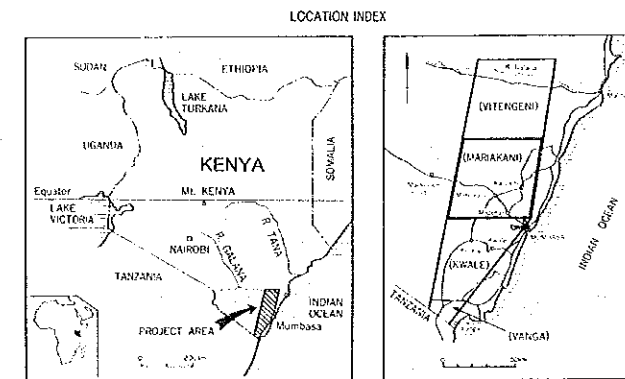


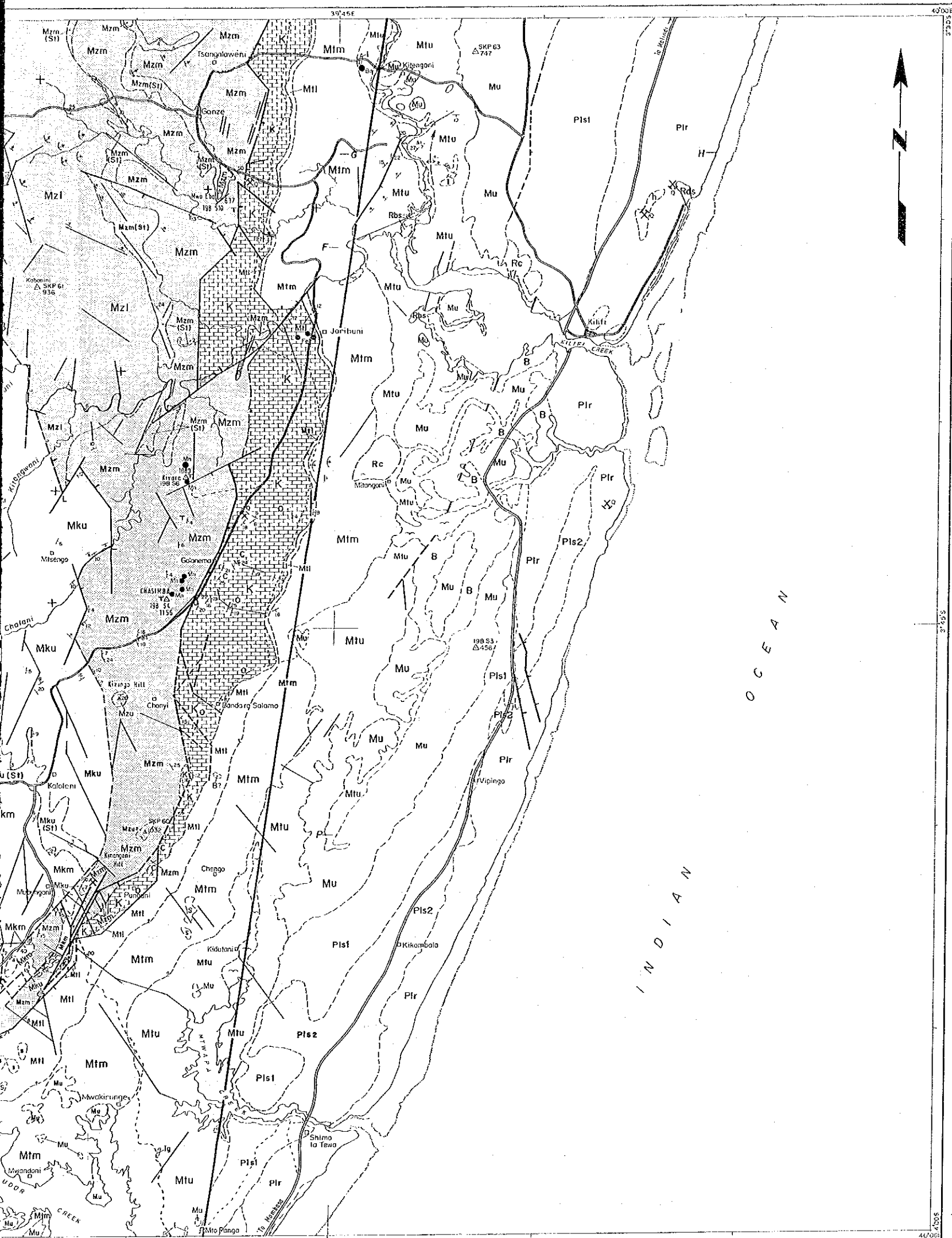
MINERAL EXPLORATION
IN
THE MOMBASA AREA, REPUBLIC OF KENYA
PHASE I

GEOLOGICAL MAP AND SECTIONS
OF THE MARIAKANI SUB-AREA,
MOMBASA AREA



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
