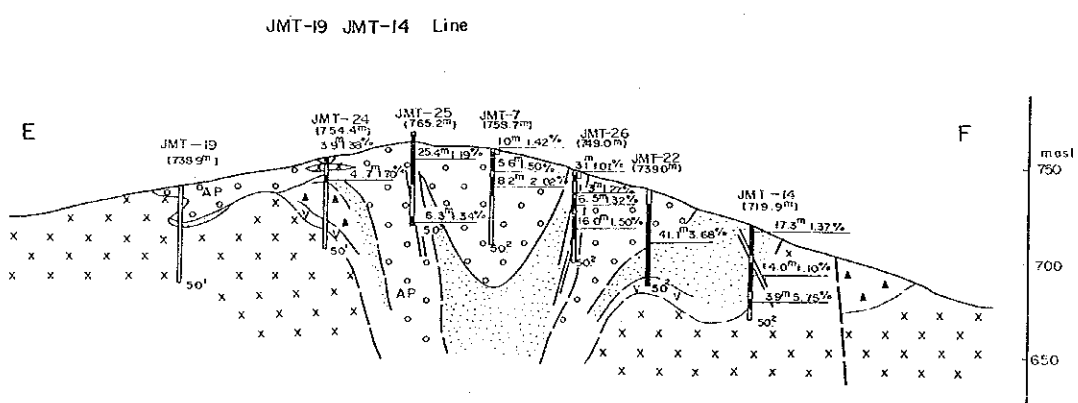
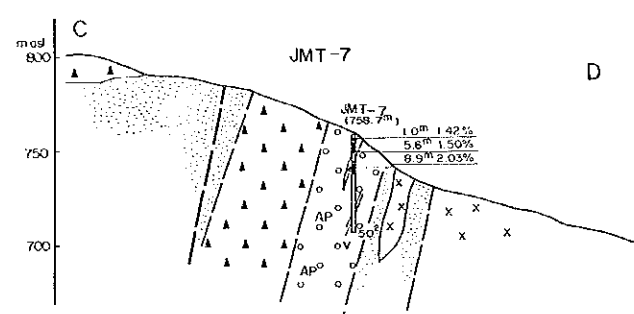
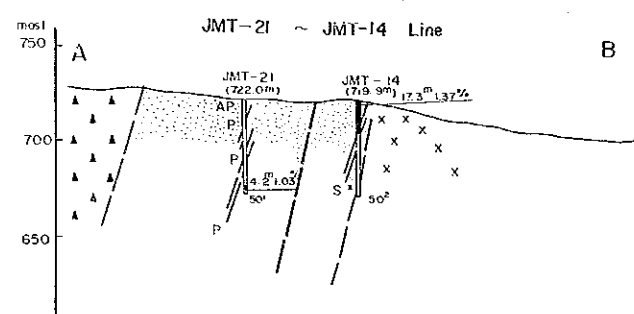
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1989



Scale 1 : 2,000

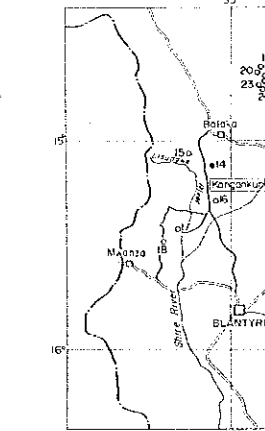
LEGEND

- Dyke plug
 - Carbonatite
 - Apatite rock
 - Agglomerate / feldspathic rock
 - Calc-silicate rock
 - Nepheline syenite
 - Fault
 - Drilling site (1987)
 - Drilling site (1980)
- Chilwa Alkaline Complex
- | Thickness, m | REO% |
|-----------------------|----------------------|
| 50.1 | (La, Ce, Nd, Sm, Eu) |
| (Depth ^m) | Tb, Y |
- Trench
 - Profile line



COOPERATIVE MINING
IN
THE CHILWA ALKALINE
REPUBLIC OF MALAWI
(PHASE I)

