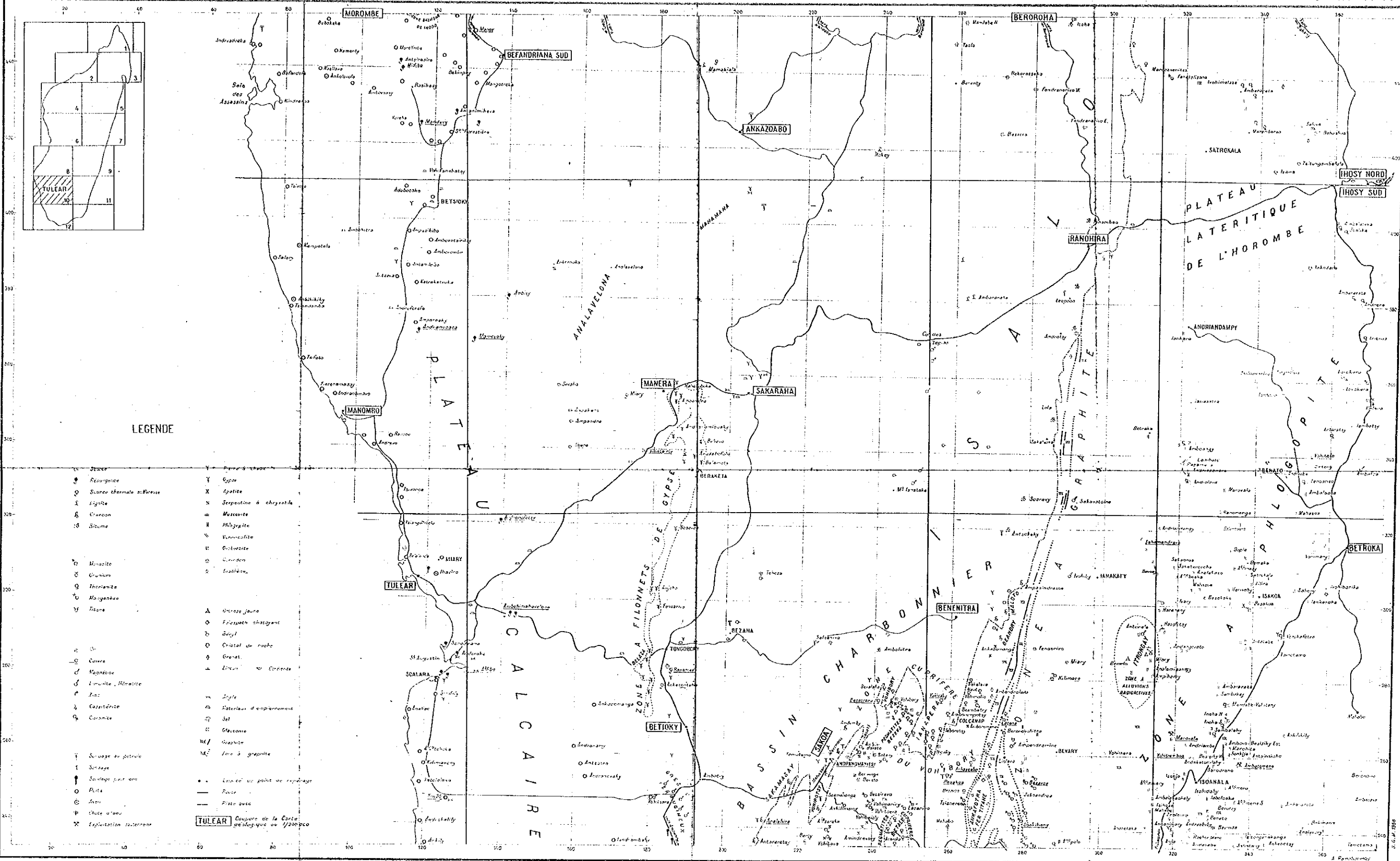


# CARTE MINIERE ET DES INDICES



**LEGENDE**

○	Source	Y	Gypse
⊕	Source thermale sulfuree	X	Opalite
⊙	Lignite	N	Serpentine à chrysolite
⊖	Carbone	M	Muscovite
⊕	Bitume	H	Phlogopite
○	Monazite	V	Vannicollite
○	Uranium	U	Urbowite
○	Thorianite	Q	Quartz
○	Stygianite	Q	Quartzite
⊕	Titane	Q	Quartz
○	Chaux	Δ	Grès jaune
○	Magnésite	△	Faïence châtaine
○	Uranite, Monazite	○	Grès
○	Zinc	○	Grès
○	Cassitérite	⊕	Éléphant
○	Covellite	⊕	Éléphant
○	Sulfure de plomb	⊕	Éléphant
○	Sulfure de zinc	⊕	Éléphant
○	Pilote	⊕	Éléphant
○	Sens	⊕	Éléphant
○	Chute d'eau	⊕	Éléphant
○	Exploitation souterraine	⊕	Éléphant
○		⊕	Éléphant

**TULEAR** Carte de la Carte géologique au 1/200000

ECHELLE : 1/500,000

THE  
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LOCATION  
SHOWIN  
JAPAN IN  
ME