February 1991

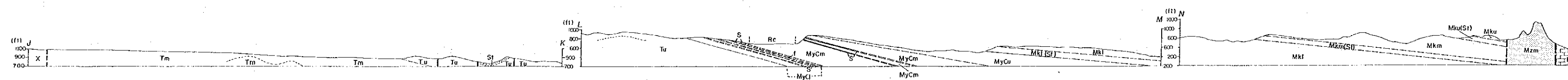
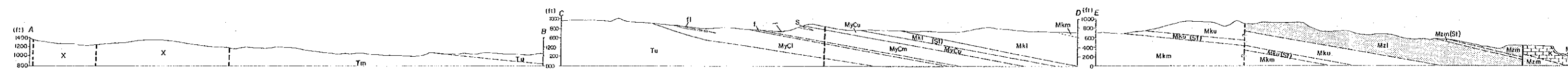
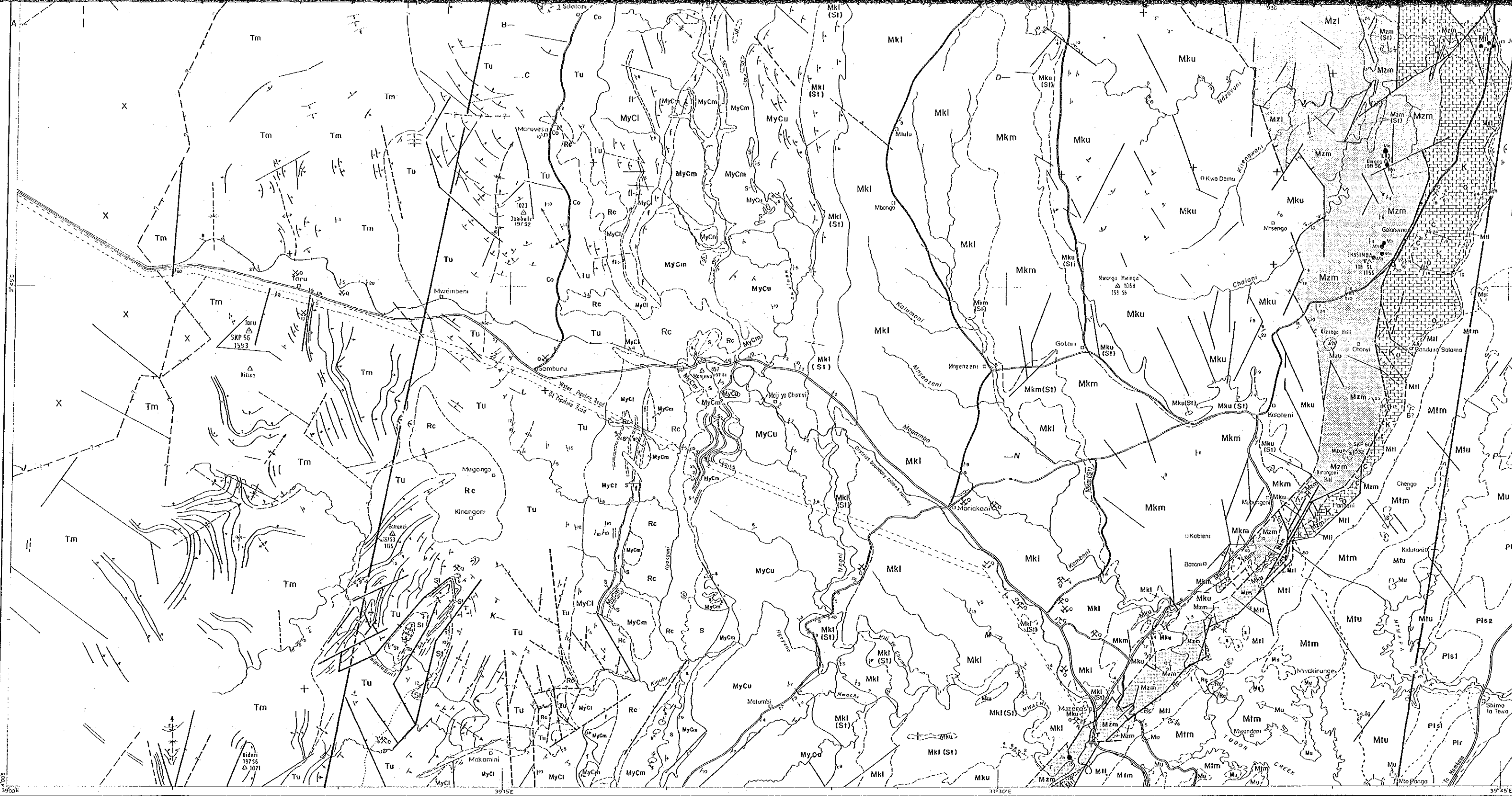
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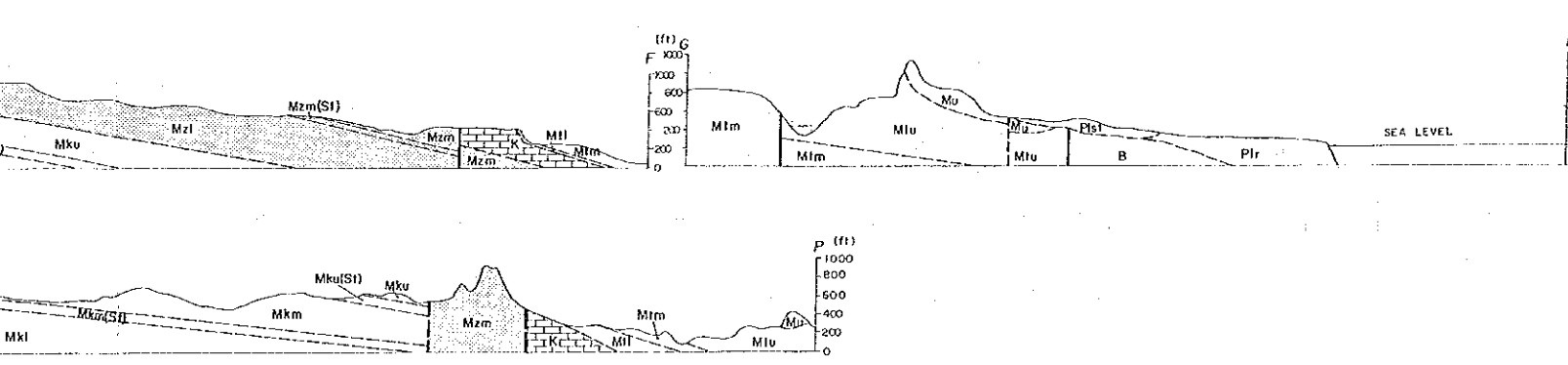
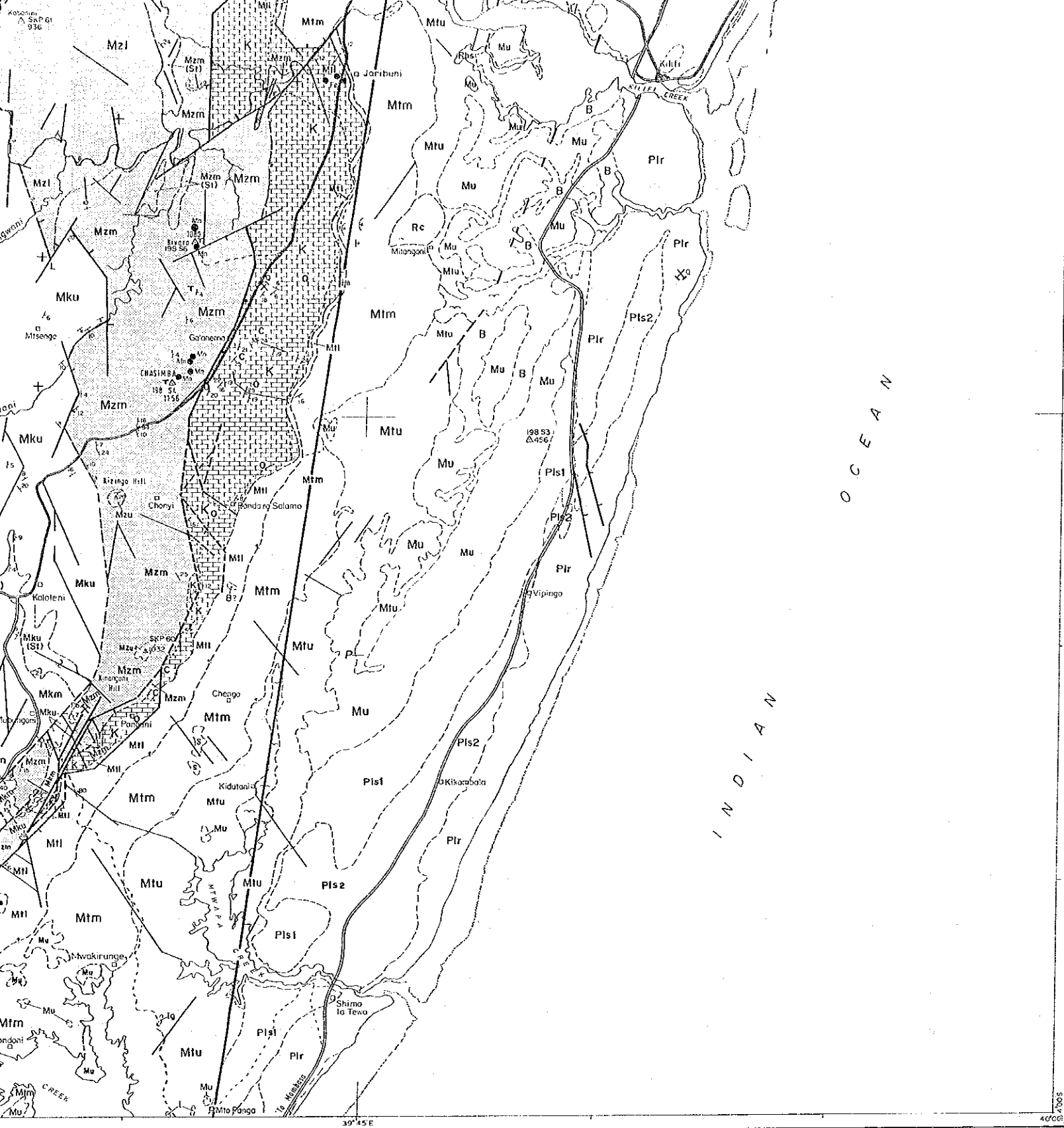


