Geology & Mineral Resources of Myanmar

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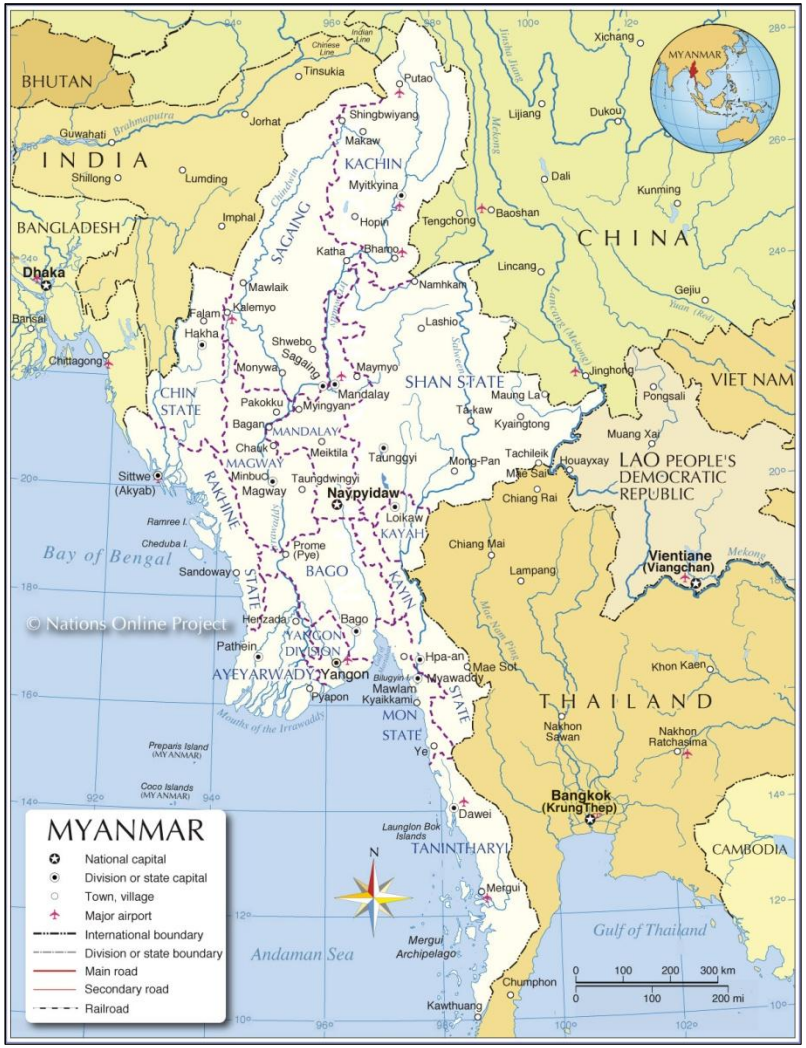
Assistant Director (Geologist)

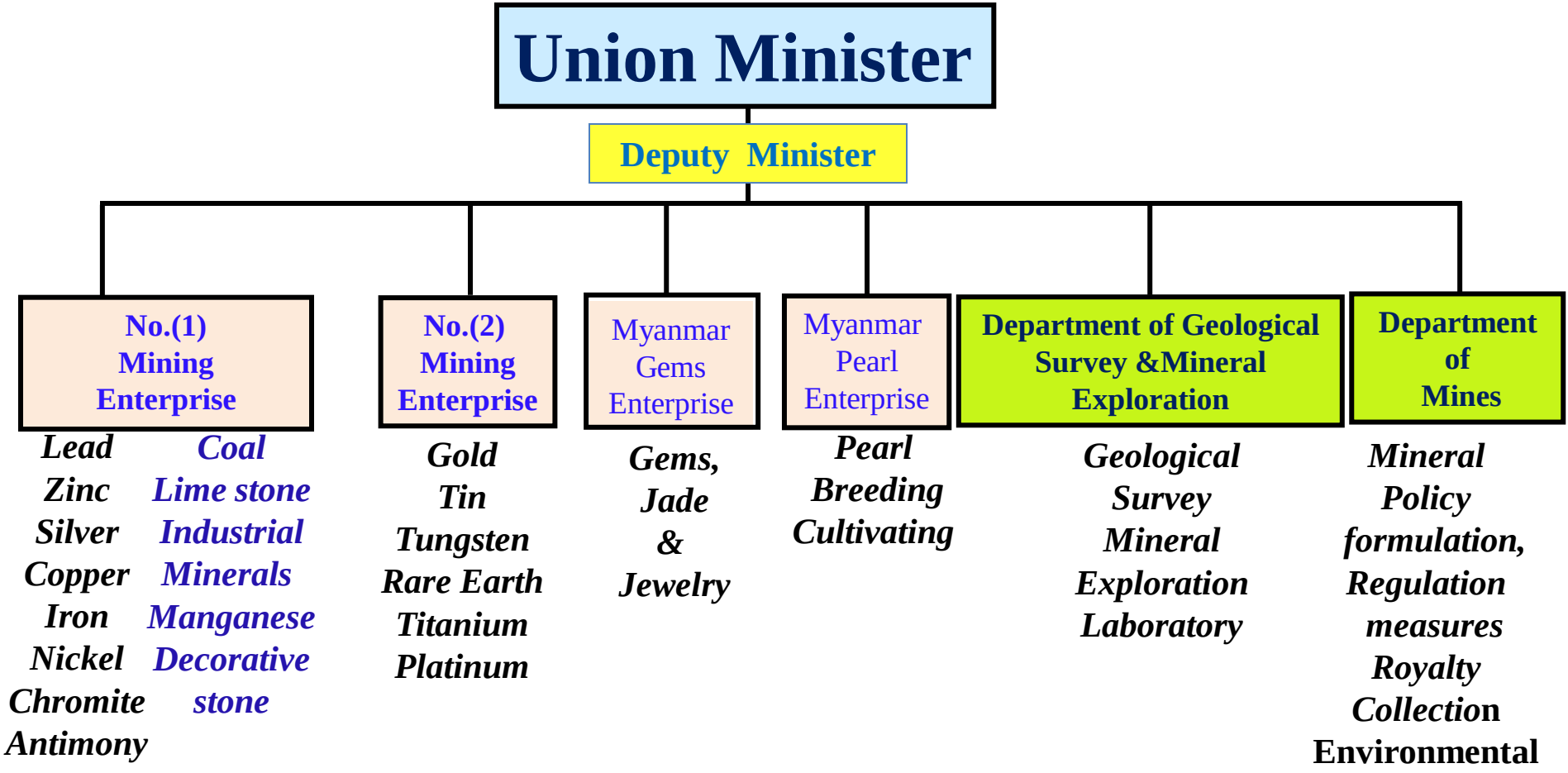
DEPARTMENT OF GEOLOGICAL SURVEY AND MINERAL EXPLORATION

MINISTRY OF MINES

Myanmar is endowed with resources of arable land, natural gas, mineral deposits, fisheries, forestry and manpower.



Area	**:**	**678528 sq.km**
Coast Line	**:**	**2100 km**
Border	**:**	**4000 km**
NS Extend	**:**	**2200 km**
EW Extend	**:**	**950 km**
Population	**:**	**>51millions(est:)**
Region	**:**	**7**
State:	**:**	**7**
Location	**:**	**10º N to 28º 30'**
		92º 30' E to 101º30'



- **The Ministry of Mines is the government authority responsible for implementation of the policy, legislation and enforcement of law, Rules and Regulations in the Mining Sector.**

- **The policy of the Ministry of Mines is not to make new investment on its own, but to encourage foreign and local investors to invest in the mining Sector.**

- **At present, the Ministry of Mines has licensed to the existing mines and large deposits to the local & foreign investors for production.**

- **Foreign Companies or Investors should have to start from the grass-root exploration at the interest potential areas if they desire.**

DEPARTMENT OF GEOLOGICAL SURVEY AND MINERAL EXPLORATION

SET UP- 430

DIRECTOR GENERAL

DEPUTY DIRECTOR GENERAL

- **GEO PLANNING DIVISION**
  - GEOPHYSICS SECTION
  - GEOCHEMISTRY SECTION
  - SURVEY SECTION
  - DRILLING SECTION
  - PHOTOGEOLOGY SECTION
  - PETROLOGY SECTION
  - GEOLOGY SECTION
  - PALETONLOGY SECTION
  - LIBRARY & MUSEUM
- **CHEMICAL LABORATORY**
- **PROCUREMENT**
  - TELECOMMUNICATION SECTION
  - ELECTRONIC SECTION
  - CIVIL ENGINEERING SECTION
  - ELECTRICITY ENGINEERING SECTION
  - MOTOR VEHICAL SECTION
- **ADMINISTRATIVE DIVISION**
- **ACCOUNTING DIVISION**