# CARTE MINIERE ET DES INDICES

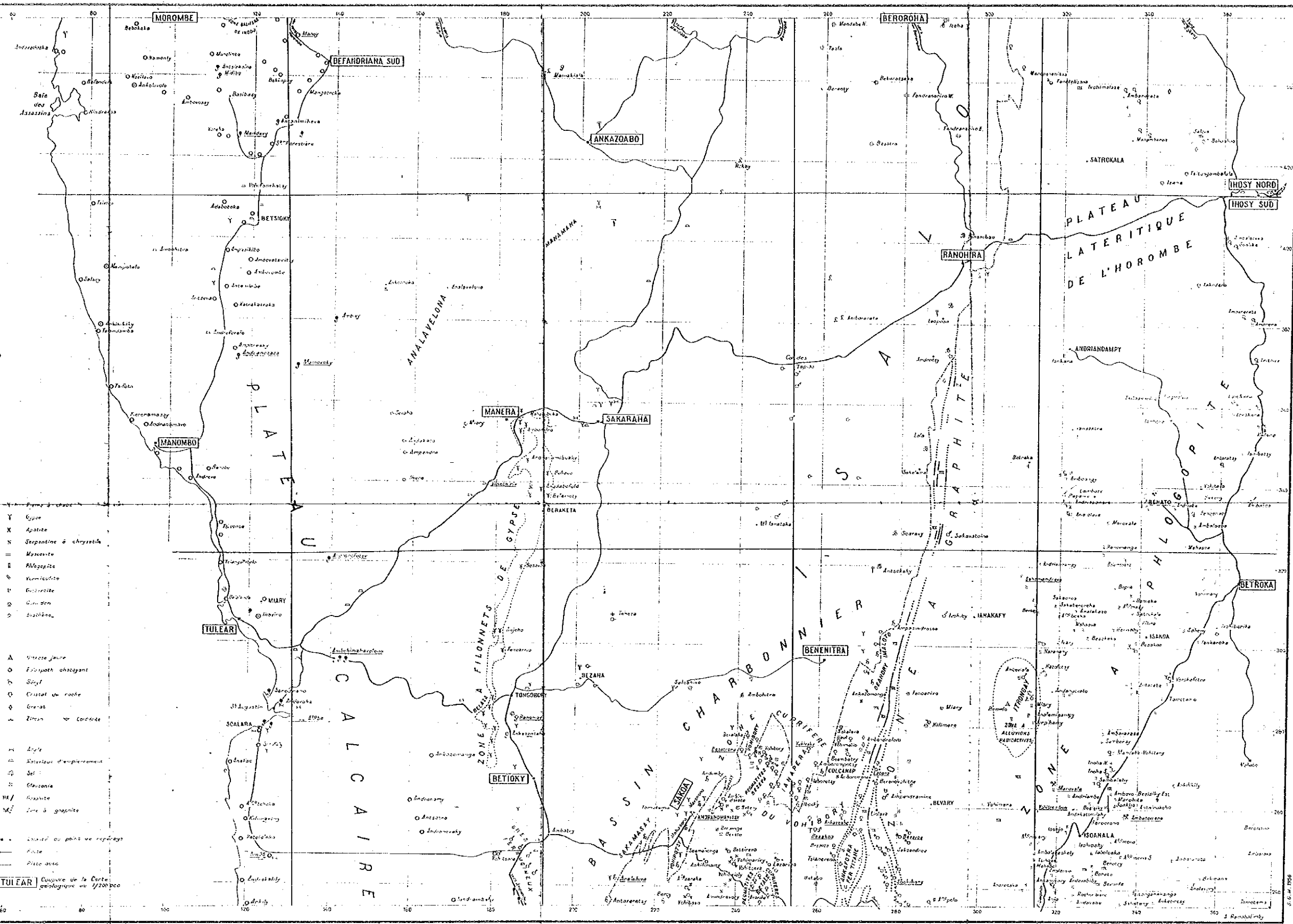
Feuille TULEAR N°10

PL. 3-2-1

THE MINERAL EXPLORATION  
IN  
THE SOUTHERN AREA  
THE DEMOCRATIC REPUBLIC OF MADAGASCAR  
(PHASE I)  
LOCATION MAP OF MINERAL DEPOSITS AND  
SHOWINGS IN THE TULEAR DISTRICT (1)

JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
FEBRUARY 1992

Scale 1:500,000



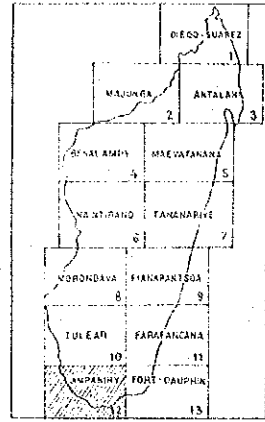
- Y Gypse
- X Apatite
- N Saponite & chrysotile
- M Muscovite
- Q Phlogopite
- V Vermiculite
- U Calcite
- D Dolomite
- S Sulfate
- A Quartzite
- O Quartzite altérant
- T Silt
- Q Cristal de roche
- Q Grès
- Z Zircon
- C Corail
- M Sable
- Q Sables d'empierrement
- Sel
- Clauzanne
- Coquille
- Zone à gypse
- Point de point de repérage
- Road
- Earth road

- LEGEND
- Fountain
  - Spring water
  - ⊙ Sulphur spring
  - ⊞ Lignite
  - ⊞ Coal
  - ⊞ Bitumen
  - ⊞ Monazite
  - ⊞ Uranium
  - ⊞ Thoronite
  - ⊞ Mn
  - ⊞ Ilmenite
  - ⊞ Rutile
  - ⊞ Allantite
  - ⊞ Au
  - ⊞ Cu
  - ⊞ Pyrite
  - ⊞ Magnetite
  - ⊞ Limonite, Hematite
  - ⊞ Zn
  - ⊞ Cassiterite
  - ⊞ Chromite
  - ⊞ Gossan
  - ⊞ Oil boring
  - ⊞ Water boring (positive)
  - ⊞ Water boring (negative)
  - ⊞ Well
  - ⊞ Cave
  - ⊞ Water fall
  - ⊞ Mine
  - ⊞ Sapphire
  - ⊞ Fluorite
  - ⊞ Limestone
  - ⊞ Gypsum
  - ⊞ Apatite
  - ⊞ Opal
  - ⊞ Chrysotile serpentinite
  - ⊞ Muscovite
  - ⊞ Phlogopite
  - ⊞ Vermiculite
  - ⊞ Talc
  - ⊞ Magnesite
  - ⊞ Corundum
  - ⊞ Sillimanite
  - ⊞ Cyanite
  - ⊞ Koolinite
  - ⊞ Turquoise
  - ⊞ Yellow orthoclase
  - ⊞ Indexite feldspar
  - ⊞ Beryl
  - ⊞ Chrysoberyl
  - ⊞ Quartz
  - ⊞ Amethyst
  - ⊞ Garnet
  - ⊞ Cordierite
  - ⊞ Zircon
  - ⊞ Tourmaline
  - ⊞ Barite
  - ⊞ Clay
  - ⊞ Crushed stone
  - ⊞ Salt
  - ⊞ Glauconite
  - ⊞ Graphite
  - ⊞ Graphite zone
  - Road
  - - - Earth road

ECHELLE : 1:500.000

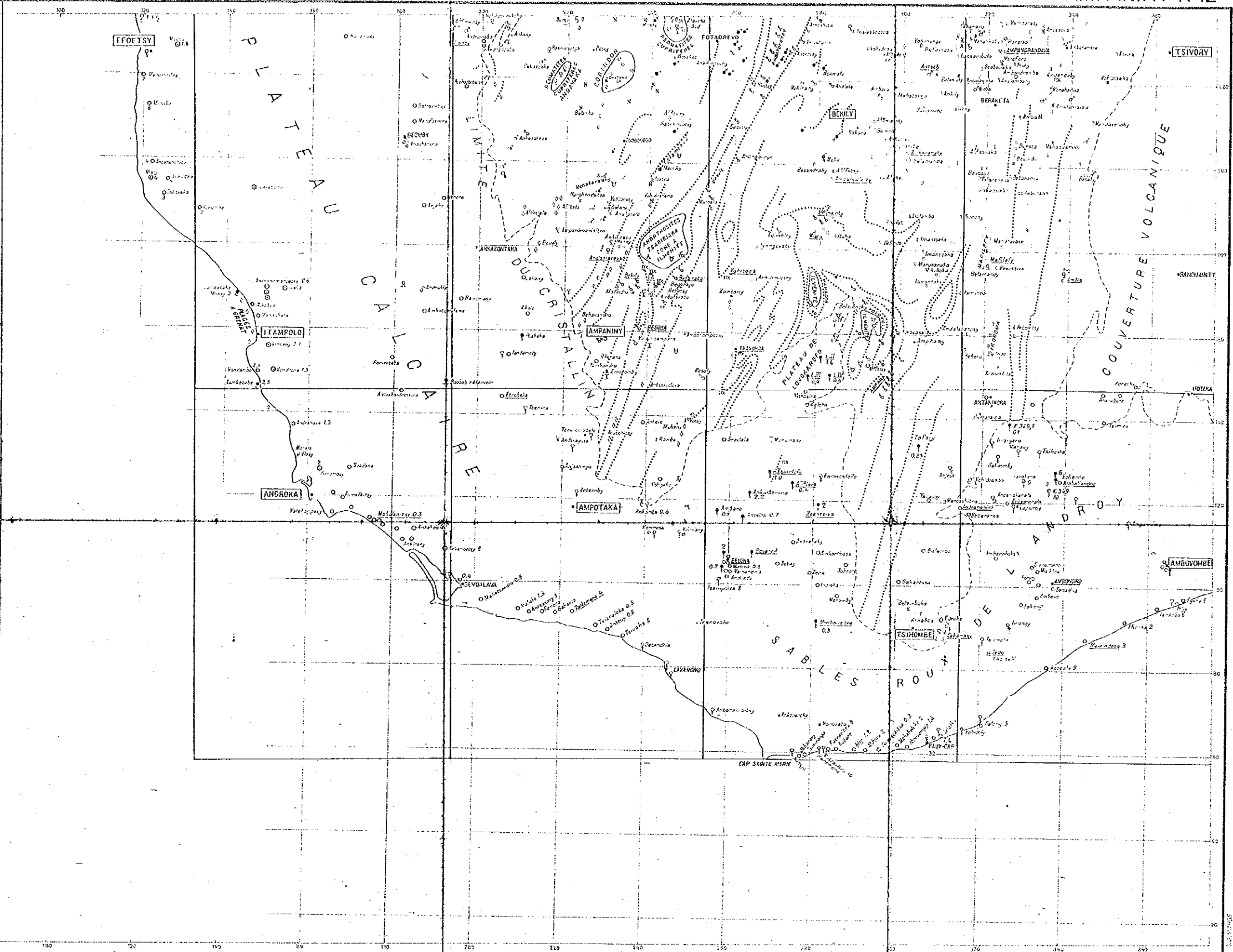
TULEAR Geological map (1:200,000)