LEGEND

QUATERNARY	Recent	Rc	Outer limit of present-day reef
		Rbs	Alluvium
		Rds	Colluvium and residual soils
		Pli2	Beach/estuarine sands
		Pli1	Dune sands
		Pli	Sands
		Pli3	Sands
		Pli4	Reef complex (undifferentiated)
		Pli5	Limestone/carbonate predominant, c.
		Pli6	Sandstone/sand predominant, shell predominant, h
		Pli7	Sands
		Pli8	Sandstones, subordinate limestones/shales
		Pli9	Sands
		Pli10	Sandstones, subordinate limestones/shales
		Pli11	Shales, subordinate limestones, l
		Pli12	Shales, subordinate limestones, l
		Pli13	Shales/siltstones/sandstones/limestones
		Pli14	Sandstone, s. limestones, l
		Pli15	Limestones, coral rich, c. oolitic/pisulitic, n
		Pli16	subordinate shales/siltstones/sandstones
		Pli17	Sandstones/arkoses
		Pli18	Sandstones/arkoses
		Pli19	Sandstones/arkoses
		Pli20	Sandstones/arkoses
		Pli21	Sandstones/arkoses
		Pli22	Sandstones/arkoses
		Pli23	Sandstones/arkoses
		Pli24	Sandstones/arkoses
		Pli25	Sandstones/arkoses
		Pli26	Sandstones/arkoses
		Pli27	Sandstones/arkoses
		Pli28	Sandstones/arkoses
		Pli29	Sandstones/arkoses
		Pli30	Sandstones/arkoses
		Pli31	Sandstones/arkoses
		Pli32	Sandstones/arkoses
		Pli33	Sandstones/arkoses
		Pli34	Sandstones/arkoses
		Pli35	Sandstones/arkoses
		Pli36	Sandstones/arkoses
		Pli37	Sandstones/arkoses
		Pli38	Sandstones/arkoses
		Pli39	Sandstones/arkoses
		Pli40	Sandstones/arkoses
		Pli41	Sandstones/arkoses
		Pli42	Sandstones/arkoses
		Pli43	Sandstones/arkoses
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		Pli92	Sandstones/arkoses
		Pli93	Sandstones/arkoses
		Pli94	Sandstones/arkoses
		Pli95	Sandstones/arkoses
		Pli96	Sandstones/arkoses
		Pli97	Sandstones/arkoses
		Pli98	Sandstones/arkoses
		Pli99	Sandstones/arkoses
		Pli100	Sandstones/arkoses

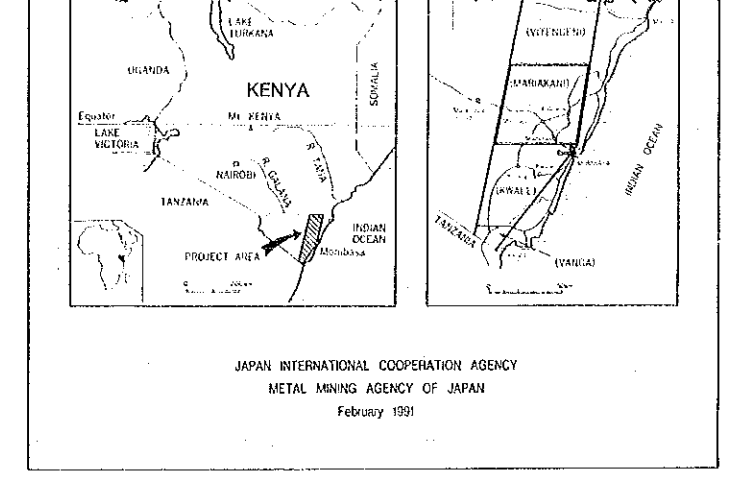
Geological boundary, known	⊗	Mine, working
Geological boundary, approximate (including photo-interpretation)	⊗	Mine, not working
Geological boundary, inferred	⊗	Quarry, working
Photo-lineament	⊗	Quarry, not working
Fault, downthrow indicated	—	Road
Fault inferred, downthrow indicated	—	Motorable track
Breccia, shear zone	—	River
Bedding, dip indicated	—	Spring
Bedding, dip (< 15°) indicated (air-photo interpretation)	—	Landslide
Bedding, flat-lying	—	Town, village
Direction and plunge of minor fold	—	Triangometric station height in feet
Anticline, plunge indicated	—	— A — B —
Syncline, plunge indicated	—	Line of section (schematic)
Mineral occurrence	●	
L		Laterite
T		Fossil wood tree trunks





QUATERNARY	Recent	Rc	Recent	Rc	Recent	Rc	Colluvium and residual soils
		Rds				Rds	Dune sands
	Pleistocene	Pls2				Pls2	Sands
		Pls1				Pls1	Sands
		Pjr				Pjr	Reef complex (undifferentiated) Limestone/calcareous predominant, c; Sandstone/sand predominant, s; shell predominant, h
TERTIARY	Pliocene	Mu	Upper Member	MUGARINI FORMATION (M)	BARATU FORMATION	Mu	Sandstones, subordinate limestones/shales
		R				R	Shales, subordinate limestones, l
CRETACEOUS		Mtu	Upper Member	UDURU FORMATION (U)		Mtu	Shales, subordinate limestones, l
		Mtu	Middle Member			Mtu	Shales/siltstones/sandstones/limestones Sandstone, s; limestones, l
		Yl	Lower Member			Yl	Limestones, (coral rich, c; calcitic/pisolitic, o) subordinate shales/siltstones/sandstones
JURASSIC		Mzi	Upper Member	WAZEKI FORMATION (W)		Mzi	Sandstones/arkoses
		Mzi	Middle Member			Mzi	Sandstones/arkoses (Shales/siltstones/sandstones, Sl)
		Mzi	Lower Member			Mzi	Sandstones/arkoses
		Mku	Upper Member	WAMBAZI FORMATION (W)		Mku	Sandstones (Shales/siltstones/sandstones, Sl)
		Mku	Middle Member			Mku	Sandstones
		Mku	Lower Member			Mku	Sandstones
TRIASSIC		Myc	Upper Member	MALI YA CHURRI FORMATION (M)		Myc	Sandstones/shales/siltstones Shales/siltstones, subordinate sandstones, s Shales with nodules containing fossil fish, f
		Myc	Middle Member			Myc	Sandstones/shales/siltstones Subordinate limestones (fragmental), fl
		Myc	Lower Member			Myc	Arkoses/sandstones/shales/siltstones, subordinate conglomerate, Co
PERMIAN		Tu	Upper Member	TARE FORMATION (T)		Tu	Arkoses/sandstones/conglomerates, subordinate shales/siltstones. Shales/siltstones predominant, Sl
		Tu	Middle Member			Tu	Arkoses/sandstones/conglomerates, subordinate shales/siltstones. Shales/siltstones predominant, Sl
CAMBRIAN(?) PRECAMBRIAN		A		MOZAMBIQUE BELT		A	Gneisses/schists/granulites/actinolites
		R				R	Igneous rocks