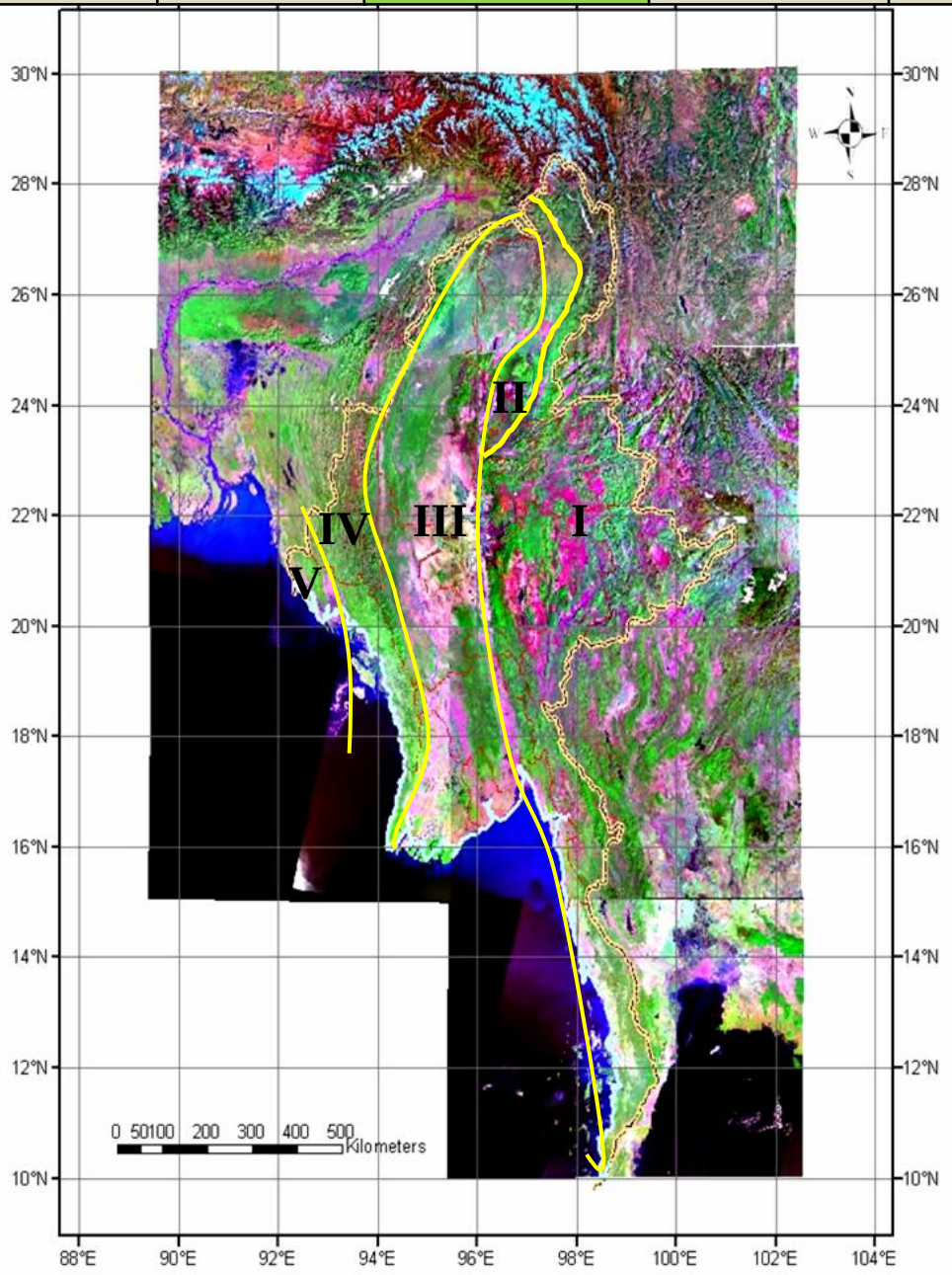
❖ **DGSE is responsible for country wide geological mapping , mineral prospecting and exploration and joint venture with foreign companies in mineral exploration and feasibility study.**

- **GEOLOGICAL MAPPING**
- **MINERAL PROSPECTING**
- **MINERAL EXPLORATION**
  - **TOPOGRAPHIC SURVEY**
  - **DETAIL GEOLOGICAL MAPPING**
  - **GEOCHEMICAL SURVEY**
  - **GEOPHYSICAL SURVEY**
  - **DRILLING**
  - **DATA ASSESSMENT AND EVALUATION**
- **LABORATORICAL ANALYSIS**
- **JOINT VENTURES with FOREIGN AND LOCAL COMPANIES**

BACKGROUND HISTORY

- ❖ 1836 - Geological Survey of India (Myanmar Branch)
- ❖ 1948 - Burma Geological Department and State Owned

  Departments, Universities
- ❖ 1974- Department of Geological Survey and Mineral Exploration
- ❖ 1970-78 - Colombo, UNDP, German Technical Aid
- ❖ 1994 to Present - Joint ventures exploration



From East to West.