# CARTE MINIERE ET DES INDICES



## LEGENDE

- |   |                          |   |                         |
|---|--------------------------|---|-------------------------|
| ○ | Eau                      | ○ | Or                      |
| ● | Source                   | ✕ | Asbeste                 |
| ○ | Charbon                  | ⊕ | Terre verte             |
| ○ | Uranium                  | ⊕ | Durand                  |
| ○ | Thorianite               | ⊕ | Orthose jaune           |
| ○ | Stibite                  | ⊕ | Feldspatho chlorite     |
| ○ | Quartz                   | ⊕ | Serpentine à chrysotile |
| ○ | Pyrite                   | ⊕ | Rutil                   |
| ○ | Argentite                | ⊕ | Graphite blanc          |
| ○ | Styrène                  | ⊕ | Puits intermittents     |
| ○ | Zone à graphite          | ⊕ | Sondage à terre         |
| ○ | Puits                    |   |                         |
| ○ | Sondage pour eau potable |   |                         |
| ○ | Sondage pour eau usée    |   |                         |
- Les chiffres placés auprès des puits et sondages indiquent la cote MSL en grammes par litre.
- localités ou points de repérage
- AMPANIHY** Échelle de la carte géologique au 1/200.000
- N.B. Les mines, très nombreuses sur cette feuille ne sont pas indiquées.



ECHELLE : 1/500.000

THE  
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META

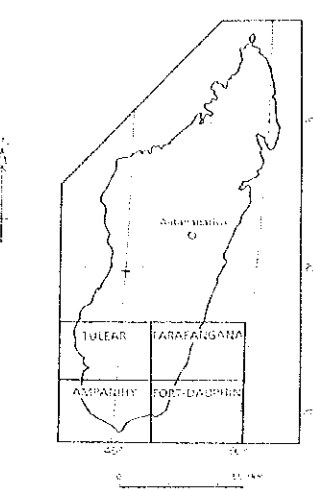
- |   |                         |
|---|-------------------------|
| ○ | Fountain                |
| ● | Spring water            |
| ○ | Sulphur spring          |
| ○ | Lignite                 |
| ○ | Coal                    |
| ○ | Bitumen                 |
| ○ | Monazite                |
| ○ | Uranium                 |
| ○ | Thorianite              |
| ○ | As                      |
| ○ | Fluorite                |
| ○ | Rutile                  |
| ○ | Allanite                |
| ○ | Au                      |
| ○ | Cu                      |
| ○ | Pyrite                  |
| ○ | Magnetite               |
| ○ | Limonite, Hematite      |
| ○ | Zn                      |
| ○ | Cassiterite             |
| ○ | Chromite                |
| ○ | Covain                  |
| ○ | Oil boring              |
| ○ | Water boring (positive) |
| ○ | Water boring (negative) |
| ○ | Well                    |
| ○ | Cave                    |
| ○ | Water fall              |
| ○ | Mine                    |

# CARTE MINIERE ET DES INDICES

Feuille AMPANIHY N°12

PL. 3-2-2

THE MINERAL EXPLORATION  
IN  
THE SOUTHERN AREA  
THE DEMOCRATIC REPUBLIC OF MADAGASCAR  
(PHASE I)  
LOCATION MAP OF MINERAL DEPOSITS AND  
SHOWINGS IN THE AMPANIHY DISTRICT (2)