	Geological boundary, known		Mine, working
	Geological boundary, approximate (including photo-interpretation)		Mine, not working
	Geological boundary, inferred		Quarry, working
	Photo-lineament		Quarry, not working
	Fault, downthrow indicated		Road
	Fault inferred, downthrow indicated		Motorable track
	Breccia, shear zone		River
	Bedding, dip indicated		Spring
	Bedding, dip (< 15°) indicated (air-photo interpretation)		Landslide
	Bedding, flat-lying		Town, village
	Direction and plunge of axis (old)		Topographic station height in feet
	Anticline, plunge indicated		Line of section (schematic)
	Syncline, plunge indicated		
	Mineral occurrence		
	Laterite		
	Fossil wood tree trunks		

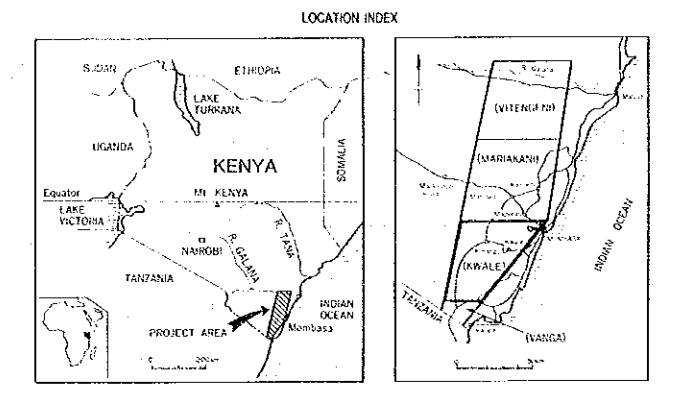


JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
February 1991

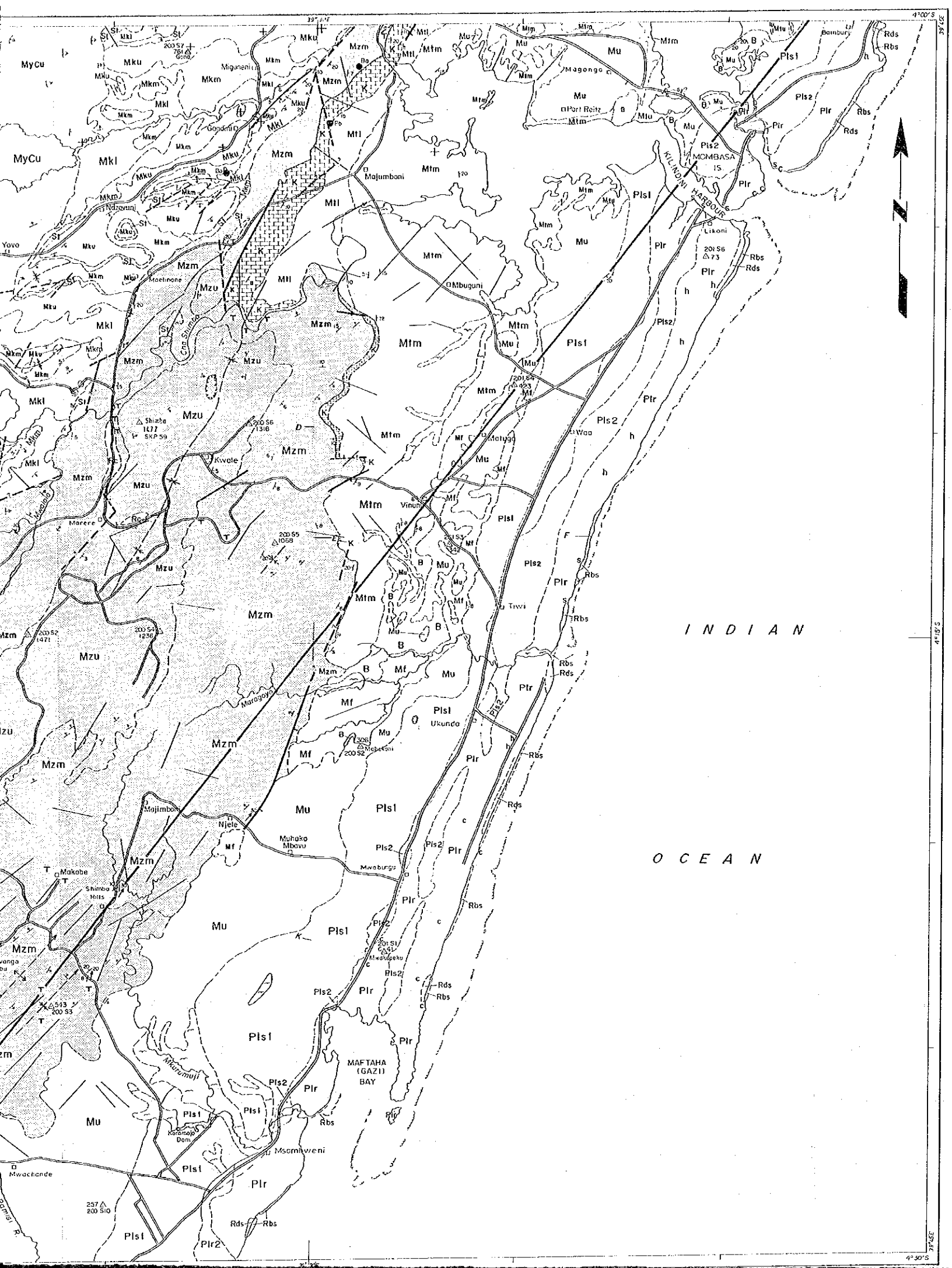
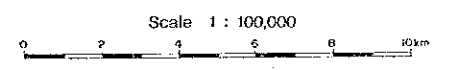


MINERAL EXPLORATION
IN
THE MOMBASA AREA, REPUBLIC OF KENYA
PHASE I

GEOLOGICAL MAP AND SECTIONS
OF THE KWALE SUB-AREA,
MOMBASA AREA



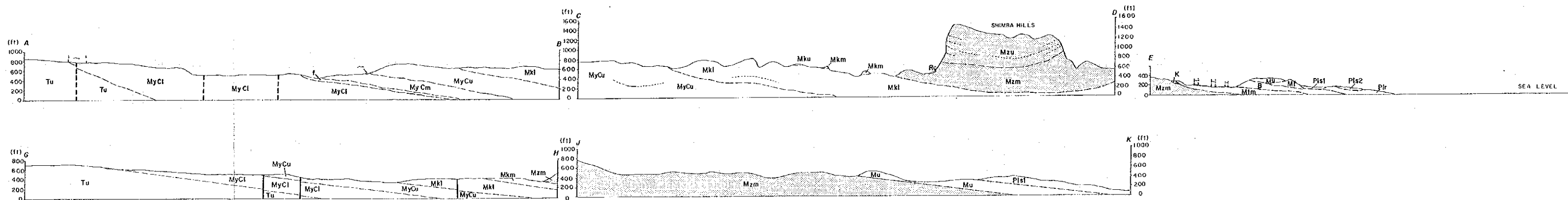
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
February 1981