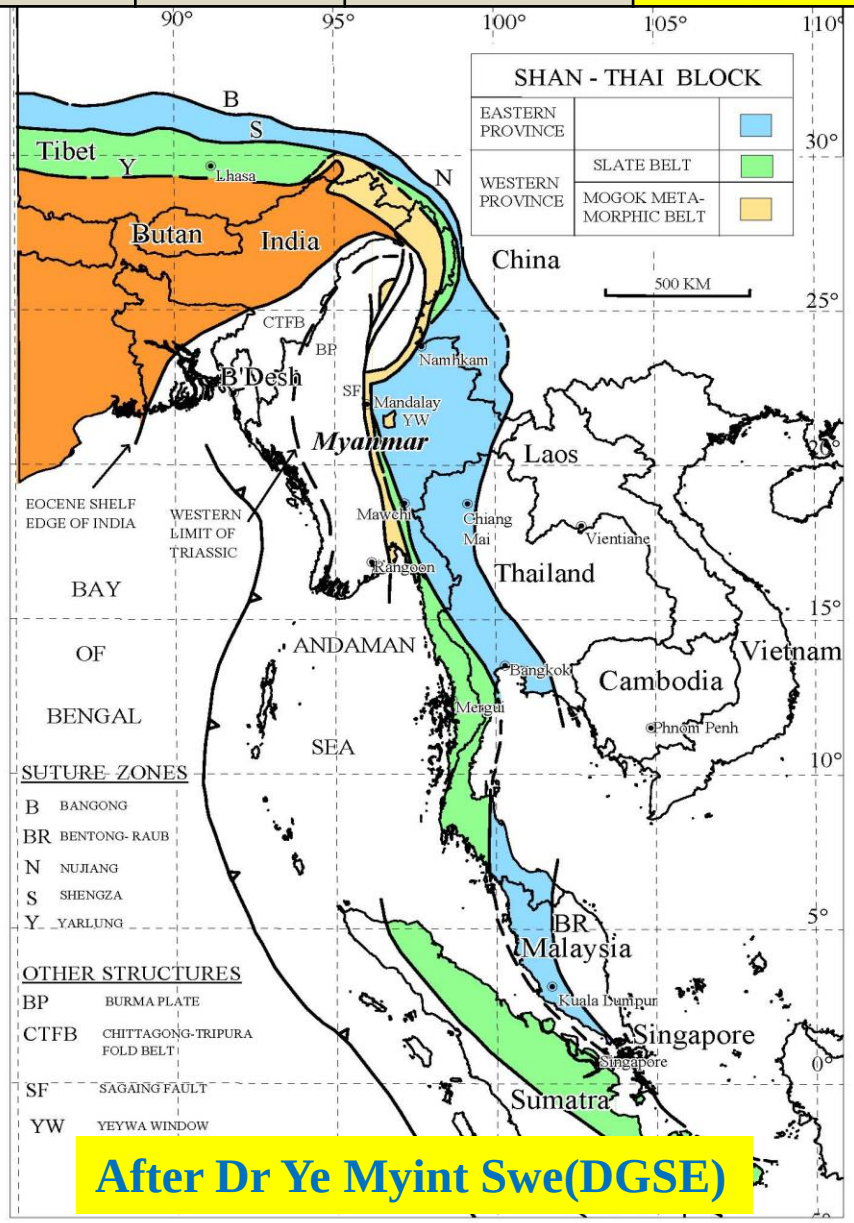
I. The Eastern Highlands

II. Upper Irrawady Province (Tagaung- Myitgyina Belt)

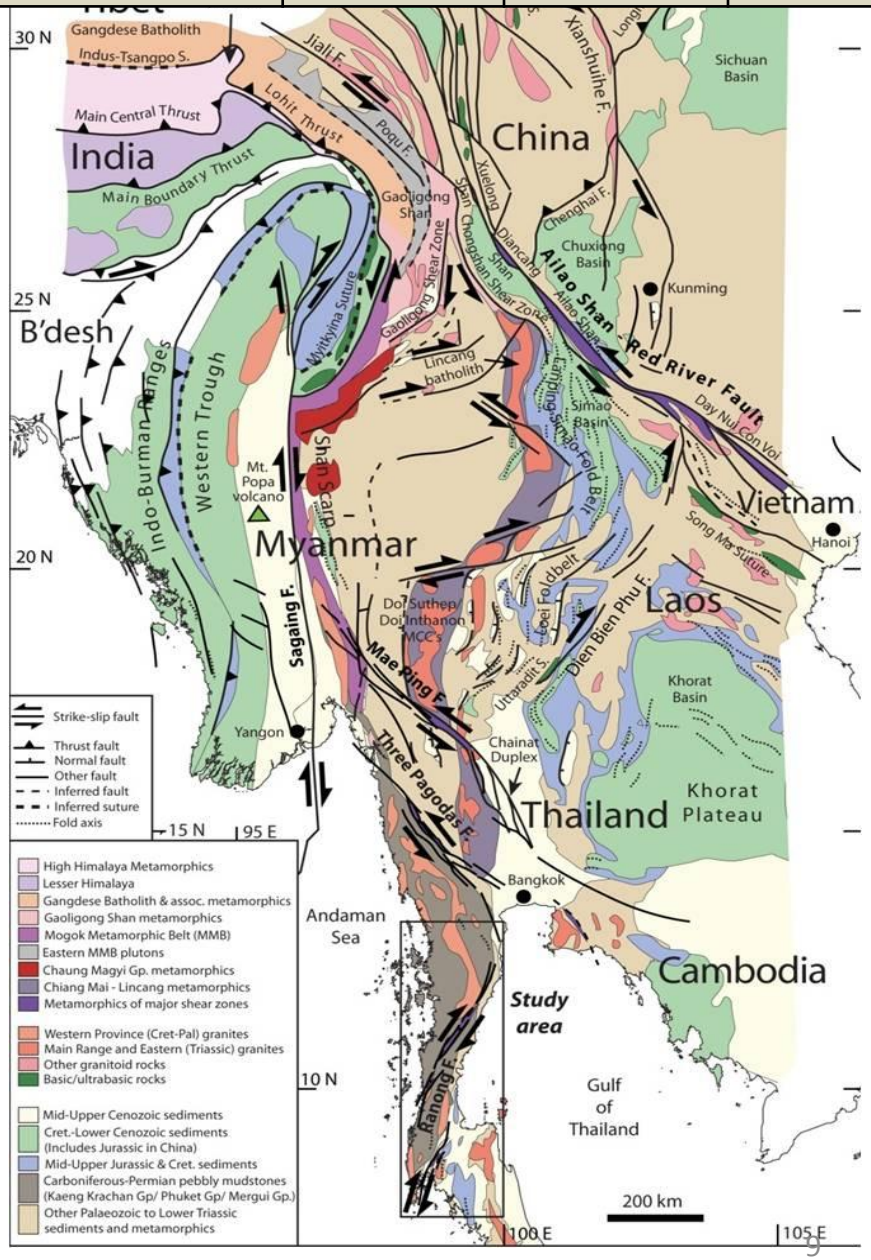
III. The Central lowlands

IV. The Western Ranges

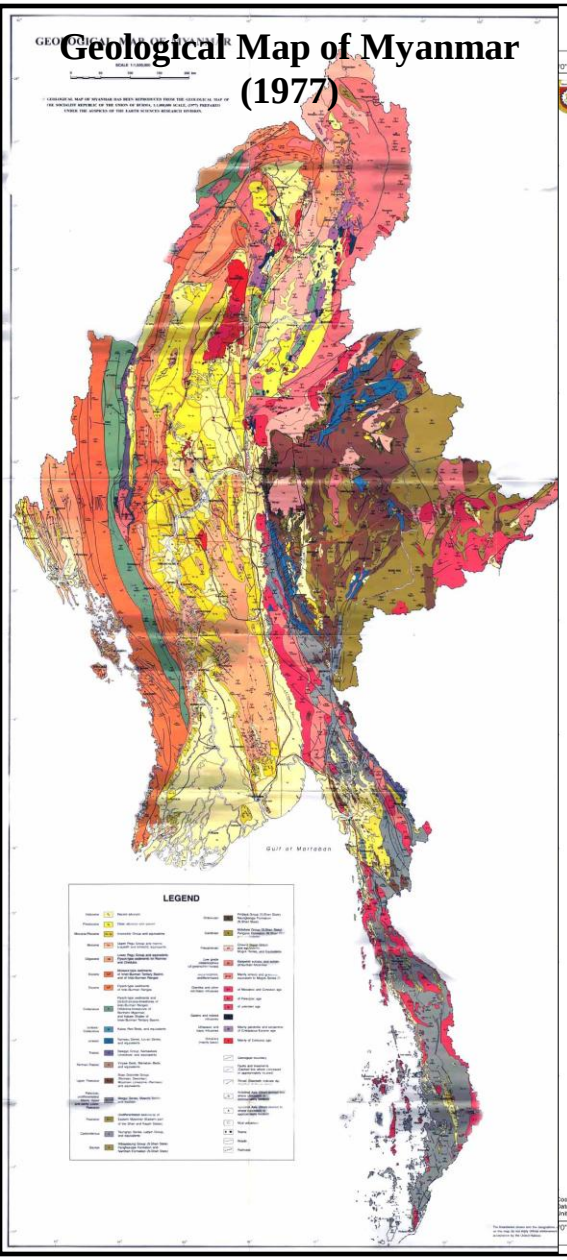
V. The Arakan Coastal Belt



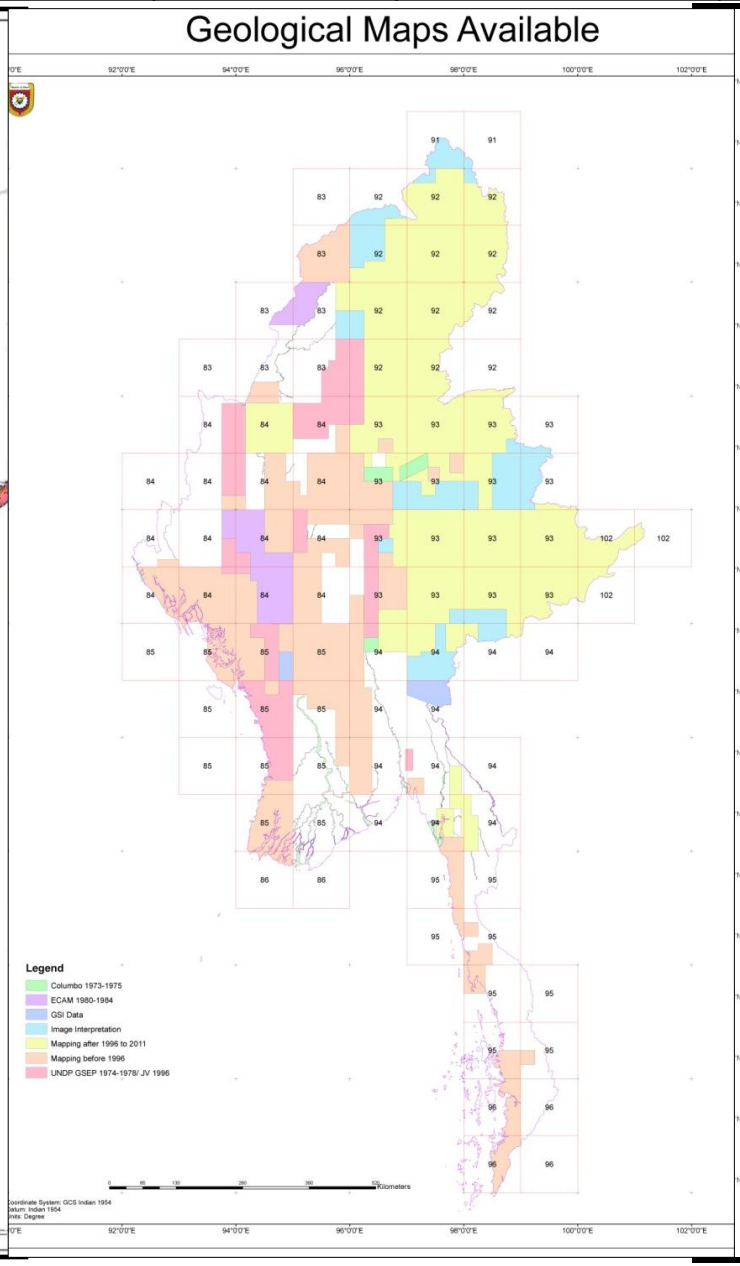
After Dr Ye Myint Swe(DGSE)



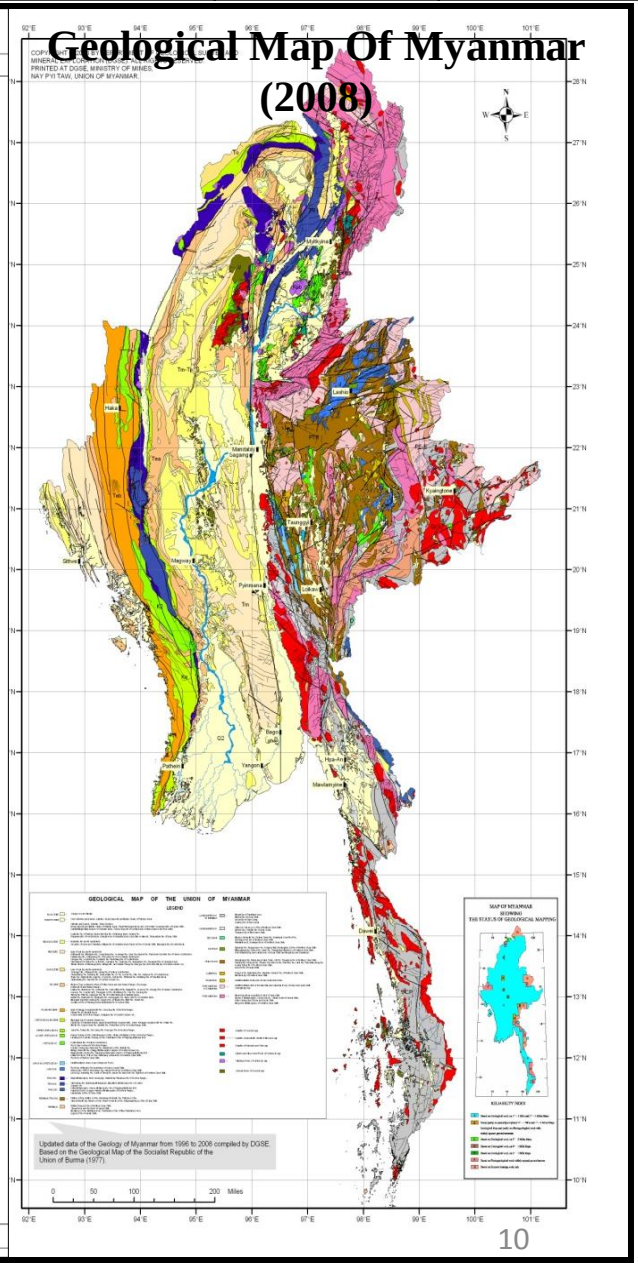
Geological Map of Myanmar (1977)