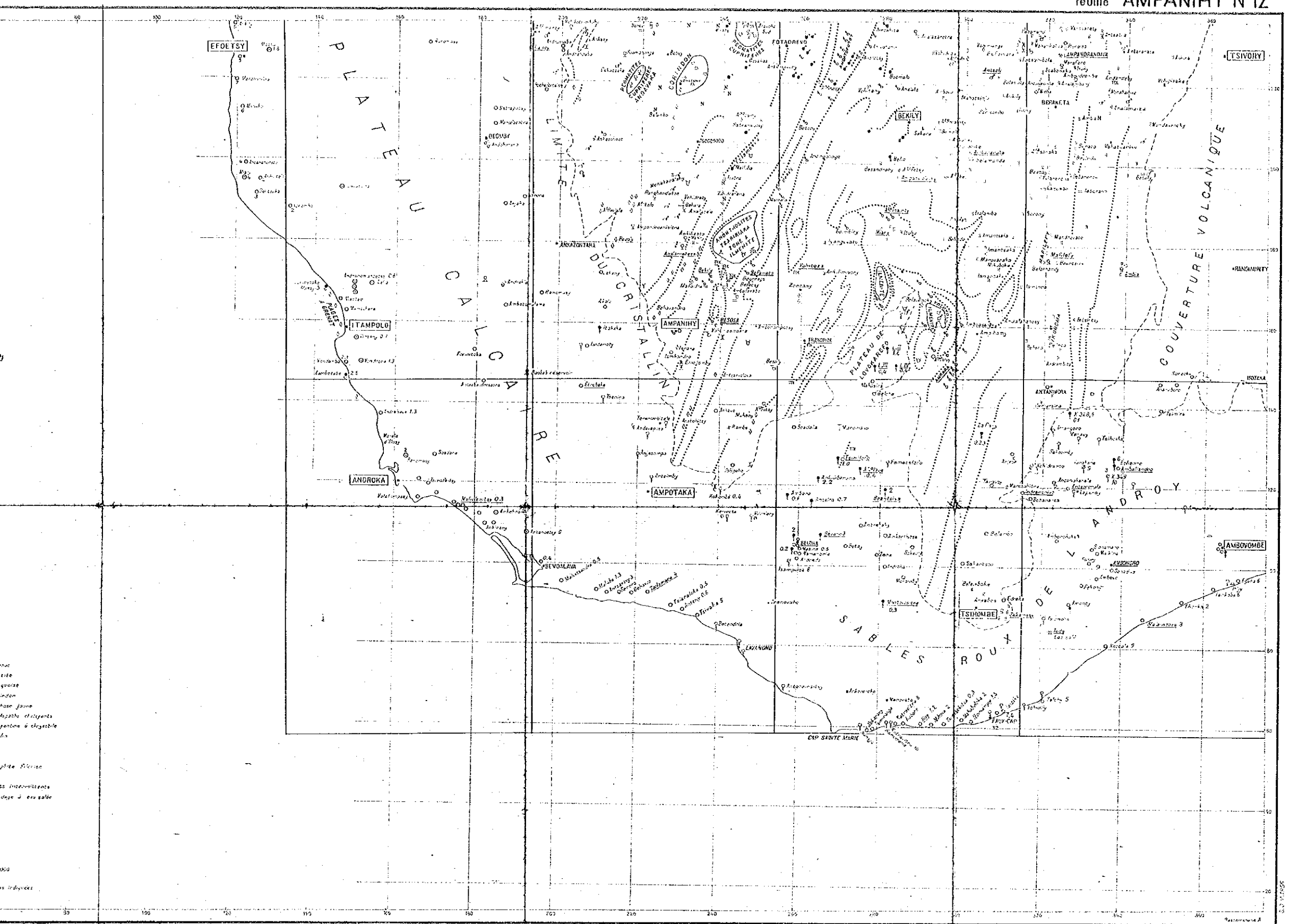


JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
FEBRUARY 1992

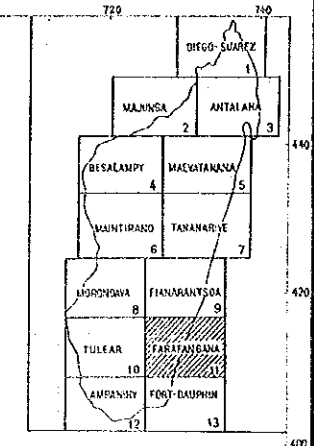
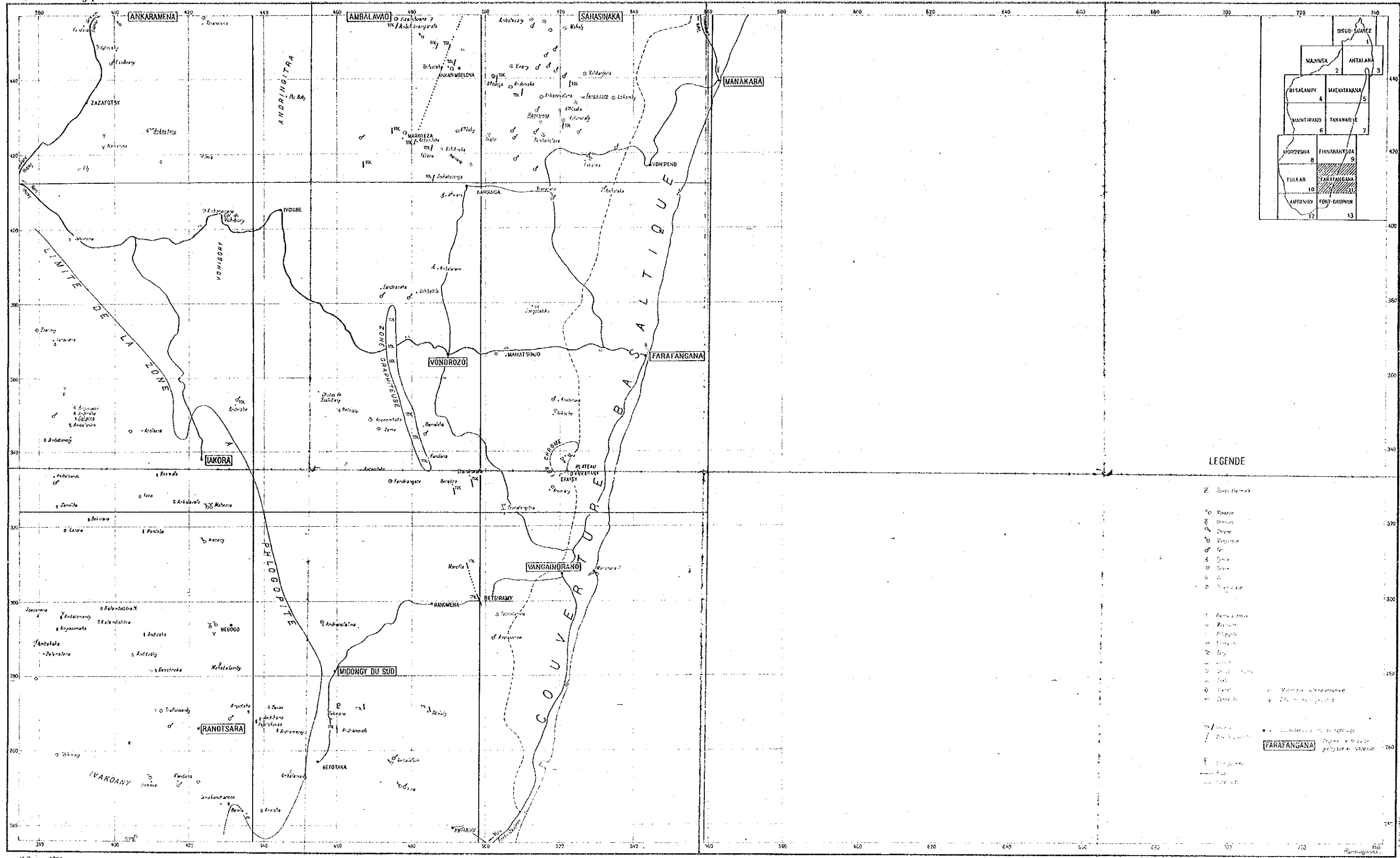
Scale 1:500,000

## LEGEND

- |                           |   |
|---------------------------|---|
| ○ Fountain                | † Sapphire  |
| ⊙ Spring water            | ■ Fluorite  |
| ⊕ Sulphur spring          | ⋈ Limestone   |
| ⊖ Lignite                 | ⋈ Gypsum  |
| ⊖ Coal                    | ⋈ Apatite   |
| ⊖ Bitumen                 | ⋈ Opal  |
| ⊖ Monazite                | ⋈ Chrysotile serpentinite   |
| ⊖ Uranium                 | ⋈ Muscovite   |
| ⊖ Thoranite               | ⋈ Phlogopite  |
| ⊖ Mn                      | ⋈ Vermiculite   |
| ⊖ Pimelite                | ⋈ Talc  |
| ⊖ Rutile                  | ⋈ Magnesite   |
| ⊖ Allantite               | ⋈ Cerurdum  |
| ○ Au                      | ⋈ Sillimanite   |
| ○ Cu                      | ⋈ Cyanite   |
| ⋈ Pyrite                  | ⋈ Kaolinite   |
| ⋈ Magnetite               | ⋈ Turquoise   |
| ⋈ Limonite, Hematite      | ⋈ Yellow orthoclase   |
| ⋈ Zn                      | ⋈ Iridescent feldspar   |
| ⋈ Cassiterite             | ⋈ Beryl   |
| ⋈ Chromite                | ⋈ Chrysoberyl   |
| ⋈ Gossan                  | ⋈ Quartz  |
| ⋈ Oil boring              | ⋈ Amethyst  |
| ⋈ Water boring (positive) | ⋈ Garnet  |
| ⋈ Water boring (negative) | ⋈ Cordierite  |
| ⋈ Well                    | ⋈ Zircon  |
| ⋈ Cave                    | ⋈ Tourmaline  |
| ⋈ Water fall              | ⋈ Barite  |
| ⋈ Mine                    | ⋈ Clay  |
|                           | ⋈ Crushed stone   |
|                           | ⋈ Salt  |
|                           | ⋈ Glaucosite  |
|                           | ⋈ Graphite  |
|                           | ⋈ Graphite zone   |
|                           | — Road  |
|                           | - - - Earth road  |
|                           | <span style="border: 1px solid black; padding: 1px;">TULEAR</span> Geological map (1:200,000) |



ECHELLE : 1/500.000



LEGENDE

- 1. Zone d'anthracite
- 2. Zone d'anthracite
- 3. Zone d'anthracite
- 4. Zone d'anthracite
- 5. Zone d'anthracite
- 6. Zone d'anthracite
- 7. Zone d'anthracite
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- 9. Zone d'anthracite
- 10. Zone d'anthracite
- 11. Zone d'anthracite
- 12. Zone d'anthracite
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- 92. Zone d'anthracite
- 93. Zone d'anthracite
- 94. Zone d'anthracite
- 95. Zone d'anthracite
- 96. Zone d'anthracite
- 97. Zone d'anthracite
- 98. Zone d'anthracite
- 99. Zone d'anthracite
- 100. Zone d'anthracite