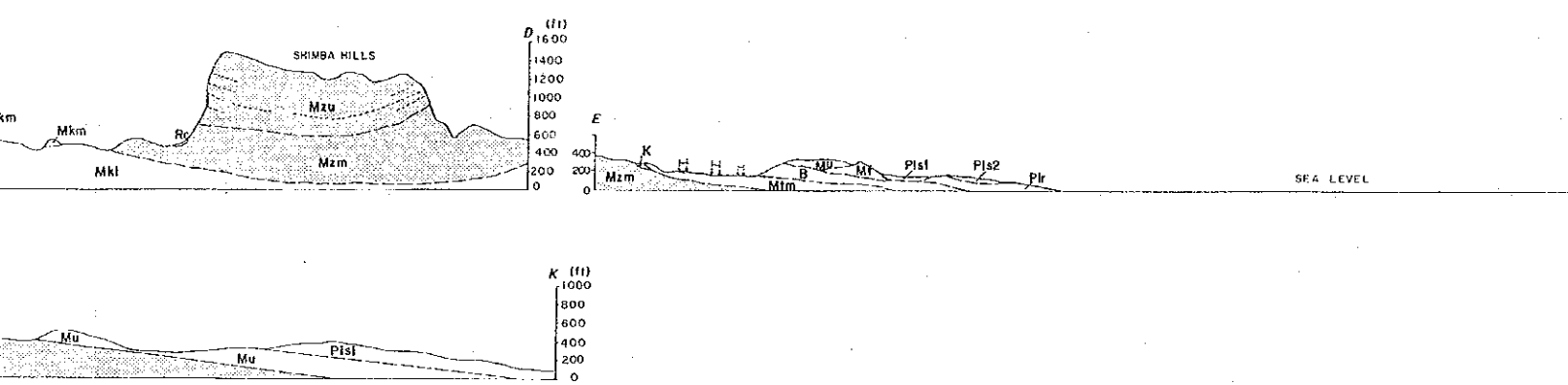
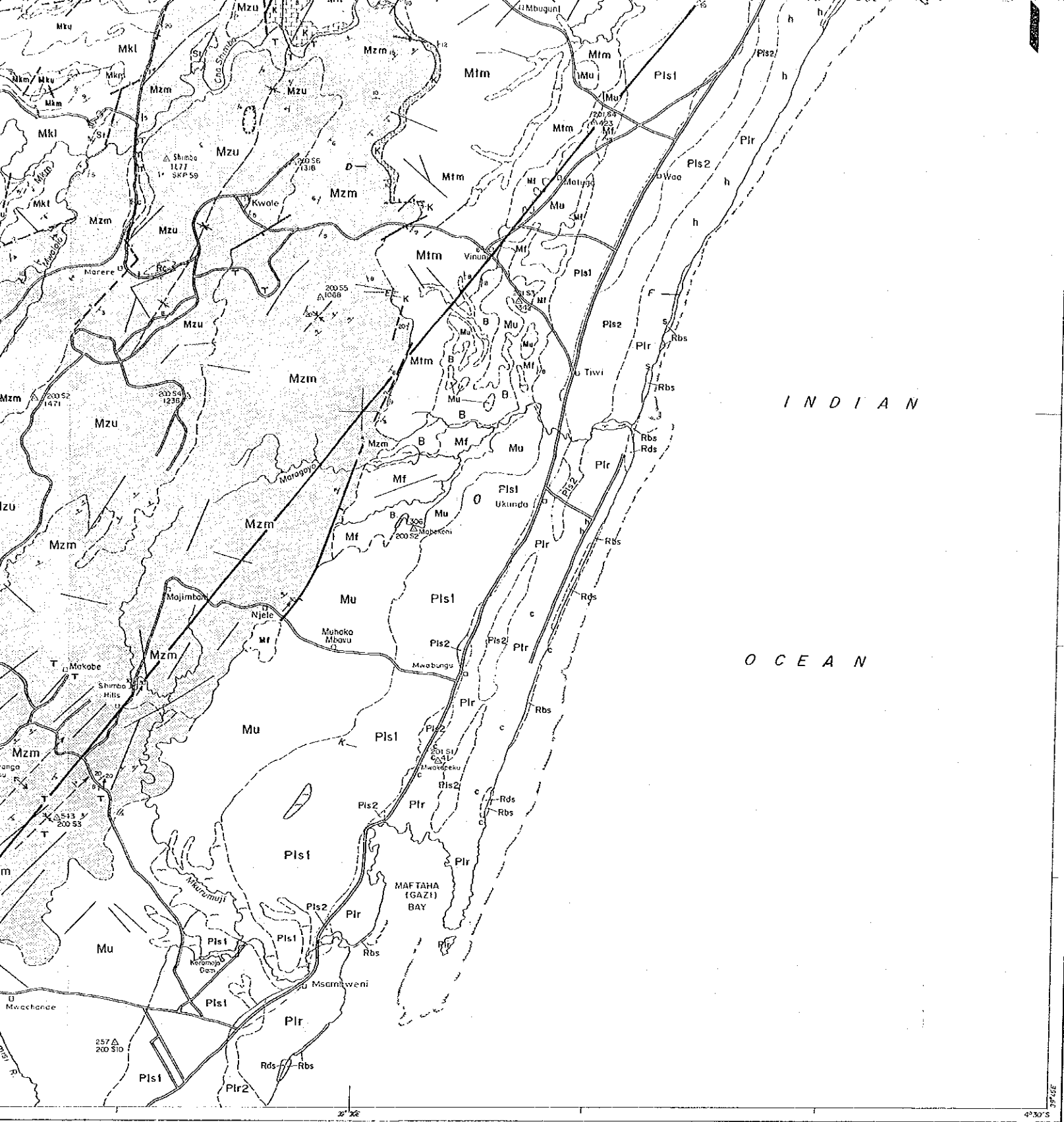