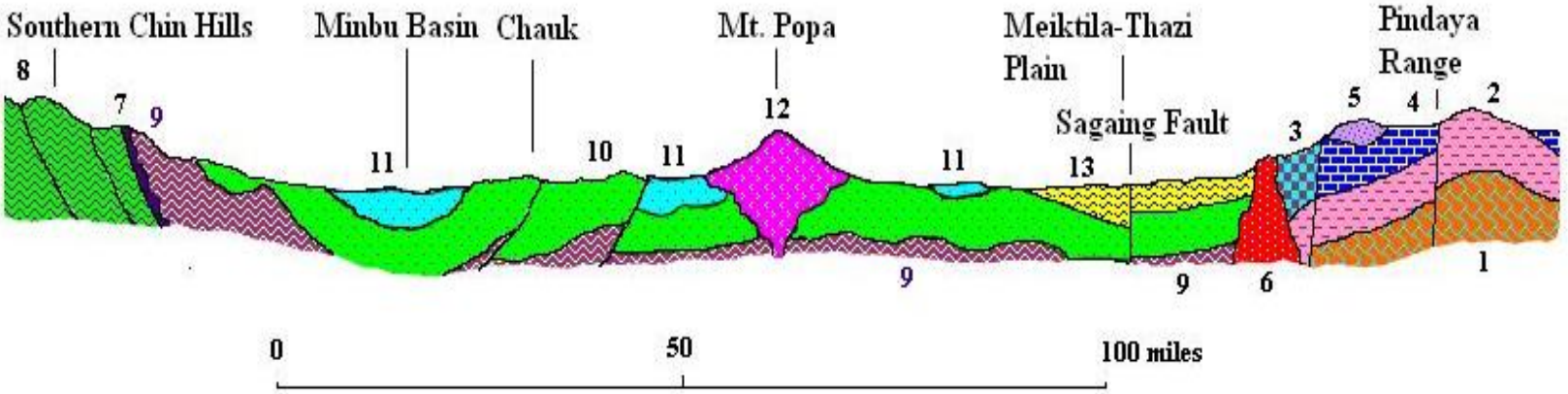
Geological Maps Available



Geological Map Of Myanmar (2008)



GENERALIZED GEOLOGICAL CROSS-SECTION ACROSS MYANMAR, APPROXIMATELY ALONG LATTITUDE 21° N
(Vertically Scale greatly exaggerated)

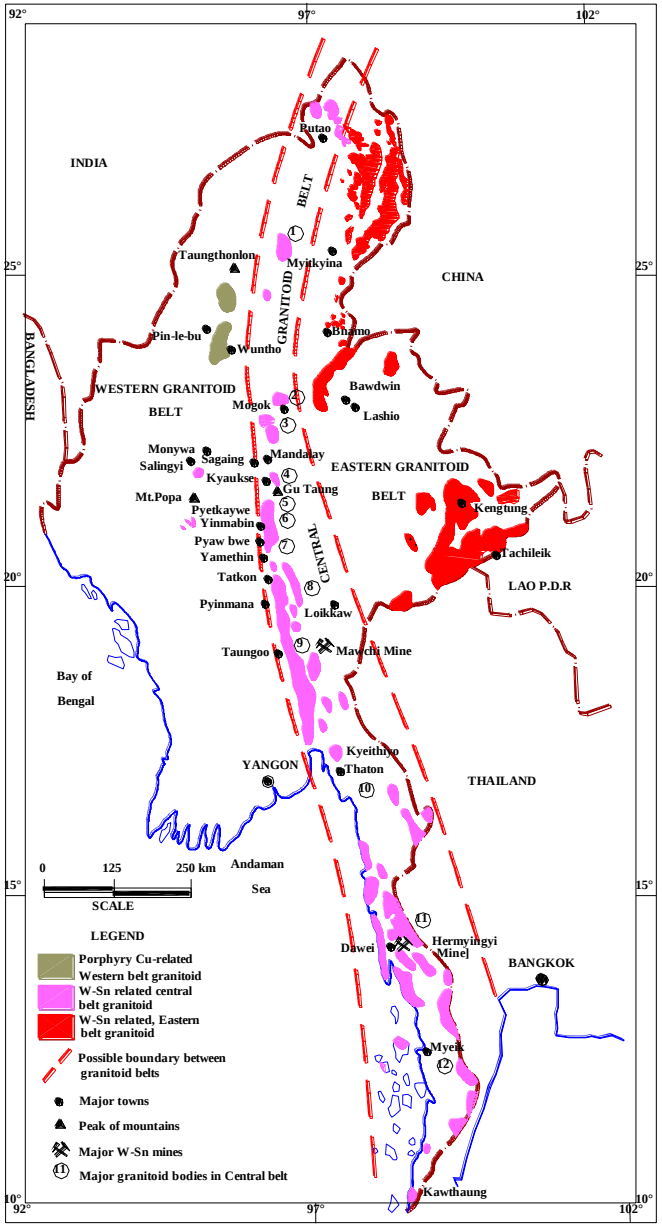


1_ Chaung Magyi Group; 2_ Lower Paleozoic units; 3_ Lower Carboniferous units; 4_ Plateau Limestone
5_ Jurassic Units; 6_ Mesozoic granitoids; 7_ Upper Cretaceous-Paleocene ultrabasic rocks; 8_ Miocene-Eocene flysch
9_ Eocene molasse; 10_ Pegu Group; 11_ Irrawaddy sandstones; 12_ Upper Cenozoic Volcanics; 13_ Alluvium