GEOLOGICAL MAP
OF CHILWA ISLAND



JAPAN INTERNATIONAL COOPERATION
METAL MINING AGENCY
FEBRUARY 1988

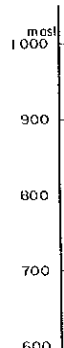
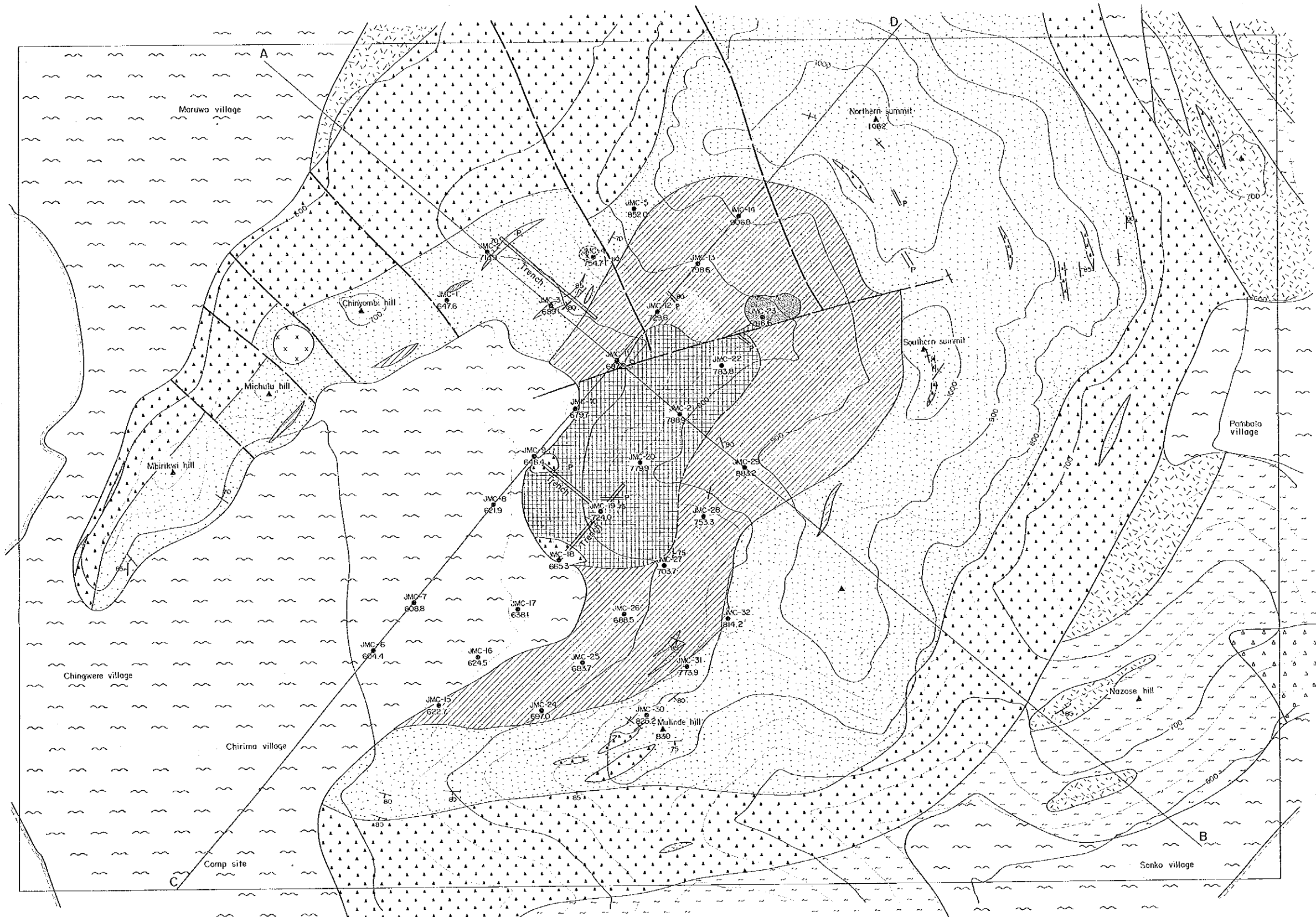


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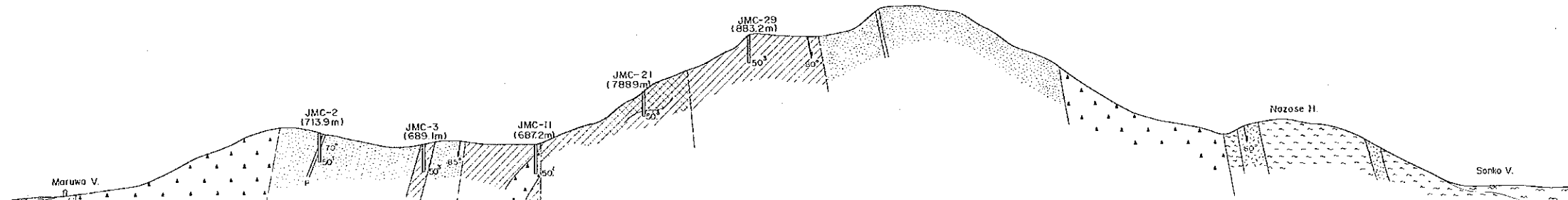
LEGEND

- Drift
- Dyke P: phonolite
- Lamprophyre
- Ankeritic sövite
- Ankeritic sövite and Sideritic carbonatite
- Sövite
- Feldspathic breccia
- Agglomerate
- Nepheline syenite
- Fertilized gneiss
- Fertilized syenite
- Fault

- Drilling site (1988)
- Trench
- Profile line



A



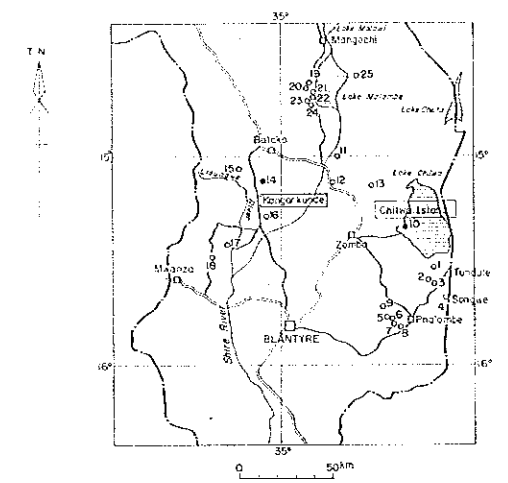
B

Location map of sur



PL. 3
 COOPERATIVE MINERAL EXPLORATION
 IN
 THE CHILWA ALKALINE AREA,
 REPUBLIC OF MALAWI
 (PHASE II)