ECHELLE : 1/500,000

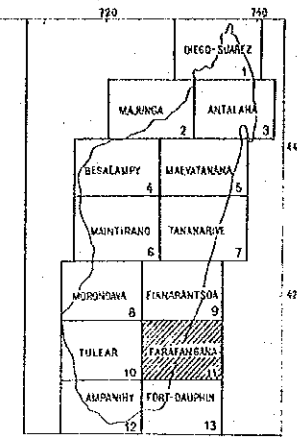
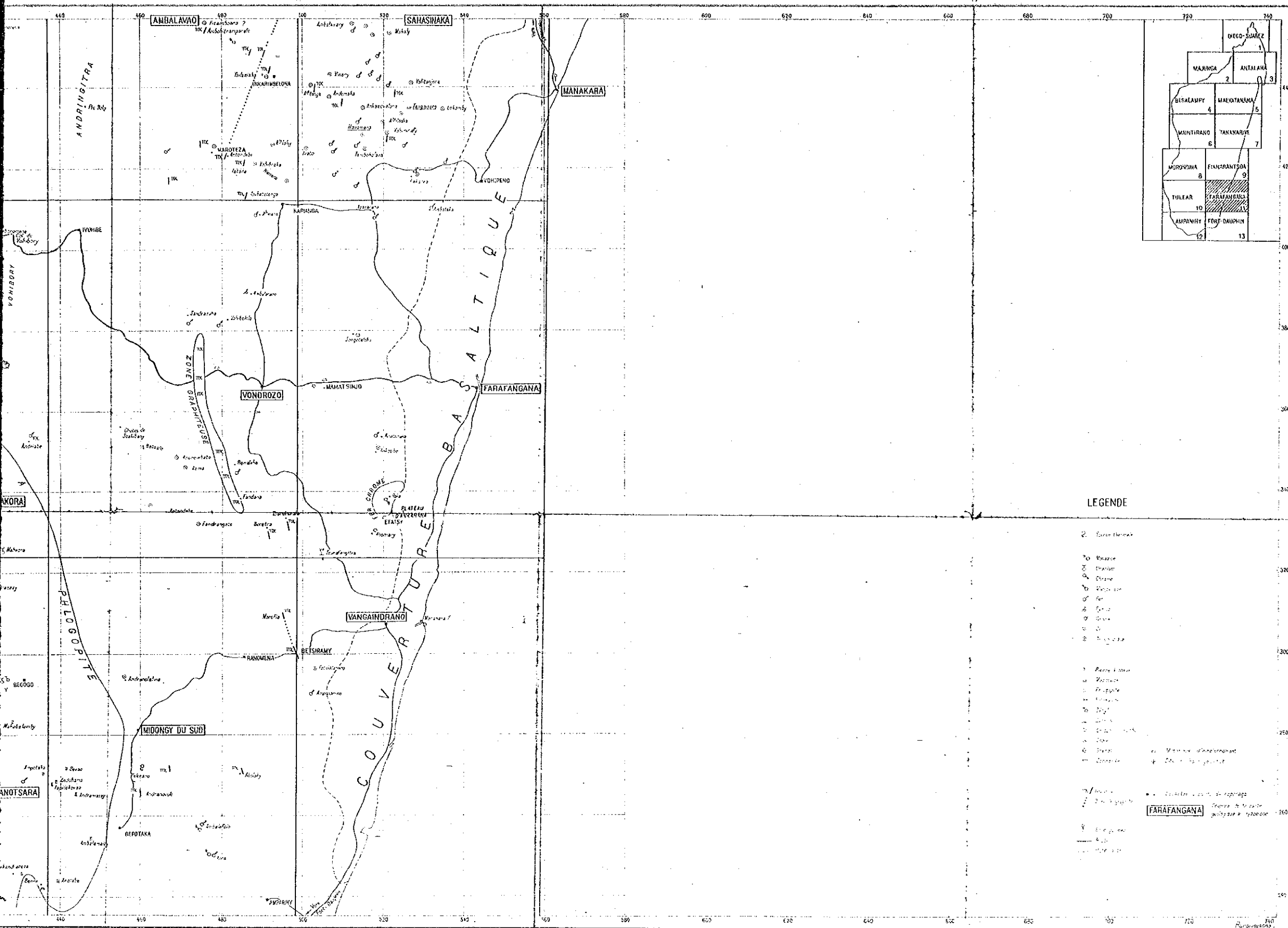
THE DEMOC  
LOCATIO  
SHOWING

JAPAN

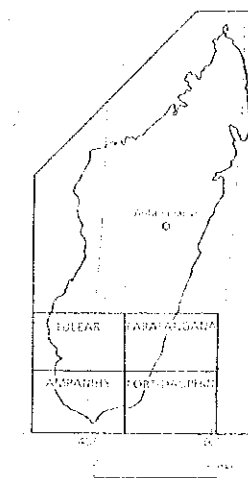
- Fountain
- Spring water
- Sulphur spring
- Lignite
- Coal
- Bitumen
- Monazite
- Uranium
- Thoriumite
- Mn
- Ilmenite
- Rutile
- Alluvite
- Au
- Cu
- Pyrite
- Magnetite
- Limonite, Hematite
- Zn
- Cassiterite
- Chromite
- Gossan
- Oil boring
- Water boring (p)
- Water boring (n)
- Well
- Cave
- Water fall
- Mine

# CARTE MINIERE ET DES INDICES

Fauille FARAFANGANA N°11



THE MINERAL EXPLORATION  
IN  
THE SOUTHERN AREA  
OF THE DEMOCRATIC REPUBLIC OF MADAGASCAR  
(PHASE I)  
LOCATION MAP OF MINERAL DEPOSITS AND  
SHOWINGS IN THE FARAFANGANA DISTRICT (3)



JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
FEBRUARY 1992

Scale 1:500,000

## LEGENDE

- Eau vive
- Eau
- Eau chaude
- Eau froide
- Eau tiède
- Eau salée
- Eau sucrée
- Eau amère
- Eau acide
- Eau alcaline
- Eau gazeuse
- Eau minérale
- Eau de source
- Eau de puits
- Eau de forage
- Eau de pluie
- Eau de mer
- Eau de lagon
- Eau de rivage
- Eau de lac
- Eau de rivière
- Eau de torrent
- Eau de cascade
- Eau de ruissellement
- Eau de infiltration
- Eau de condensation
- Eau de précipitation
- Eau de neige
- Eau de glace
- Eau de fonte
- Eau de dégel
- Eau de ruissellement
- Eau de infiltration
- Eau de condensation
- Eau de précipitation
- Eau de neige
- Eau de glace
- Eau de fonte
- Eau de dégel