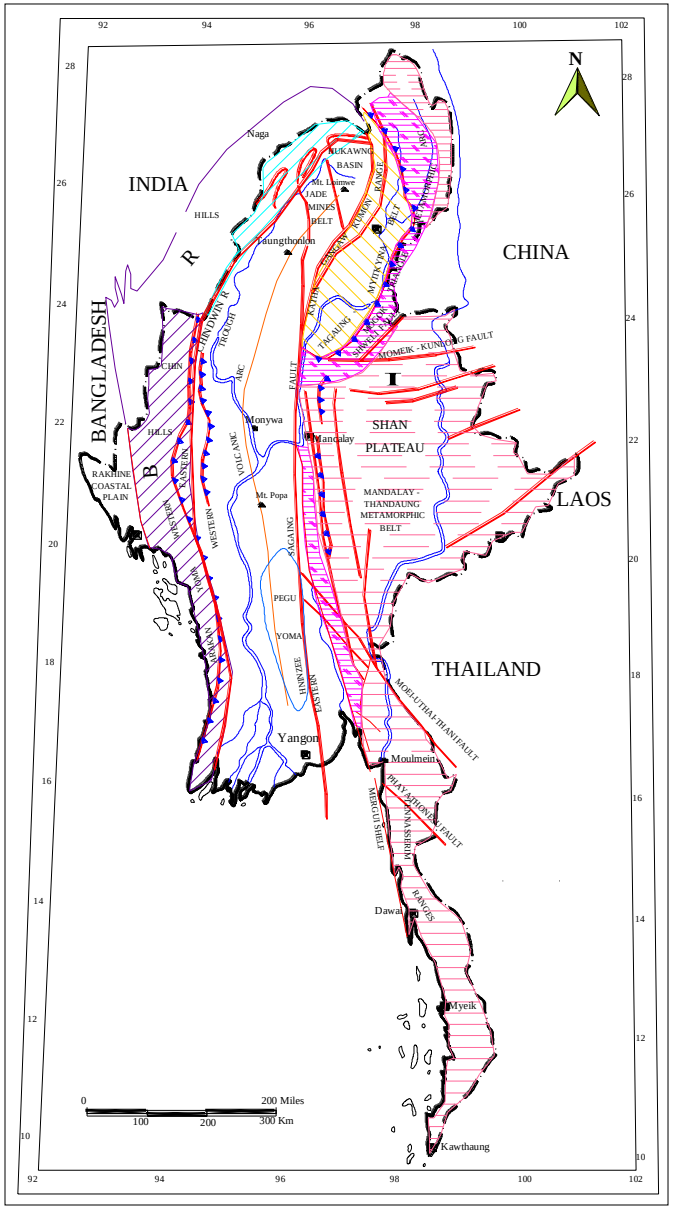
Dr. U Thein, 1992

GENERALIZED GEOLOGICAL CROSS-SECTION ACROSS MYANMAR

DISTRIBUTION OF GRANITOIDS

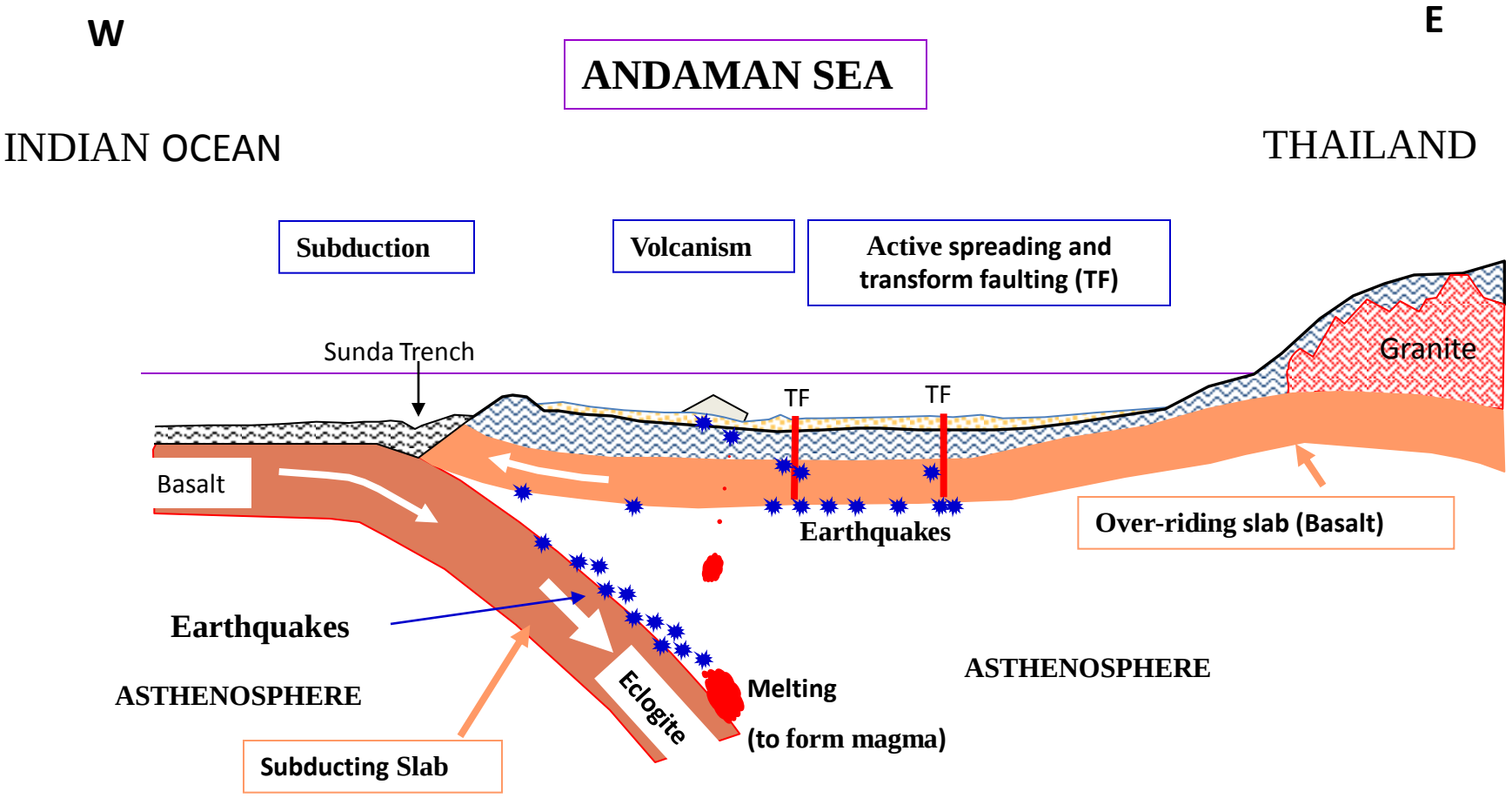


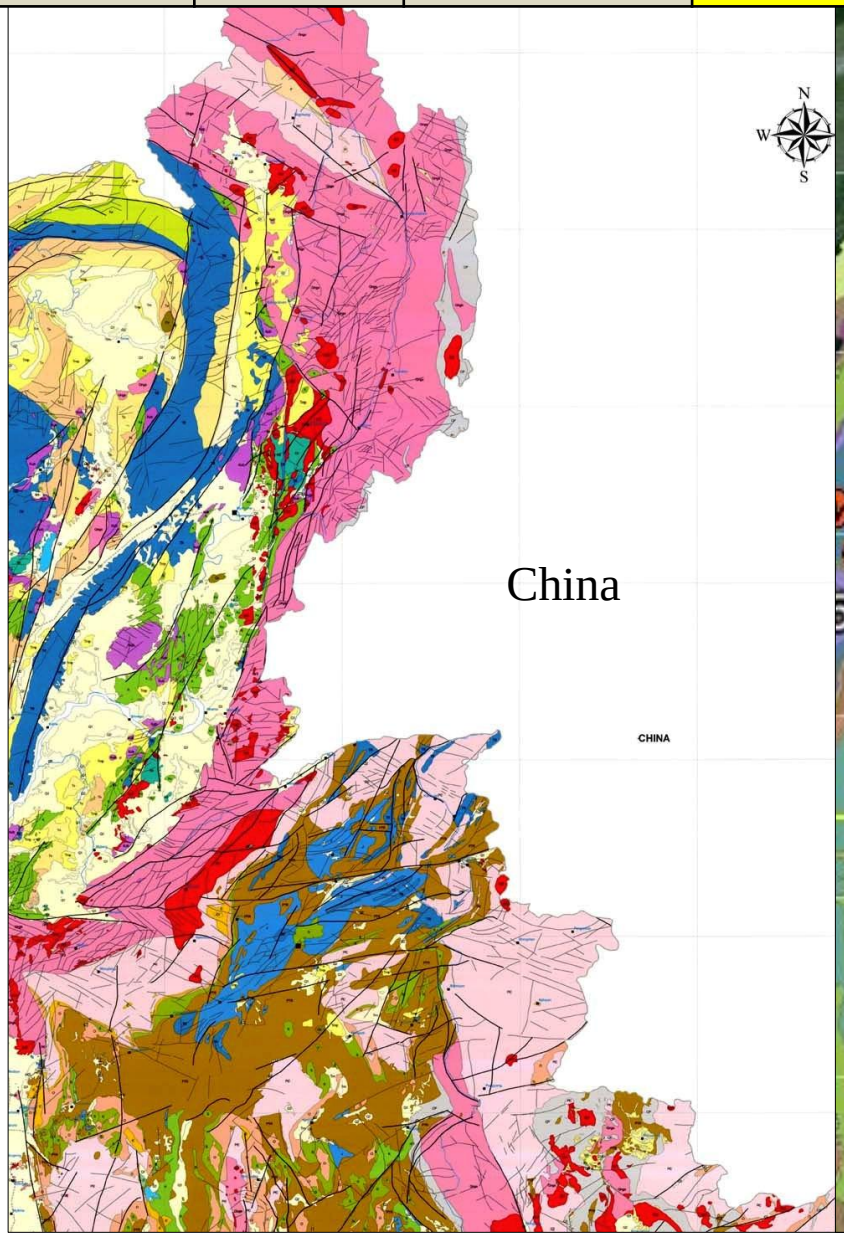
SIMPLIFIED STRUCTURAL MAP

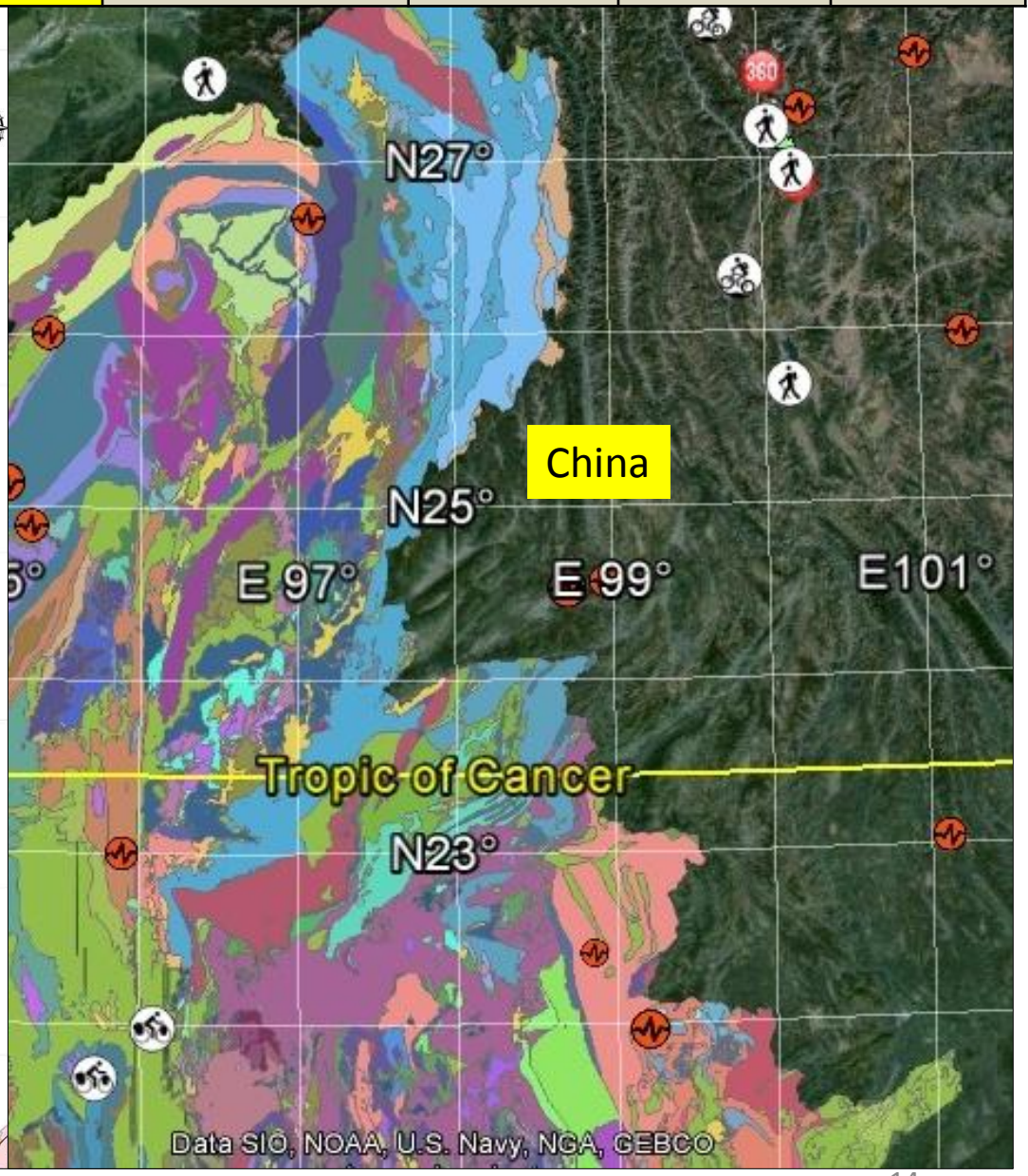


Three modes of earthquake generation in the Andaman Sea

(Schematic tectonic cross-section along Lat 11˚N)