LEGEND

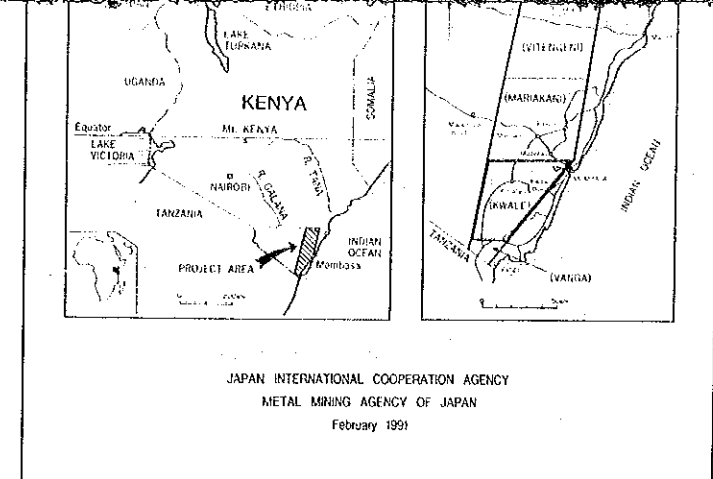
Recent	Rbs	Beach/estuarine sands
QUATERNARY	Rds	Dune sands
	Pls2	Sands
	Pls1	Sands
Pleistocene	Pir	Reef complex (undifferentiated) Limestone/calcareous predominant, c: Sandstone/sand predominant, s: shell predominant, h
	Yu	Sands
TERTIARY	Uf	Upper Member MAGARIINI FORMATION (U) SANDSTONES/SANDS, SUBORDINATE SHALES/SILTS
	B	BARATLE FORMATION SANDSTONES, SUBORDINATE Limestones/shales
CRETACEOUS	Mtu	Upper Member MTOPIA FORMATION (M) Shales, subordinate limestones, l
	Mtm	Middle Member Shales, subordinate sandstones, (limestones) l
	Mtl	Lower Member Shales/siltstones/sandstones
JURASSIC	Kf	KARRE FORMATION Limestones, subordinate shales/siltstones/sandstones
	Mzu	Upper Member MAZUKU FORMATION (M) Sandstones/arkoses
TRIASSIC	Mza	Middle Member Sandstones/arkoses (Siltstones/sandstones, St)
	Mku	Upper Member Sandstones
	Mka	Middle Member KARIAKANI FORMATION (K) Sandstones (Siltstones/sandstones, St)
PERMIAN	Mkl	Lower Member Sandstones
	Ycu	Upper Member YUJUYU CHUMBI FORMATION (Y) SANDSTONES/SHALES/SILTSTONES
	Yca	Middle Member Shales/siltstones, subordinate sandstones, s Shales with nodules containing fossil fish, f
PERMIAN	Ycl	Lower Member Shales/siltstones, subordinate sandstones, s
	Tu	Upper Member TANE FORMATION (T) Arkoses/sandstones/shales/siltstones, subordinate conglomerates/limestones
PERMIAN	Ta	Middle Member Arkoses/sandstones/conglomerates, subordinate shales/siltstones
	Ix	Igneous rocks Agglomerate, A; Carbonatite, C; Granite, F

	Geological boundary, known		Mine, working
	Geological boundary, approximate (including photo-interpretation)		Mine, not working
	Geological boundary, inferred		Quarry, working
	Photo-lineament		Quarry, not working
	Fault, downthrow indicated		Road
	Fault inferred, downthrow indicated		Motorable track
	Breccia, shear zone		River
	Bedding, dip indicated		Spring
	Bedding, dip (< 15°) indicated (air-photo interpretation)		Landslide
	Bedding, flat lying		Town, village
	Direction and plunge of minor fold		Trigonometric station height in feet
	Anticline, plunge indicated		Line of section (schematic)
	Syncline, plunge indicated		
	Mineral occurrence		
	Laterite		
	Fossil wood tree trunks		



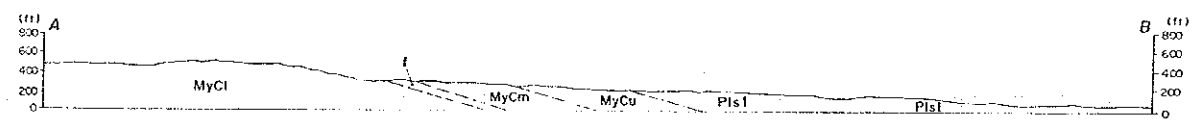
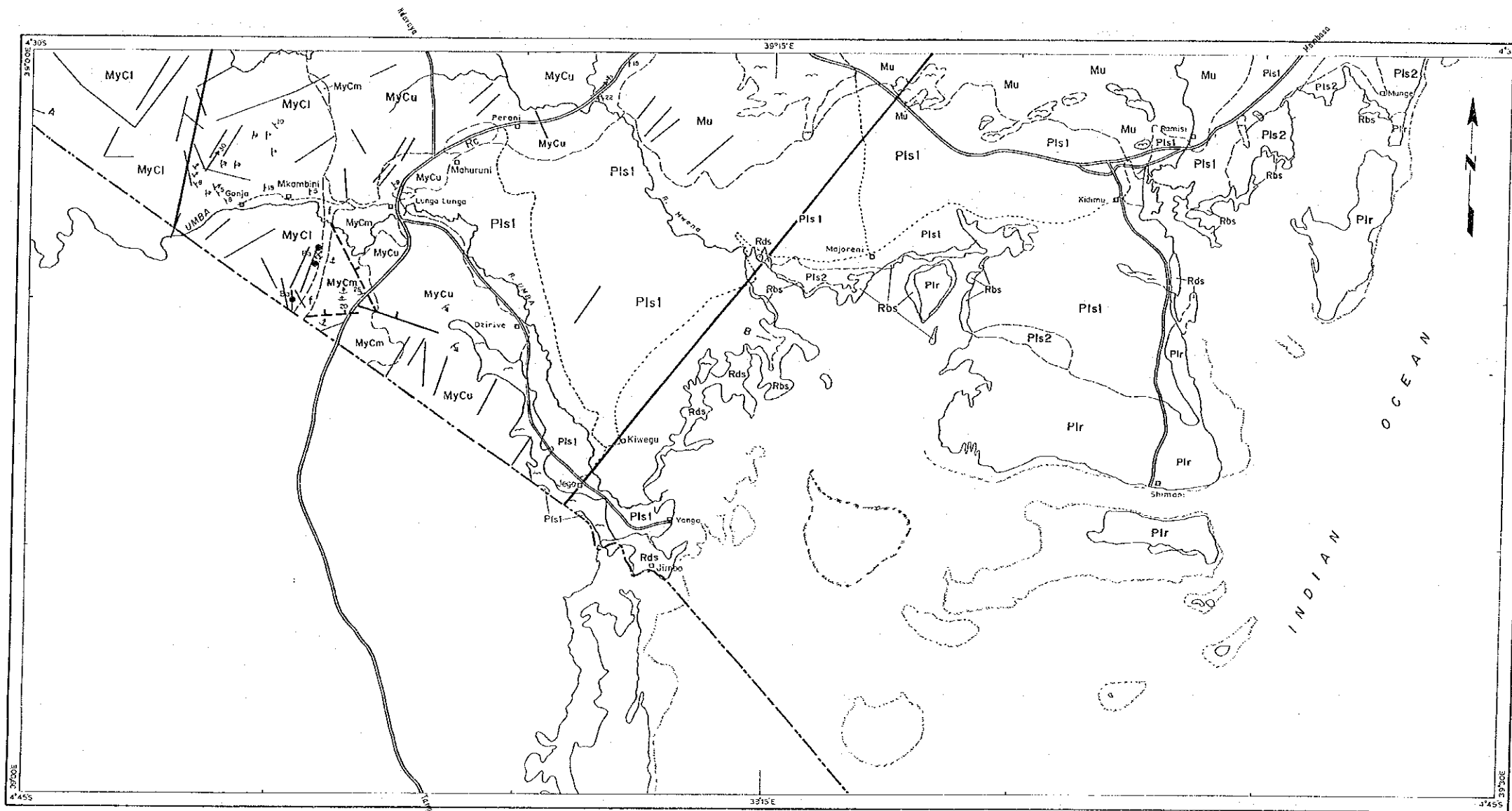