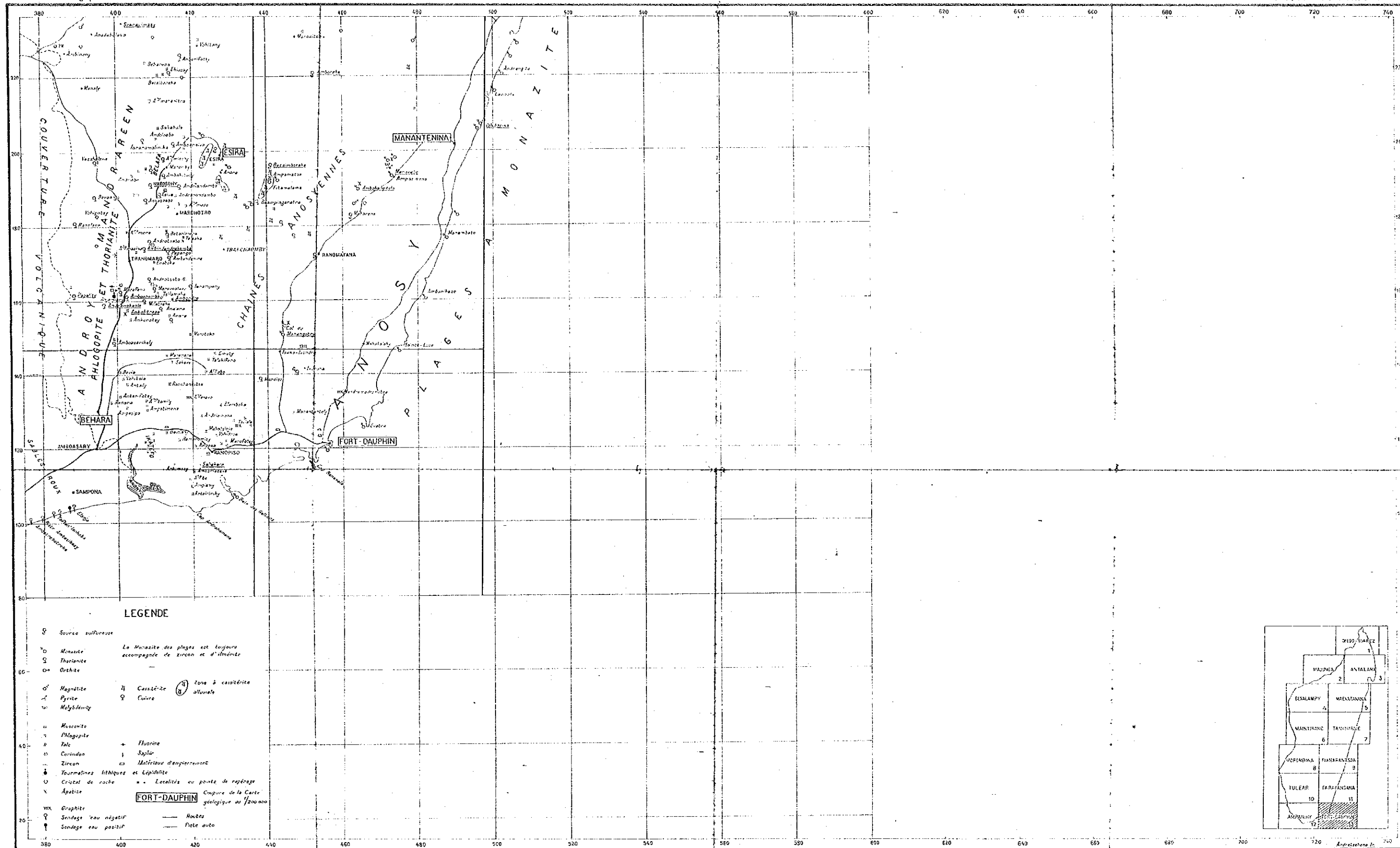
## LEGEND

- Fountain
- Spring water
- Sulphur spring
- Tignite
- Coal
- Bitumen
- Monazite
- Uranium
- Thoranite
- Mn
- Ilmenite
- Rutile
- Allanite
- Au
- Cu
- Pyrite
- Magnetite
- Limonite, Hematite
- Zn
- Cassiterite
- Chromite
- Gossan
- Oil boring
- Water boring (positive)
- Water boring (negative)
- Well
- Cave
- Water fall
- Mine
- Sapphire
- Fluorite
- Limestone
- Gypsum
- Apatite
- Opal
- Chrysotile serpentinite
- Muscovite
- Phlogopite
- Vermiculite
- Talc
- Magnesite
- Corundum
- Sillimanite
- Cyanite
- Kaolinite
- Turquoise
- Yellow orthoclase
- Iridescent feldspar
- Beryl
- Chrysoberyl
- Quartz
- Amethyst
- Garnet
- Cordierite
- Zircon
- Tourmaline
- Barite
- Clay
- Crushed stone
- Salt
- Glauconite
- Graphite
- Graphite zone
- Road
- - - Earth road

ECHILLE 1:500,000

[TULEAR] Geological map (1:200,000)

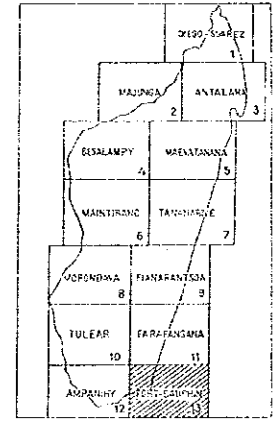
# CARTE MINIERE ET DES INDICES



**LEGENDE**

○ Source sulfureuse  
 ○ Monazite  
 ○ Thorite  
 ○ Orthite  
 ○ Magnétite  
 ○ Pyrite  
 ○ Molybdène  
 ○ Moscovite  
 ○ Phlogopite  
 ○ Talk  
 ○ Corindon  
 ○ Zircon  
 ○ Tourmalines litiques et lépidolite  
 ○ Cristal de roche  
 ○ Apatite  
 ○ Graphite  
 ○ Sondage eau négatif  
 ○ Sondage eau positif

La Monazite des plages est toujours accompagnée de zircon et d'ilménite  
 Zone à cassitérite alternée  
 Cassitérite  
 Cuivre  
 Fluorine  
 Saphir  
 Matériaux d'empiérement  
 Localités ou points de repère  
 Coupe de la Carte géologique au 1/200000  
 Routes  
 Piste auto



ECHELLE 1/500000

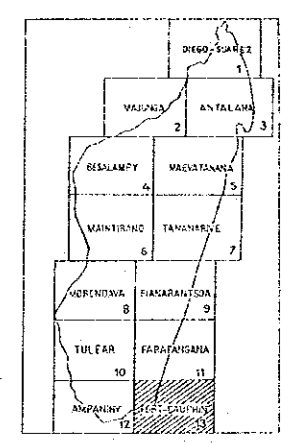
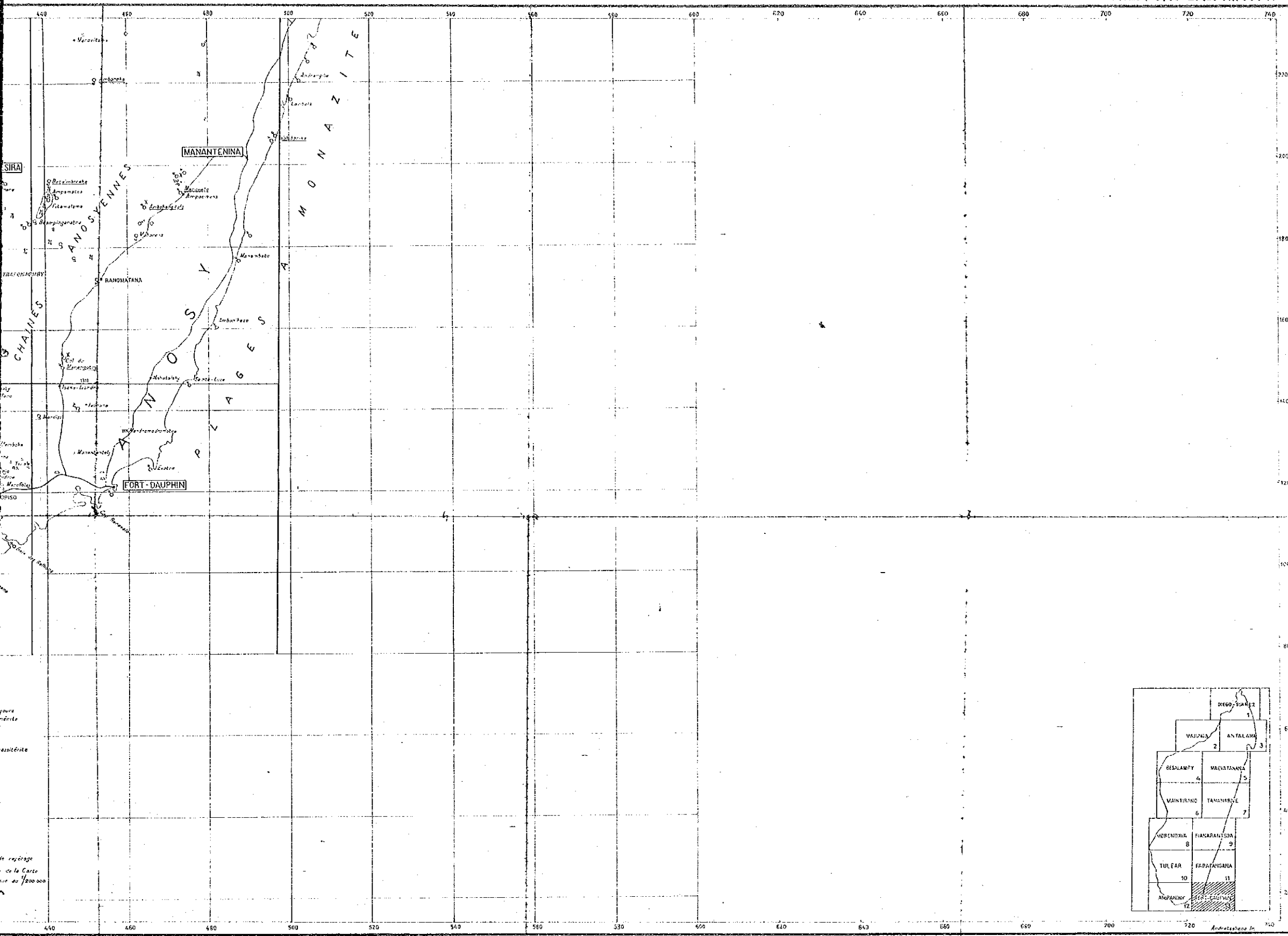
THE  
THE DEMOCRAT  
LOCATION M  
SHOWINGS IN