GEOLOGICAL MAP AND PROFILES
 OF CHILWA ISLAND SECTOR



JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN
 FEBRUARY 1989

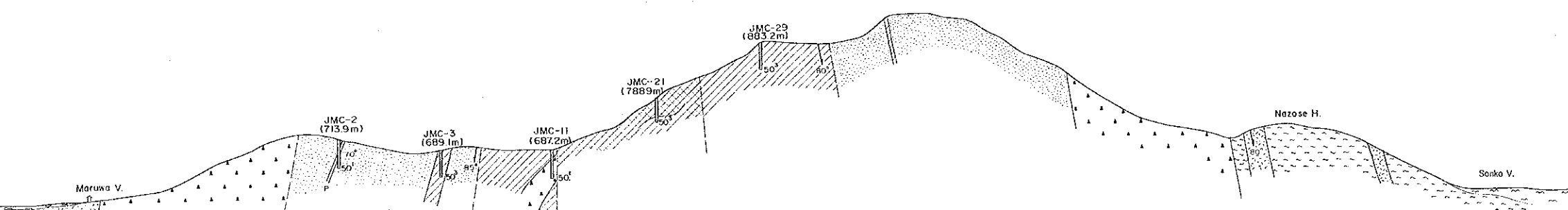
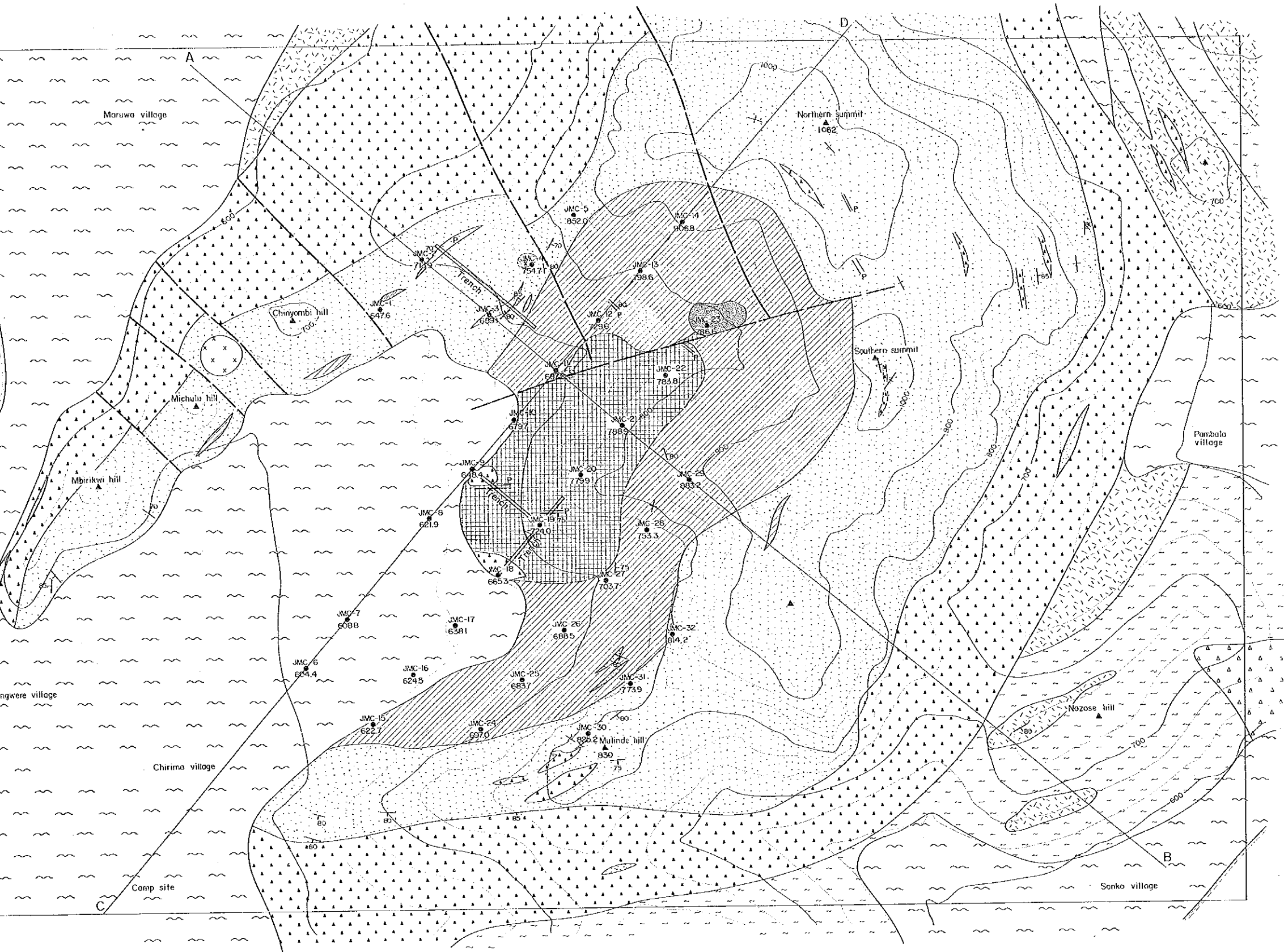
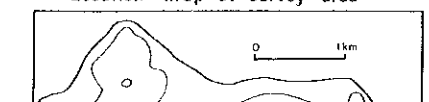
0m 250m 500m
 Scale 1 : 5,000