QUATERNARY	Rc	Colluvial and residual soils	
	Rbs	Beach/estuarine sands	
	Rds	Dune sands	
Pleistocene	Pls2	Sands	
	Pls1	Soils	
	Plr	Reef complex (undifferentiated) Limestone/calcareous predominant, c; Sandstone/sand predominant, s; shell predominant, h	
TERTIARY	Pliocene	Yu Upper Member MAGARIYI FORMATION (M) YARAPA FORMATION (Y)	
	Miocene	Wf BARATLEU FORMATION	
CRETACEOUS	Upper Member	Wtu Shales, subordinate limestones, l	
	Middle Member	Wtm Shales, subordinate sandstones, (limestones) l	
	Lower Member	Wtl Shales/siltstones/sandstones	
JURASSIC	KAMBE FORMATION		Limestones, subordinate shales/siltstones/sandstones
	Upper Member	Jku	Sandstones/arkoses
	Middle Member	Jkm	Sandstones/arkoses (shales/siltstones/sandstones, st)
	Lower Member	Jkl	Sandstones
TRIASSIC	MARIKANI FORMATION (M)		Sandstones (shales/siltstones; sandstones, st)
	Upper Member	Mku	Sandstones
	Middle Member	Mkm	Sandstones (shales/siltstones; sandstones, st)
PERMIAN	DURVA GROUP		Sandstones/shales/siltstones
	Upper Member	Pku	Shales/siltstones, subordinate sandstones, s
	Middle Member	Pkm	Shales with nodules containing fossil fish, f
	Lower Member	Pkl	Shales/siltstones, subordinate sandstones, s
	Upper Member	Tu	Arkoses/sandstones/shales/siltstones, subordinate conglomerates/limestones
	Middle Member	Tm	Arkoses/sandstones/conglomerates, subordinate shales/siltstones
			Igneous rocks Agglomerate, A; Carbonatite, C; Fenite, F



Scale 1 : 100,000
0 2 4 6 8 10 km

	Geological boundary, known		Vine, working
	Geological boundary, approximate (including photo-interpretation)		Vine, not working
	Geological boundary, inferred		Quarry, working
	Photo-lineament		Quarry, not working
	Fault, downthrow indicated		Road
	Fault inferred, downthrow indicated		Motorable track
	Breccia, shear zone		River
	Bedding, dip indicated		Spring
	Bedding, dip (< 15°) indicated (air-photo interpretation)		Landslide
	Bedding, flat lying		Town, village
	Direction and plunge of minor fold		Trigonometric station height in feet
	Anticline, plunge indicated		Line of section (schematic)
	Syncline, plunge indicated		
	Mineral occurrence		
	Laterite		
	Fossil wood tree trunks		



LEGEND

<p>QUATERNARY</p> <p>Recent</p> <p>Pleistocene</p> <p>TERTIARY</p> <p>Pliocene</p> <p>TRIASSIC</p> <p>PERMIAN</p>	<p>Recent</p> <p>Rbs</p> <p>Rds</p> <p>Pls2</p> <p>Pls1</p> <p>Plr</p> <p>Mu</p> <p>MyCu</p> <p>MyCm</p> <p>MyCl</p>	<p>Upper Member</p> <p>Upper Member</p> <p>Middle Member</p> <p>Lower Member</p> <p>YACARINI FORMATION (Y)</p> <p>YALI YA CHUMBI FORMATION (Y/C)</p>	<p>Outer limit of present-day reef</p> <p>Alluvium</p> <p>Colluvium and residual soils</p> <p>Beach/estuarine sands</p> <p>Dune sands</p> <p>Sands</p> <p>Sands</p> <p>Reef complex (undifferentiated)</p> <p>Limestone/calcareous predominant, c.</p> <p>Sandstone/sand predominant, s. shell predominant, h.</p> <p>Sands</p> <p>Sandstones/shales/siltstones</p> <p>Shales/siltstones subordinate sandstones, s.</p> <p>Shales with nodules containing fossil fish, f.</p> <p>Shales/siltstones subordinate sandstones, s.</p>	<p>● ss Mineral occurrence</p> <p>✕ Mine, not working</p> <p>— Road</p> <p>— Waterable track</p> <p>— River</p> <p>□ Tom, village</p> <p>— A — B — Line of section (schematic)</p>
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Geological boundary, known

Geological boundary, approximate (including photo-interpretation)

Photo-lineament

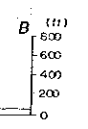
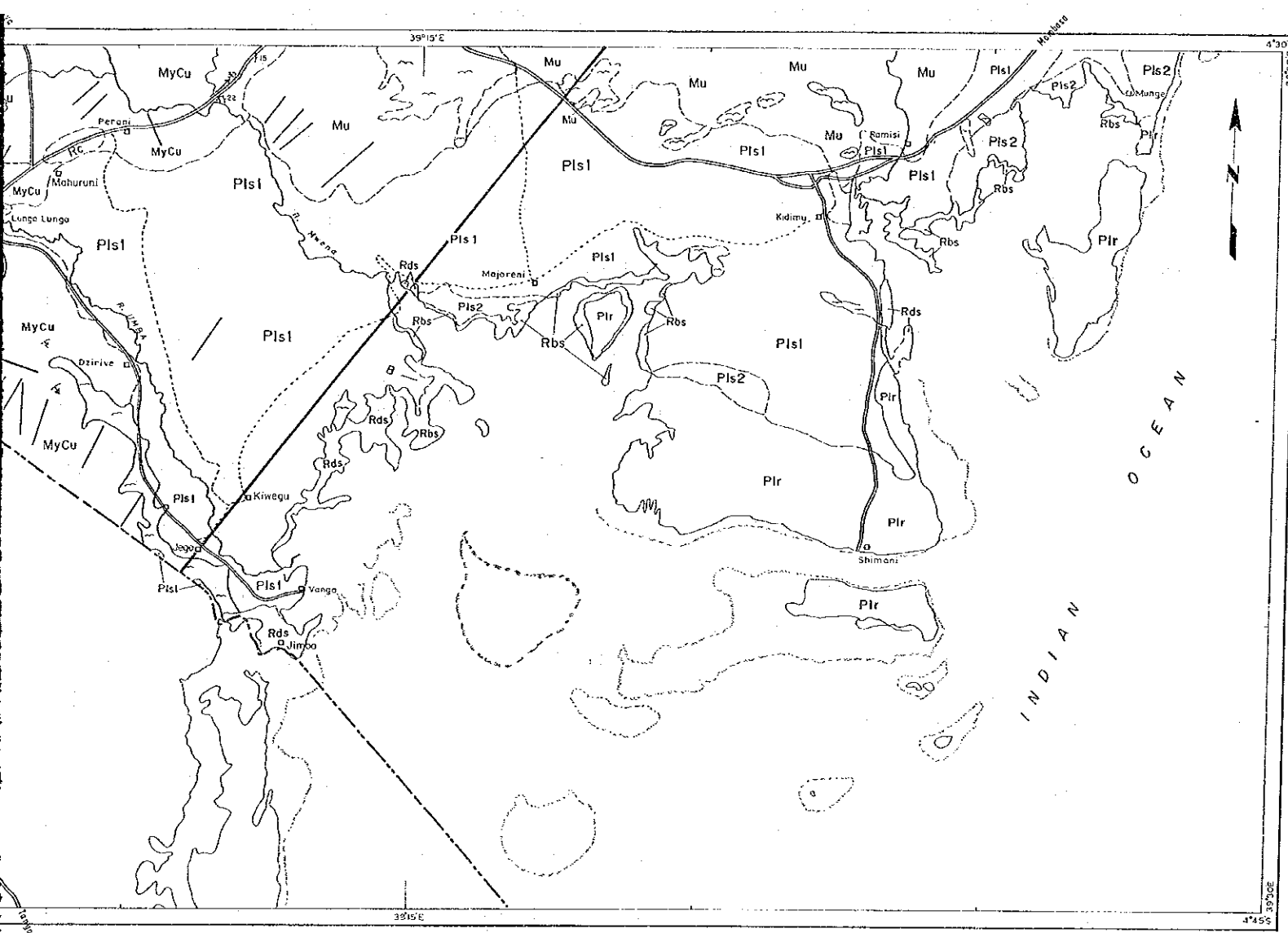
Fault, downthrow indicated