JAPAN INT  
MET

- Fountain
- Spring water
- Sulphur spring
- Lignite
- Coal
- Bitumen
- Monazite
- Uranium
- Thoranite
- Mn
- Ilmenite
- Rutile
- Alluaite
- Au
- Cu
- Pyrite
- Magnétite
- Limonite, Hematite
- Zn
- Cassitérite
- Chromite
- Gossan
- Oil boring
- Water boring (positif)
- Water boring (negatif)
- Well
- Cave
- Water fall
- Mine

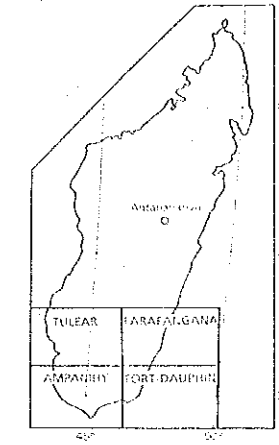
# CARTE MINIERE ET DES INDICES

Feuille FORT-DAUPHIN N°13



ECHELLE 1/500000

THE MINERAL EXPLORATION  
IN  
THE SOUTHERN AREA  
THE DEMOCRATIC REPUBLIC OF MADAGASCAR  
(PHASE I)  
LOCATION MAP OF MINERAL DEPOSITS AND  
SHOWINGS IN THE FORT-DAUPHIN DISTRICT (4)



JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
FEBRUARY 1992

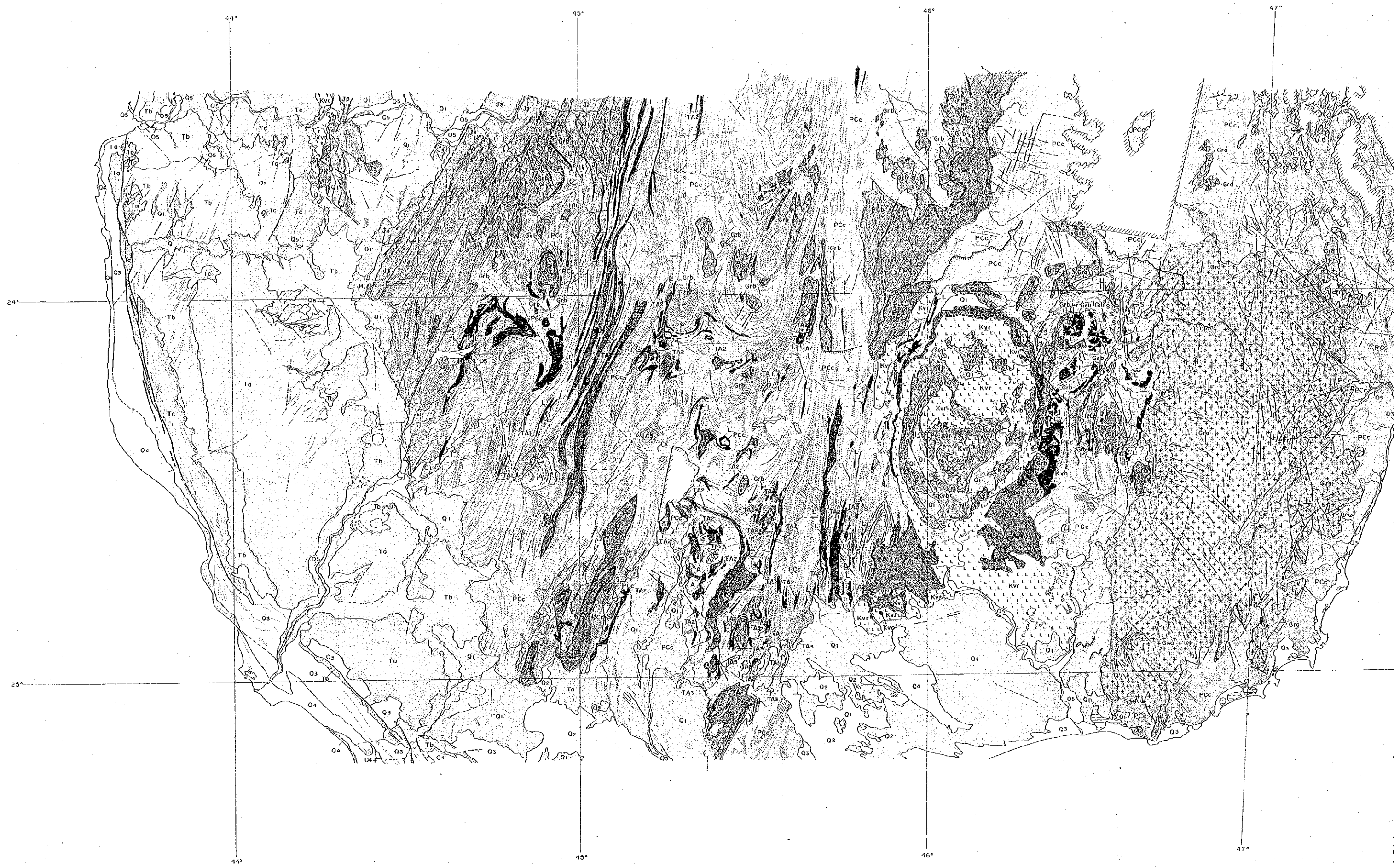
Scale 1:500,000

## LEGEND

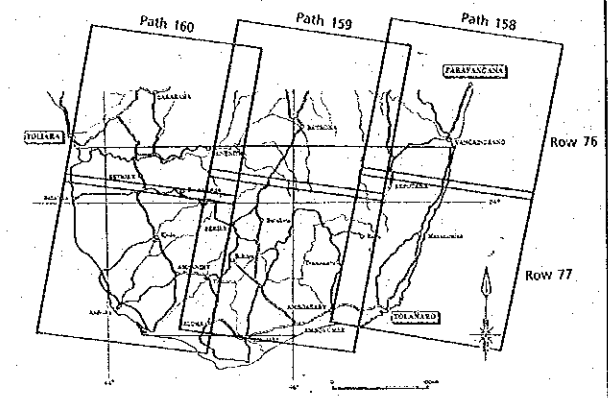
- |                           |                           |
|---------------------------|---------------------------|
| ○ Fountain                | † Sapphires               |
| ● Spring water            | ■ Fluorite                |
| ○ Sulphur spring          | ⋈ Limestone               |
| ⋈ Lignite                 | ⋈ Gypsum                  |
| ⋈ Coal                    | ⋈ Apatite                 |
| ⋈ Bitumen                 | ⋈ Opal                    |
| ⋈ Monazite                | ⋈ Chrysotile serpentinite |
| ⋈ Uranium                 | ⋈ Muscovite               |
| ⋈ Thorianite              | ⋈ Phlogopite              |
| ⋈ Mn                      | ⋈ Vermiculite             |
| ⋈ Ilmenite                | ⋈ Calc                    |
| ⋈ Rutile                  | ⋈ Magnesite               |
| ⋈ Allanite                | ⋈ Corundum                |
| ○ Au                      | ⋈ Sillimanite             |
| ○ Cu                      | ⋈ Cyanite                 |
| ⋈ Pyrite                  | ⋈ Kaolinite               |
| ⋈ Magnetite               | ⋈ Turquoise               |
| ⋈ Limonite, Hematite      | ⋈ Yellow orthoclase       |
| ⋈ Zn                      | ⋈ Iridescent feldspar     |
| ⋈ Cassiterite             | ⋈ Beryl                   |
| ⋈ Chromite                | ⋈ Chrysoberyl             |
| ⋈ Gossan                  | ⋈ Quartz                  |
| ⋈ Oil boring              | ⋈ Amethyst                |
| ⋈ Water boring (positive) | ⋈ Garnet                  |
| ⋈ Water boring (negative) | ⋈ Cordierite              |
| ⋈ Well                    | ⋈ Zircon                  |
| ⋈ Cave                    | ⋈ Tourmaline              |
| ⋈ Water fall              | ⋈ Barite                  |
| ⋈ Mine                    | ⋈ Clay                    |
|                           | ⋈ Crushed stone           |
|                           | ⋈ Salt                    |
|                           | ⋈ Glauconite              |
|                           | ⋈ Graphite                |
|                           | ⋈ Graphite zone           |
|                           | ⋈ Road                    |
|                           | ⋈ Earth road              |

TULÉAR Geological map (1:200,000)

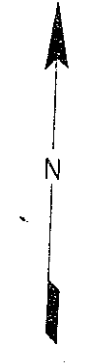
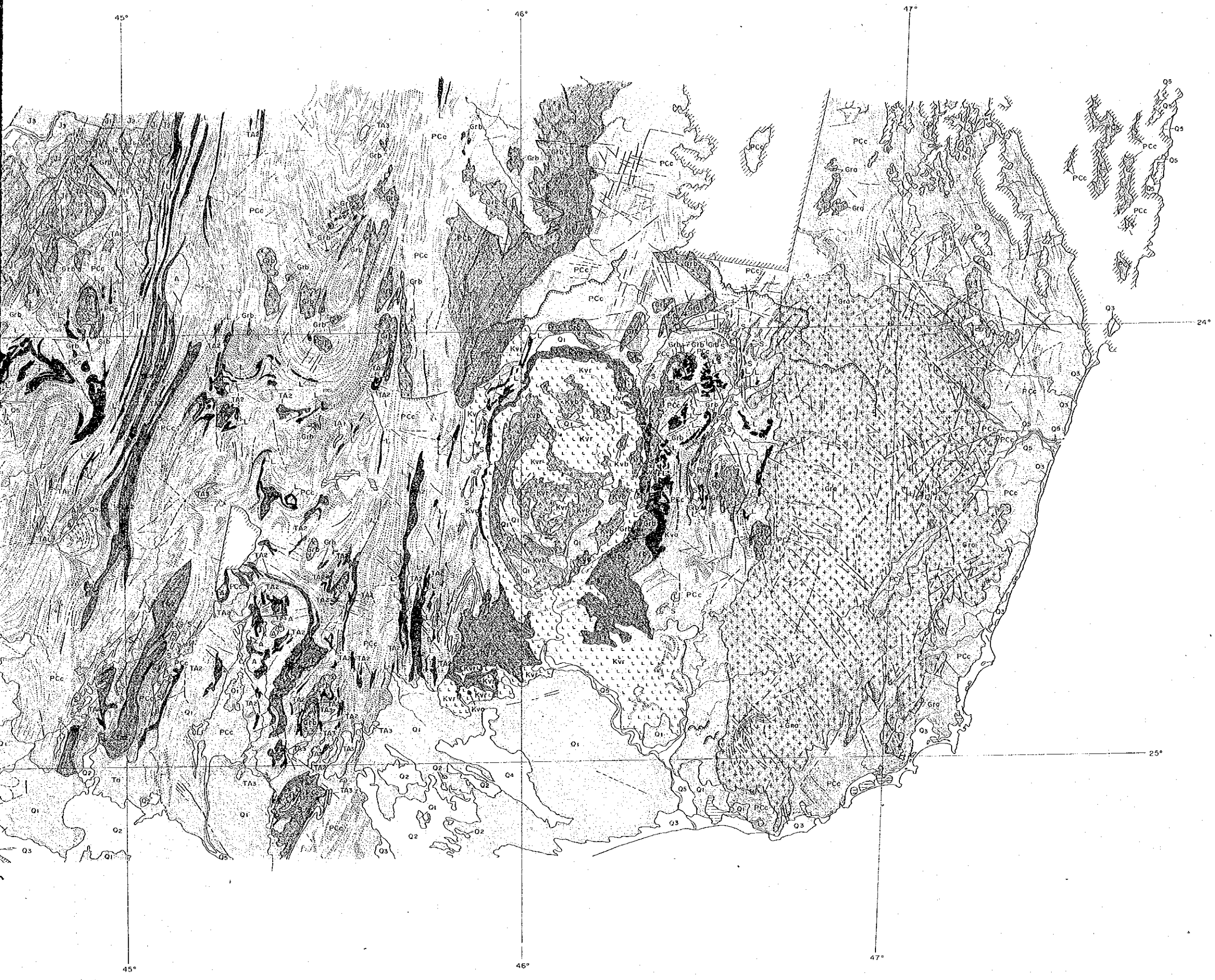
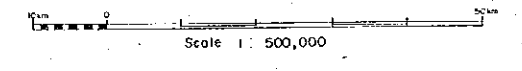




THE MINERAL EXPLORATION  
IN  
THE SOUTHERN AREA  
THE DEMOCRATIC REPUBLIC OF MADAGASCAR  
(PHASE I)  
GEOLOGICAL INTERPRETATION MAP OF  
LANDSAT TM FALSE COLOR IMAGERY



JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
FEBRUARY 1992



LEGEND

Interpreted units	Correlation with geologic map and rock types
Q1	alluvium
Q2	dune, alluvium
Q3	Aeolian old dune
Q4	eluviated white sand
Q5	Carapace sand
T1	Eocene marine facies
T2	Eocene marine facies, Carapace sand
T3	Eocene marine facies, Clavator (Cretaceous)
K11	Cretaceous (rhynchonella, dallenia, trischyris)
K12	Cretaceous (basalt, labradorite, sakalavia)
K13	Lower to Middle Cretaceous marine facies
J1	Middle to Upper Jurassic marine facies
J2	Lower Permian to Lower Triassic continental facies
P1	Precambrian metamorphic rocks
P2	Precambrian metamorphic rocks
P3	Precambrian metamorphic rocks
G1	Anosyennes granite
G2	granite, migmatite
A	amphibolite
M	marble
S	quartzite
TA1	tonal anomaly
TA2	tonal anomaly
TA3	tonal anomaly
---	unit boundary
- - - -	uncertain unit boundary
.....	bedding trace or schistosity
~	strike and dip direction
~	anticline with direction of plunge
~	syncline with direction of plunge
~	fault (barbs on downthrown side)
~	inferred fault
~	lineament
~	drainage
~	lake
~	cloud cover