LEGEND

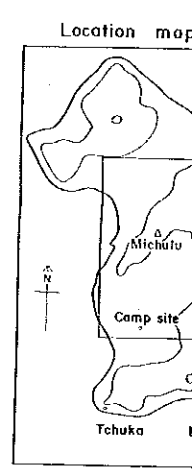
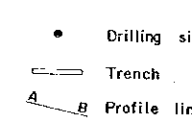
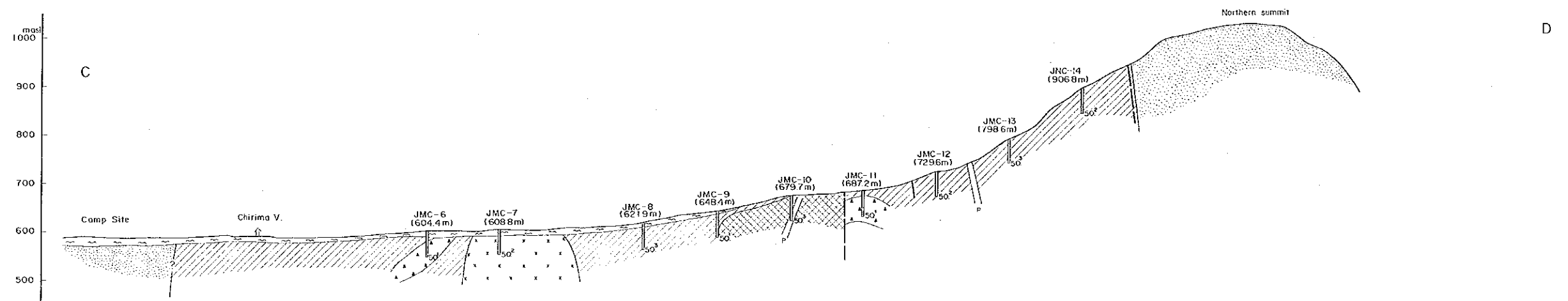
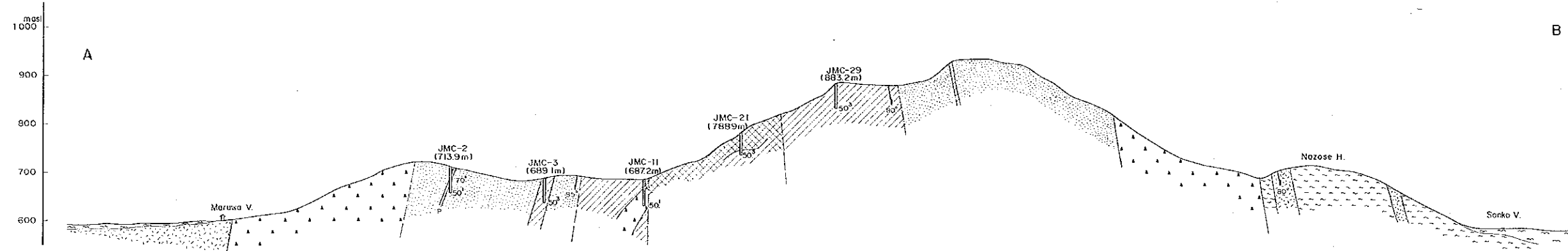
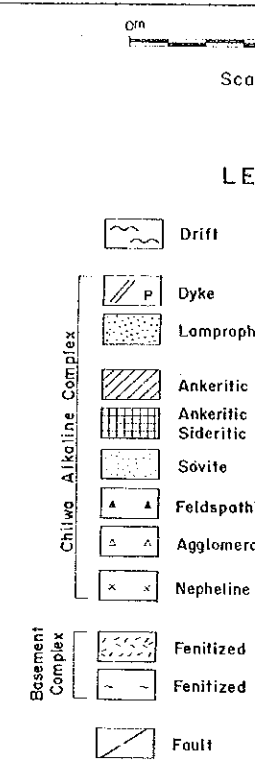
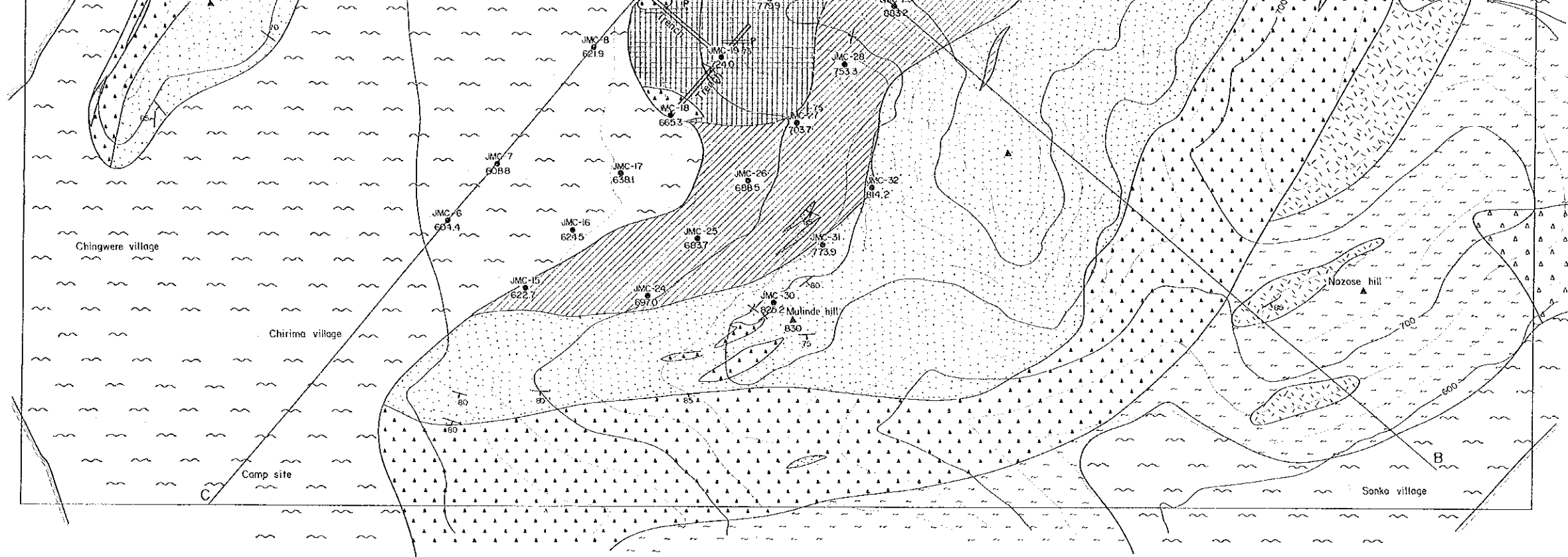
- Drift
- Dyke P: phonolite
- Lamprophyre
- Ankeritic sövite
- Ankeritic sövite and Sideritic carbonatite mixed zone
- Sövite
- Feldspathic breccia
- Agglomerate
- Nepheline syenite
- Basement Complex
- Fenitized gneiss
- Fenitized syenite
- Fault