Fault inferred, downthrow indicated

Bedding, dip indicated

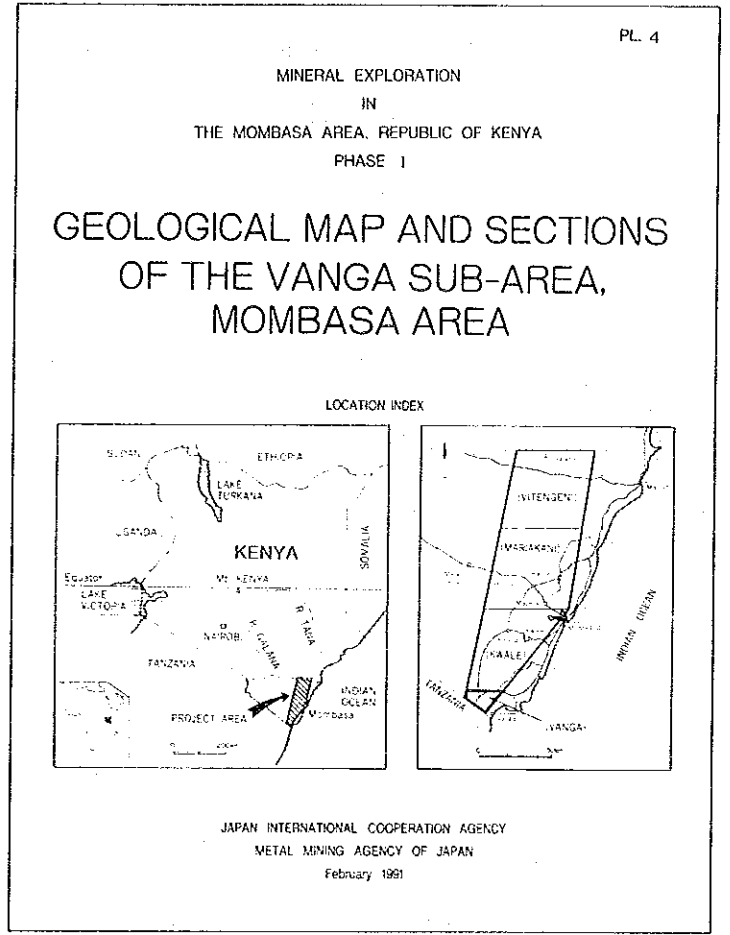
Bedding, dip (< 15°) indicated (air-photo interpretation)

Direction and plunge of minor fold



LEGEND

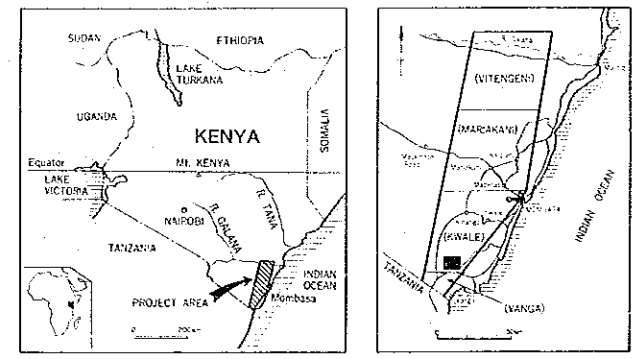
- | | | | |
|--|---|--|---|
| <p>QUATERNARY</p> <p>Recent</p> <p>Pleistocene</p> <p>TERTIARY</p> <p>Pliocene</p> <p>TRIASIC</p> <p>PERMIAN</p> | <p>Re</p> <p>Rbs</p> <p>Mds</p> <p>Pls2</p> <p>Pls1</p> <p>Pir</p> <p>Mu Upper Member</p> <p>MyCu Upper Member</p> <p>MyCa Middle Member</p> <p>MyCl Lower Member</p> | <p>Outer limit of presentday reef</p> <p>Alluvium</p> <p>Colluvium and residual soils</p> <p>Beach/estuarine sands</p> <p>Dune sands</p> <p>Sands</p> <p>Sands</p> <p>Reef complex (undifferentiated)</p> <p>Limestone/calcareous, predominant: c</p> <p>Sandstone/sand predominant, s: shell predominant, h</p> <p>Sands</p> <p>Sandstones/shales/siltstones</p> <p>BURELA GROUP</p> <p>Shales/siltstones, subordinate sandstones, s</p> <p>Shales with nodules containing fossil fish, f</p> <p>Shales/siltstones, subordinate sandstones, s</p> | <p>●Bs Mineral occurrence</p> <p>✕ Mine, not working</p> <p>— Road</p> <p>Motorable track</p> <p>— UMBU — River</p> <p>□ Town, village</p> <p>— A — B — Line of section (schematic)</p> |
|--|---|--|---|



MINERAL EXPLORATION
IN
THE MOMBASA AREA, REPUBLIC OF KENYA
PHASE I

GEOLOGICAL MAP OF
THE MRIMA HILL-
JOMBO HILL AREA

LOCATION INDEX



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
February 1991

Scale 1:25,000



LEGEND

Recent				
Quaternary	Rc			Recent alluvium
Tertiary	Mu	Upper Member	MARAKAYI FORMATION (M)	Sand
Quaternary	Mzm	Middle Member	MARAKAYI FORMATION (M)	Sandstone and siltstone
Tertiary	Mkl	Lower Member	MARAKAYI FORMATION (M)	Sandstones
Tertiary	MyCu	Upper Member	MARAKAYI FORMATION (M)	Sandstone and siltstone
	Ig			Granite, gneiss, schist, amphibolite, and other metamorphic rocks

- Geological boundary (known and approximate)
- Photo-lineament
- Fault, existing and inferred
- Mineralized vein
- Mineralization area
- Mineralized float
- Bedding, dip and strike
- Bedding by air-photo interpretation
- Intrusive rock (Lamprophyric dyke)
- Line of section