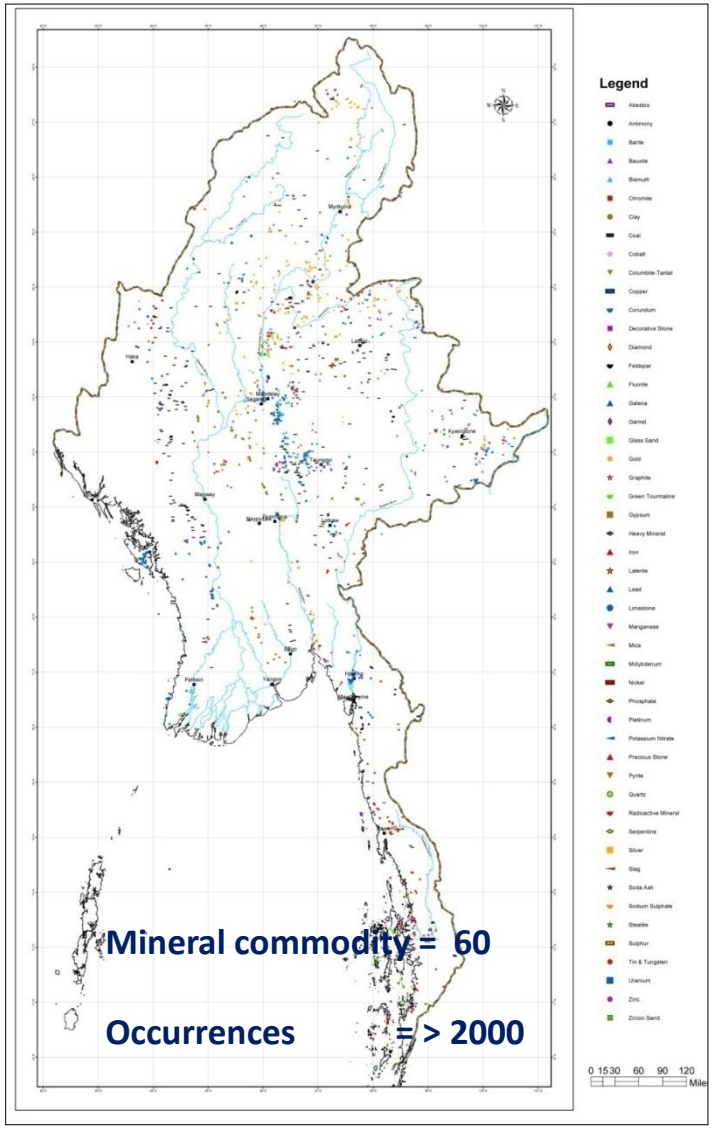

China
CHINA

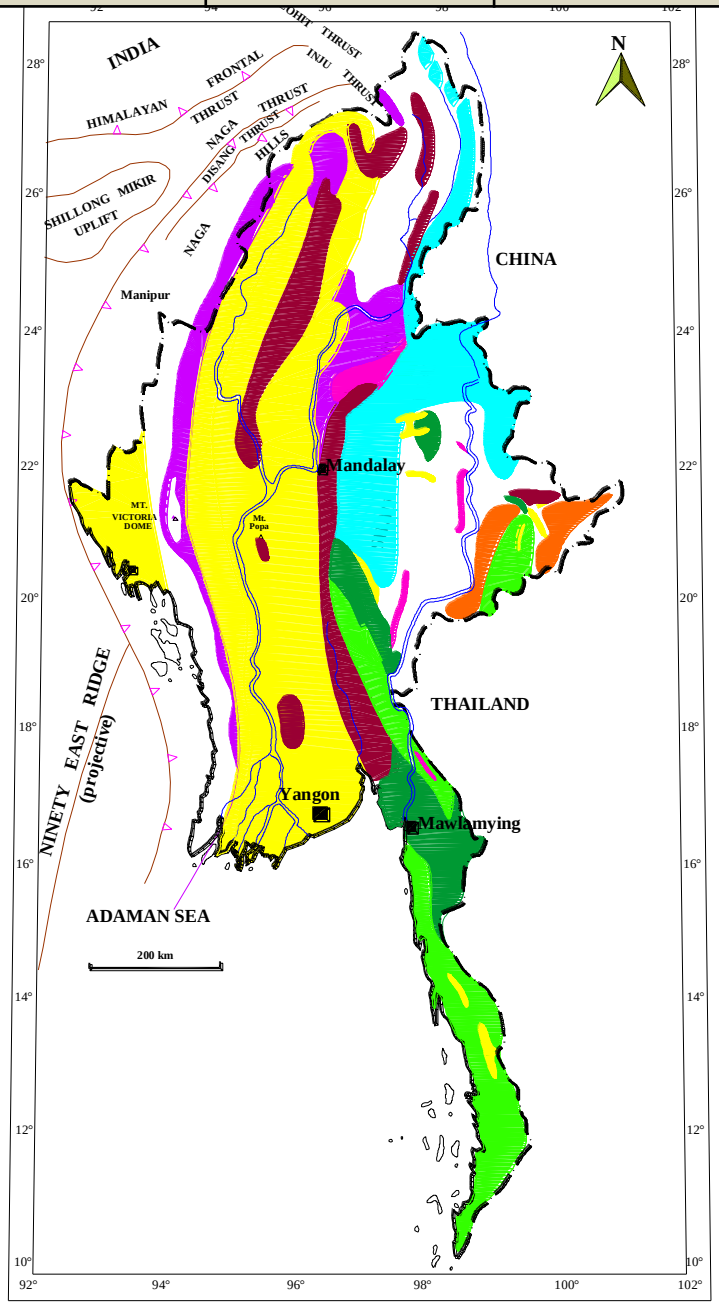

N27°
China
N25°
E 97°
E 99°
E101°
Tropic of Cancer
N23°
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

- **Myanmar at present can be categorized as four major richness on the status of mineral resources.**

General Category	Minerals
Very rich	Jade, Ruby, Sapphire, Limestone
Rich	Copper, Lead, Zinc, Tin, Tungsten, Gold, Coal, Barite
Fairly rich	Antimony, Silver, Nickel, Gypsum, Iron, Manganese
Poor	Chromite, PGM Minerals, Radioactive Minerals, Diamond, Fertilizer Minerals, Fluorite, Bauxite, Mercury, Kaolin, Feldspar, Quartz, Bentonite, Mica REE

MINERAL DITRIBUTION OF MYANMAR





INDEX

- Tin- Tungsten Belts
- Antimony Belts
- Lead – Zinc – Silver- Copper Belts
- Gold- Copper- Iron Belts
- Nickel- Chromite- Copper- Gold- Platinum Belts
- Iron – Manganese Belt
- The Precious Stone Belts
- Oil- Gas and Coal Belts

MINERAL BELTS OF MYANMAR

After U Soe Thi Ha (2006)

In Myanmar, Mineral occurrences include

1. *Metallic ore minerals*

Iron & metals for steel alloys- ***Fe, Mn, Cr, Ni, Mo***

Base & non-ferrous metals – ***Pb, Zn, Cu, Sn, W, Sb & Ti***

Precious & rare metals- ***PGM, Au, Ag, Nb, Ta***

2. *Industrial minerals & non-metallic raw minerals*

Chemical & fertilizer minerals- ***Barite, fluorite, Gypsum, rock salt***

Ceramic & refractory minerals- ***clay, limestone, dolomite, feldspar, quartz, glass sand***

Construction & building materials- ***Decorative stones, road materials, limestone for cement***