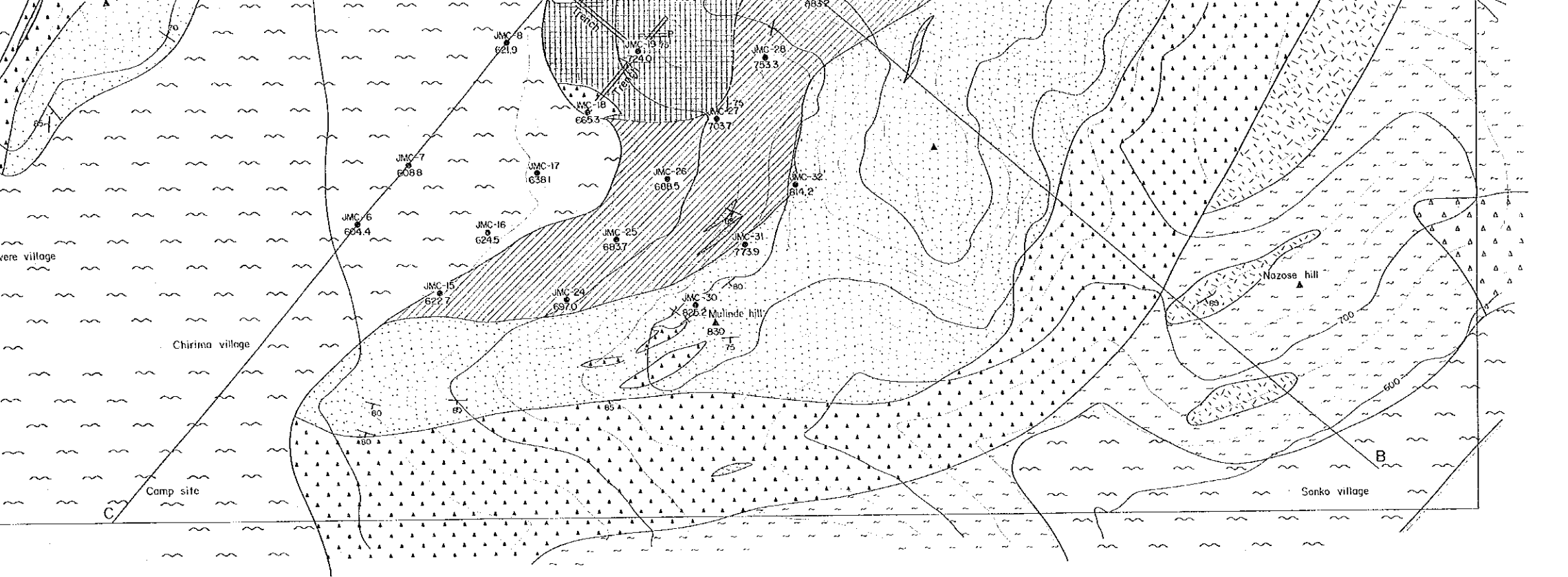
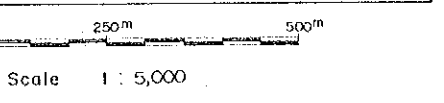
- Drilling site (1988)
- Trench
- A-B Profile line

Location map of survey area



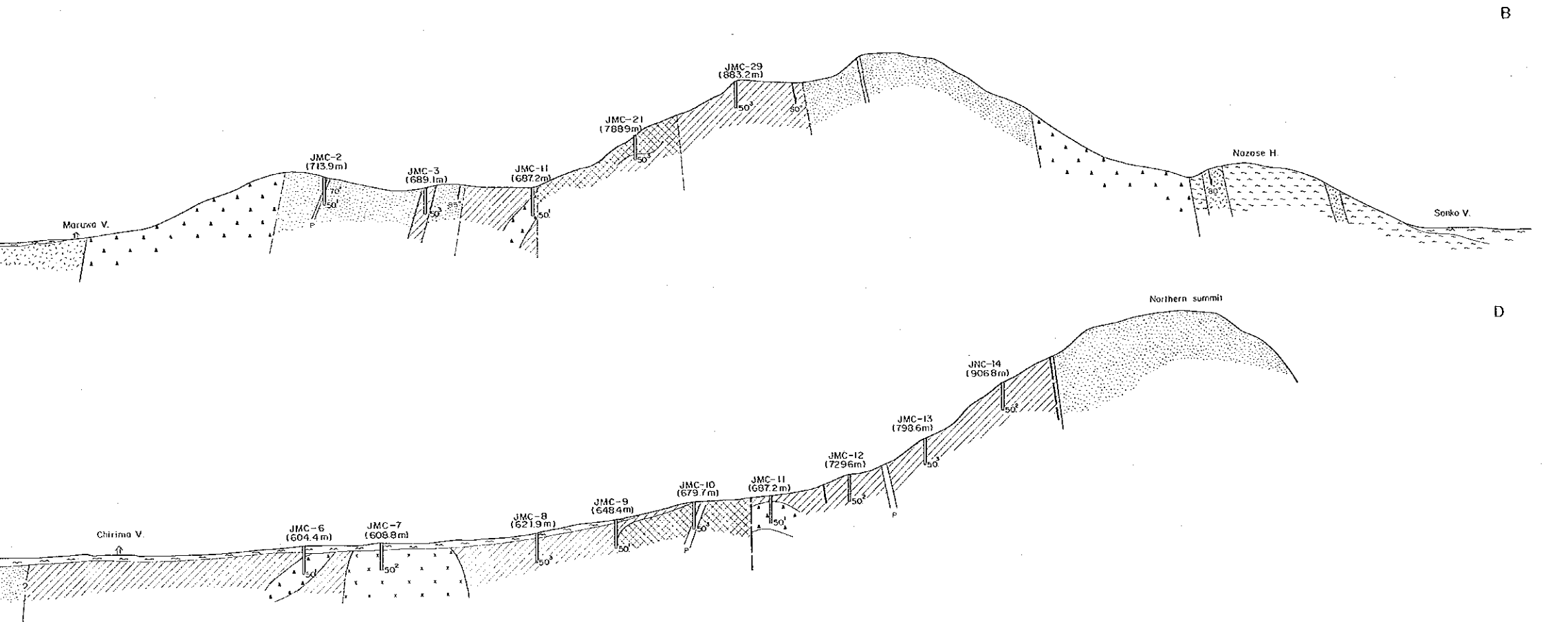
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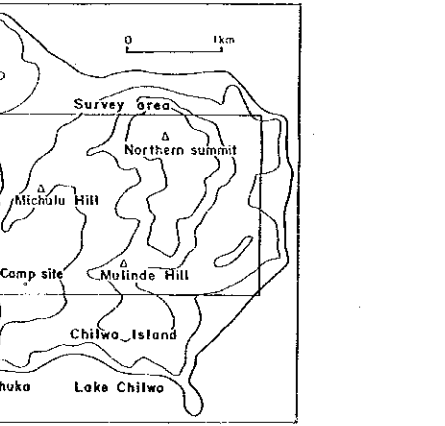