3. *Preceous & semi-precious Gemstones*

Ruby, Sapphire, Jade, Diamond, etc

4. *Fuel minerals*

Oil, natural gas, oil shale, coal,

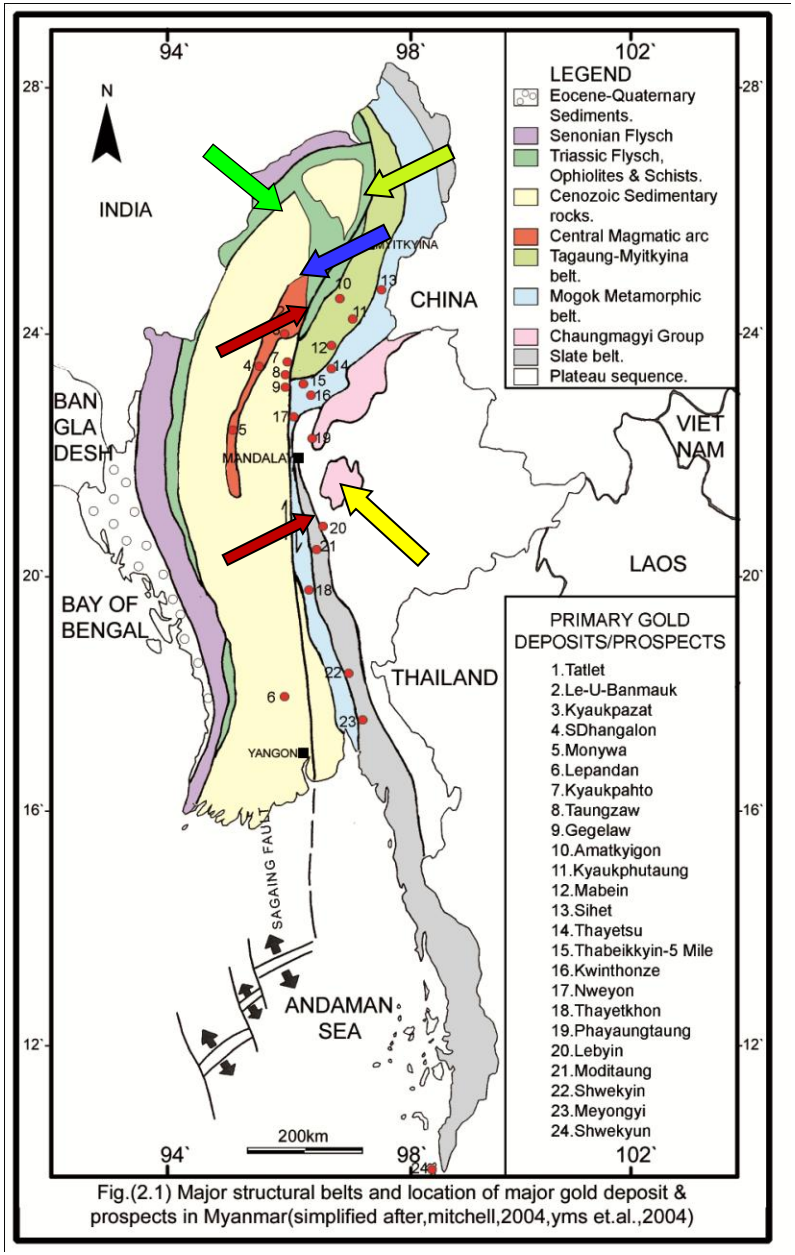


Fig.(2.1) Major structural belts and location of major gold deposit & prospects in Myanmar(simplified after,mitchell,2004,yms et.al.,2004)

PRIMARY GOLD DEPOSITS/OCCURRENCES IN MYANMAR

(1) **Mesothermal gold-quartz lode, porphyry style Cu-Au & its related Epithermal Au along the central magmatic arc.**

(2) **Sediment-hosted epithermal Au mineralization along the Sagaing fault zone.**

(3) **Mesothermal and epithermal gold mineralization in Tagaung - Myitkyina belt.**

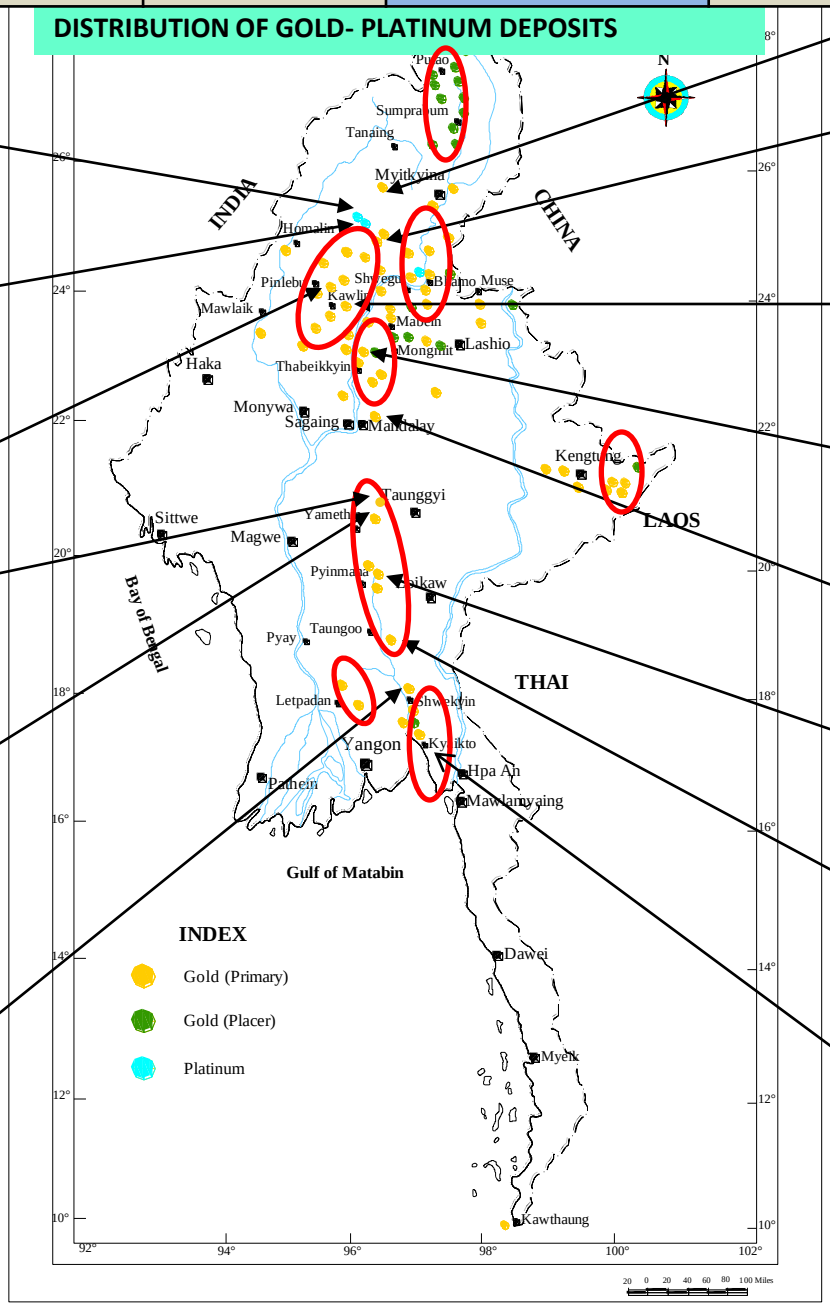
(4) **Au(Cu) skarn & Mesothermal veins in marble, gneiss and granite within the Mogok metamorphic belt & Jurassic marble of Turbidites.**

(5) **Slate belt style Mesothermal gold-quartz veins in Chaung Magyi & Mergui Groups.**

Gold Deposits

- **Mesothermal gold-quartz lode, porphyry style Cu-Au & its related Epithermal Au along the central volcanic arc of Kawlin, Wuntho, Banmauk area.**
- **Sediment-hosted epithermal Au mineralization along the Sagaing fault zone.**
- **Mesothermal and epithermal gold mineralization in Tagaung Myitkyina belt at Mabein, Shwegu and Bamoh area.**
- **Au(Cu) Skarn & Mesothermal veins in marble, gneiss and granite within the Mogok metamorphic belt Pyinmana, Singu and Thabeikkyin area and Au skarn & mesothermal veins in marble within Jurassic turbidites Kalaw area.**
- **Slate belt style Mesothermal gold-quartz veins in Chaung Magyi & Mergui Groups at Yamethin and Patheingyi area.**
- **Over 300 gold occurrences are recorded as Primary and Placer.**

DISTRIBUTION OF GOLD- PLATINUM DEPOSITS



Shadusuik (Kachin)
Pt + Pd - 0.01 gm/t
1 million (Possible)

Ngagyan (Kachin)
Pt + Pd - 0.53%
21 million (Possible)

Shangalon (Sagaing)
Au - 1.4- 12 ppm
0.02 million (Possible)

Shweminbon (Shan)
Au - 2 – 3 ppm
0.22 million (Possible)

Moehti Taung (Mandalay)
Au - 15- 27 ppm
0.06 million (Probable)

Myese Taung (Bago)
Au - 0.43 ppm
0.018 million (Possible)

Shwegyin (Bago)
Au - 0.1-0.35 gm/t
1.2 million Cu.yd. (Probable)

Wakan- Tanaing (Kachin)
Au - 0.04 gm/t
0.023 million Cu. Yd (Possible)

Namma- Kangon (Kachin)
Au - 0.13 gm/t
1.05 million Cu. Yd(Possible)

Kyaukpahto (Sagaing)
Au - 3 ppm
6 million (Probable)

Kwinthonse (Mandalay)
Au - 2-4 ppm
1.4 million (Probable)

Phayaungtaung (Mandalay)
Au - 4 ppm
3.7 million (Probable)

Pyinmana (Mandalay)
Au - 2 ppm
0.9 million (Possible)

Taunggu (Bago)
Au - 0.2-0.5 gm/t
0.2 million (Possible)

Meyongyi Meyonle (Mon)
Au - 1.5 – 30.6 gm/t
0.07 million (Possible)

Gold occurrences = 342
Potential = 67 million tons

Copper Deposits

- **More than 100 occurrences copper mineralization are recorded in Myanmar but most of them are of minor important.**

- **The copper mineralization within the central volcanic arc started from Mt. Popa and passes through lower Chindwin area where the volcanics are hosted to the porphyry copper deposits at the Sabe Taung, Kyesin Taung, & Lepadaung Taung, Monywa and continued to the Kawlin area of the Northern part of Myanmar.**

- **Copper is also found at Mandalay region Sabe Taung and Shan State as the Hydrothermal sources.**

DITRIBUTION OF COPPER DEPOSITS

Yekantha
Cu -2.8 %
0.13 million (Possible)

Shangalon
Cu -0.23 %
9 million (Possible)