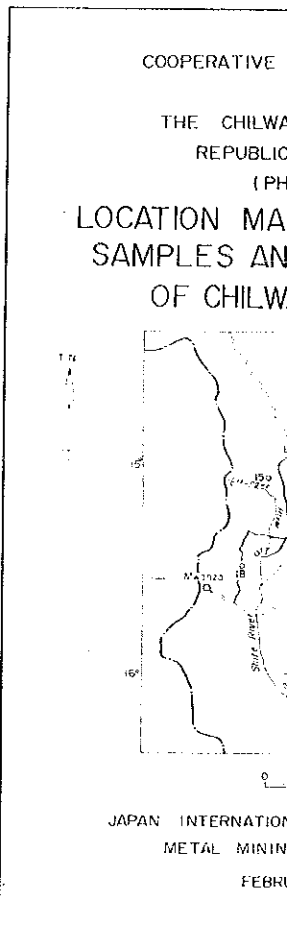
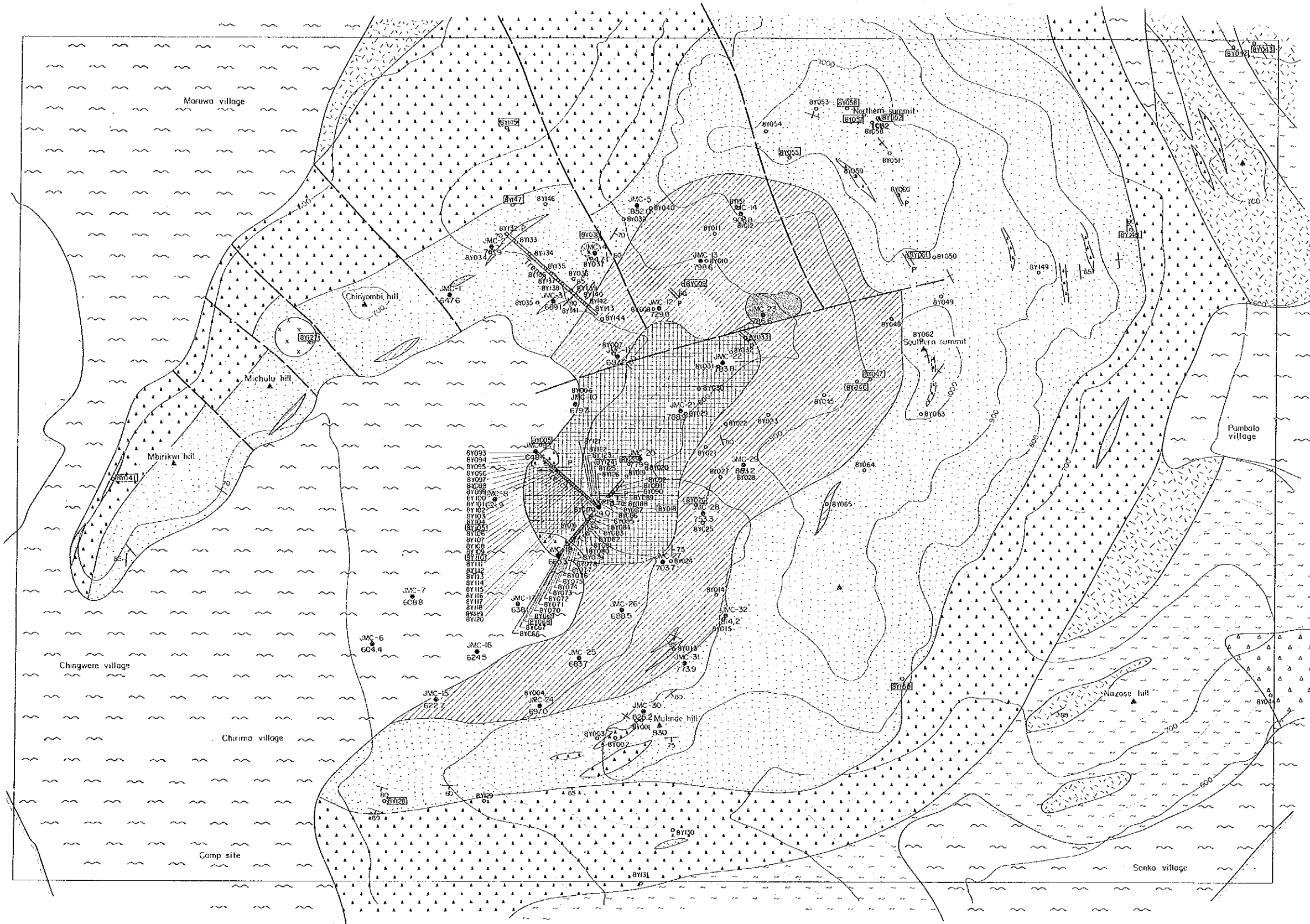
LEGEND

- Drift
- Dyke P: phonolite
- Lamprophyre
- Ankeritic sövite
- Ankeritic sövite and Sideritic carbonatite mixed zone
- Sövite
- Feldspathic breccia
- Agglomerate
- Nepheline syenite
- Fenitized gneiss
- Fenitized syenite
- Fault
- Drilling site (1988)
- Trench
- Profile line



Location map of survey area

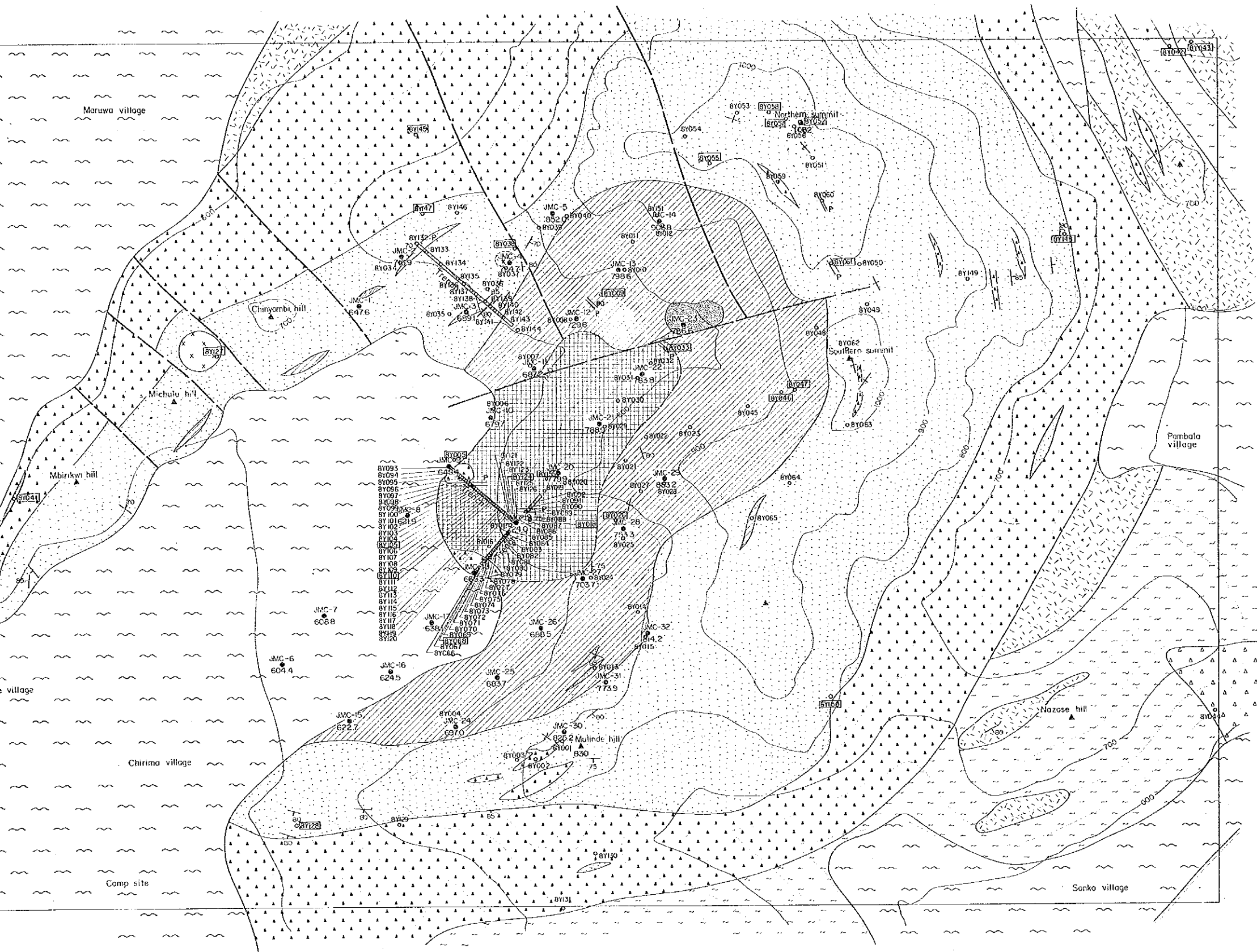




Scale
0m

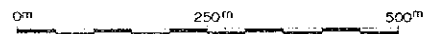
LEGEND

- Geochemical
- BY001 Geochemical
- BY001 Rock sample



PL. 4
 COOPERATIVE MINERAL EXPLORATION
 IN
 THE CHILWA ALKALINE AREA,
 REPUBLIC OF MALAWI
 (PHASE II)
 LOCATION MAP OF GEOCHEMICAL
 SAMPLES AND ROCK SAMPLES
 OF CHILWA ISLAND SECTOR

JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN
 FEBRUARY 1989



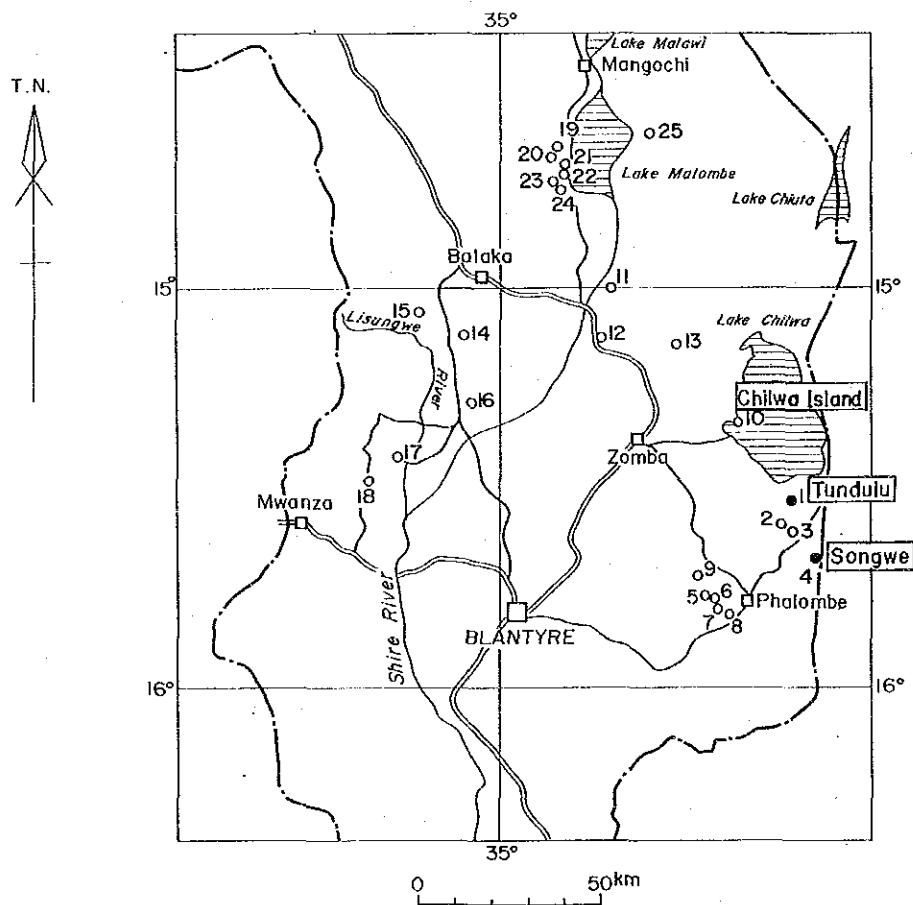
Scale 1 : 5,000

LEGEND

- Geochemical and rock sampling point
- BY001 Geochemical sample No.
- BY001 Rock sample No.

PL. 5
COOPERATIVE MINERAL EXPLORATION
IN
THE CHILWA ALKALINE AREA,
REPUBLIC OF MALAWI
(PHASE III)

GEOLOGICAL DRILL LOG
(1 / 200)



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

FEBRUARY 1989

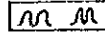



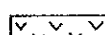
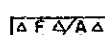
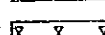
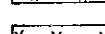
THE COOPERATIVE MINERAL EXPLORATION
IN
THE CHILWA ALKALINE AREA
REPUBLIC OF MALAWI
(PHASE III)

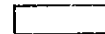
GEOLOGIC DRILL LOG
DDH JMC-2



Elevation 713.9m
Total Depth 50.1m
Inclination - 90°



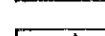
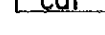
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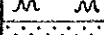
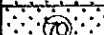

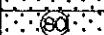


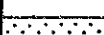





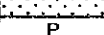

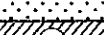



LEGEND

-  Drift
-  Sideritic carbonatite
-  Ankeritic sövite
-  Sövite
-  Carbonate-silicate rock
-  F:Feldspathic breccia, A:Agglomerate
-  Syenite
-  Nepheline syenite

-  Dykes
- T— Trachyte
- P— Phonolite
- S— Sölvbergite
- D— Dolerite
- L— Lamprophyre

-  Joint, Fissure
-  % of carbonatite content

-  Manganese mineral
-  Hematite
-  Calcite
-  Apatite

Depth (m)	Geology	Lination	Description	Assay (ppm)																	
				Sample No.	Depth (m)	Thick-ness (m)	La	Ce	Nd	Sm	Eu	Tb	Nb	Sr	Y	P					
0.70			Feldspathic br. bearing brown to gray sövite		0.70																
4.00			Drusy feld. br. bearing sövite	C0201	6.50	6.50	736	1349	348	51.8	21.3	10.0	1336	5369	189	32492					
5.30			Feld. bre. bearing sövite																		
7.20			Drusy sövite		7.20																
8.00			Drusy sövite	C0202	4.00	4.00	861	1490	405	75.3	21.7	5.7	2161	2423	129	8024					
11.20		80°	Light brown limonitized phonolite	C0203	11.20	1.80	175	322	70	14.7	5.7	<0.1	286	1532	69	1370					
13.00				C0204	13.00	3.80	514	908	241	26.6	16.9	<0.1	1194	7401	117	6172					
16.80		70°	Limonitized phonolite		16.80																
20.30			Dark gray porphyritic phonolite	C0205	14.20	14.20	92	183	39	6.0	3.1	<0.1	261	324	33	532					
27.00			Light brown limonitized phonolite																		
31.00		70°	Gray mdg sövite with pyrite	C0206	31.00	5.40	651	1173	379	47.0	21.0	7.0	958	4088	137	4687					
33.20		60°	Greenish gray phonolite																		
33.90		60°	Feld. br. bearing gray to white mdg sövite with pyrite	C0207	36.40	1.10	785	1265	385	68.1	21.4	6.8	920	4180	159	11512					
36.40			38.5m galena																		
37.50			40.1 sphalerite																		
42.50				C0208	42.50	5.00	199	519	347	56.6	27.5	2.1	761	8011	114	1928					
47.50			48.0m galena	C0209	47.50	5.00	425	856	483	95.7	37.7	4.0	980	6819	157	3943					
50.10				C0210	50.10	2.60	671	1098	378	50.2	22.5	4.9	480	12045	130	5279					