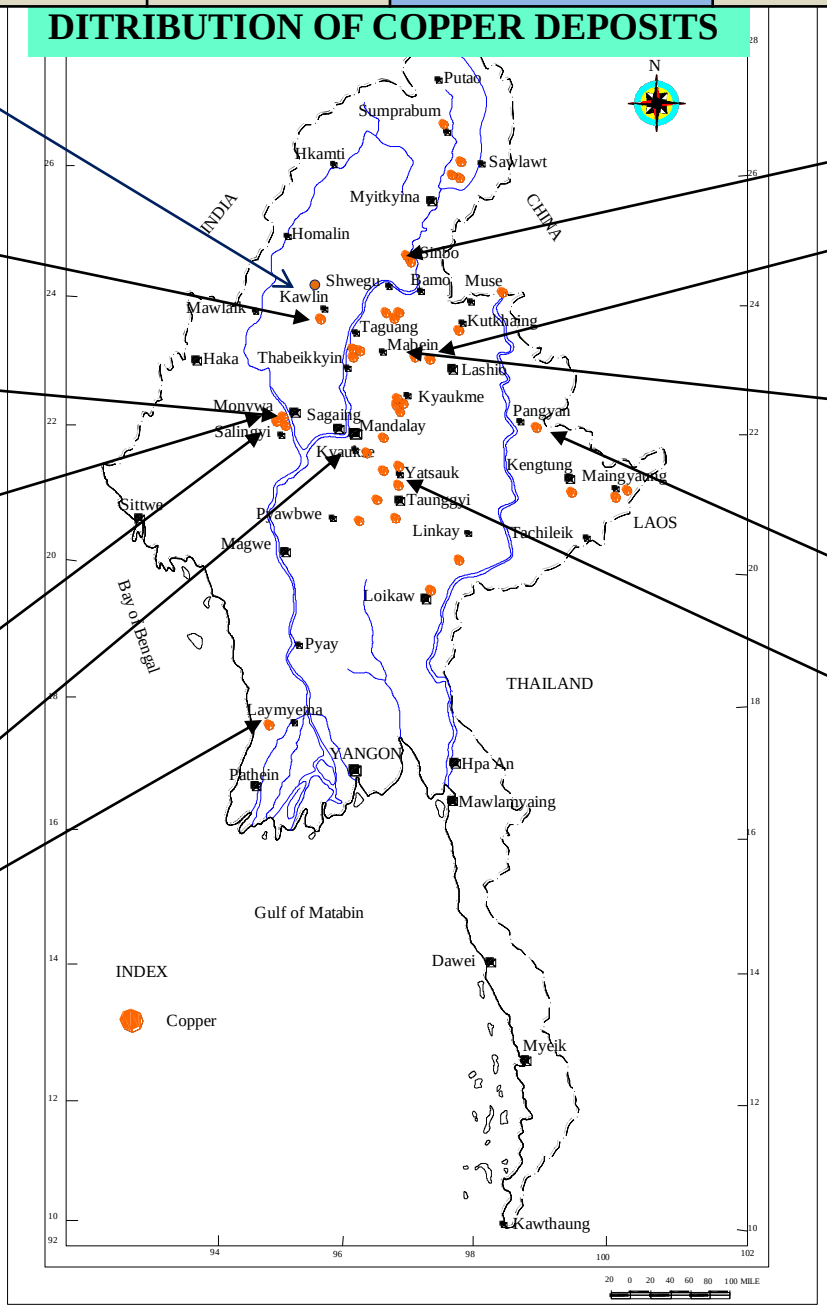
KyesinTaung
Cu - 0.77 %
66.5 million (Possible)

SabeTaung & SB south
Cu - 0.7 to1.01 %
27.86 million (Possible)

Letpadaung
Cu - 0.4 %
1478 million (Possible)

Sabe Taung
Cu - 1.51 %
0.88 million (Possible)

Laymyetna
Cu - 0.8 to 2 %
0.28 million (Possible)



Sinbo- Nankesan
Cu - 3 to 4 %
0.21 million (Possible)

Bawdwin
Cu - 0.87 %
2.5 million (Possible)

Panmakut Manna
Cu - 4 %
0.001 million (Possible)

Panpwe KyaukTaung
Cu - 0.4 %
0.003 million (Possible)

Kweeight
Cu - 4 %
0.001 million (Possible)

Copper Occurrences = 131

Potential = 1991 million ton

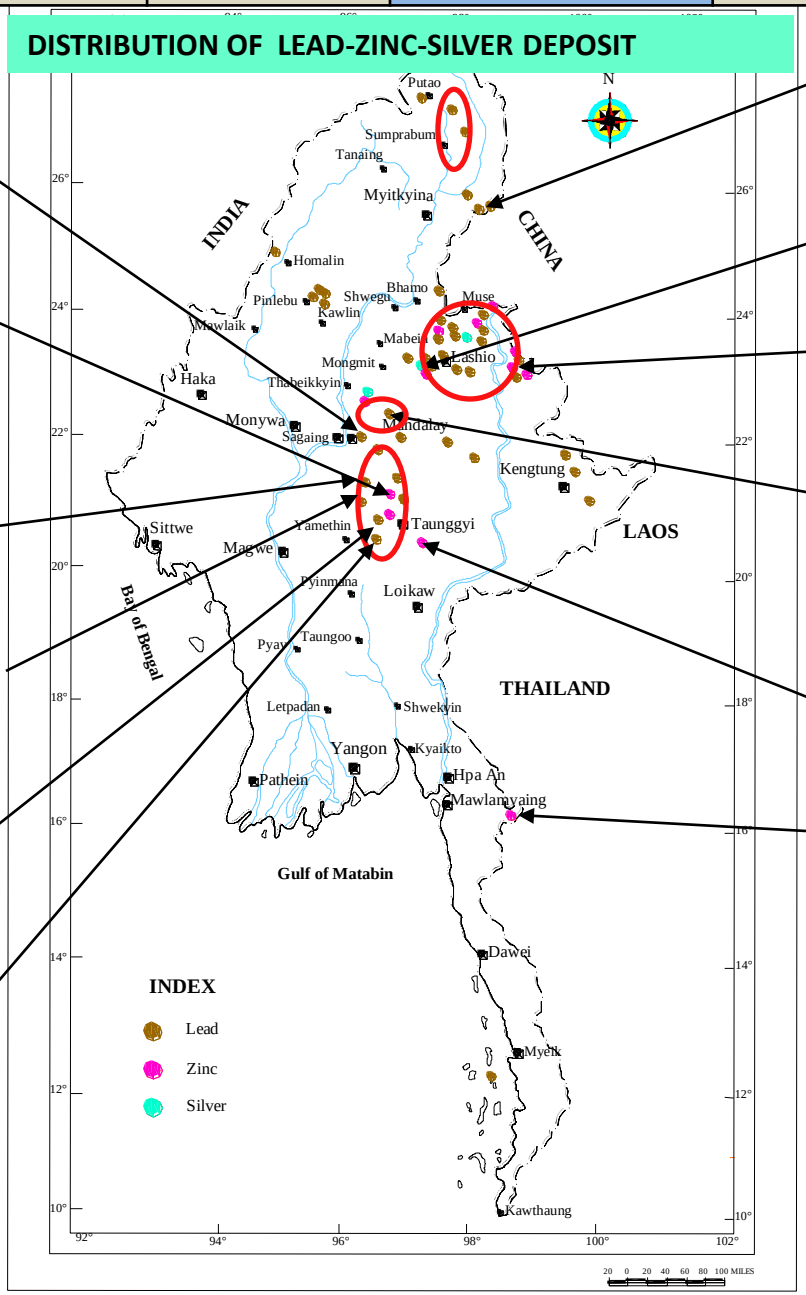
Lead-Zinc-Silver Deposits

- **More than 300 occurrences of Pb-Zn-Silver mineralization are recorded in Myanmar.**

Mineralization occurs as five different styles:

- **Volcanogenic massive sulphides type (VMS) at Bawdwin. The mineralization is bound to an approximately 4 km long and about 100 m wide NW-SE oriented Bawdwin Fault Zone. Mohochaung lead ore deposit approximately 30 km north of Namtu is a stockwork mineralization of galena in calcite gangue.**
- **Massissippi valley type (MVT) deposit at Bawsaing mine Occur in the Ordovician Limestone, the sulphidic ores are found in numerous small occurrences in a narrow NNW-SSE striking zone approximately 6 km long.**
- **Cavity filling vein-type in Yadanatheingi mine. Shear zone about 10 m thick which cuts across the sediments of the Chaung Magyi Series in NW-SE direction.**
- **Ore is found in vein fissures and stockworks in veins and skarn type near the contact between granitic rock and marble at Phaungdaw mine.**
- **Zinc carbonate deposit (secondary deposit) at Lonchein mine of SSS and Naungmain of NSS.**

DISTRIBUTION OF LEAD-ZINC-SILVER DEPOSIT



Kyadwinye (Mandalay)
Pb, - 4.%
10 million (Potential)

Bawsaing (Shan North)
Pb, Zn - 6%
0.0075 million (Probable)

Dokdoye Yechanpyin (Shan south)
Pb, - 27%
0.25 million (Possible)

Nyaunggyat (Shan south)
Pb, - 7%
0.78 million (Potential)

Paungdaw (Mandalay)
Pb, - 4.7%
0.09 million (Probable)

Darthway (Mandalay)
Pb, - 7.7%
0.07 million (Possible)

Panwa (Kachin)
Pb,Zn -1.06%
12.5 million (Possible)

Bawdwin (Shan North)
Pb,Zn -5%
12.8 million (Probable)

Phaleng (Shan North)
Zn - 15.84%
0.011million (Possible)

Yadanatheingi (Shan North)
Pb, Zn - 4%
0.1 million (Probable)

LonChein(Shan South)
Zn - 36%
0.234million (Possible)

Mawhki (Kayin)
Zn - 0.3%
0.332 million (Possible)

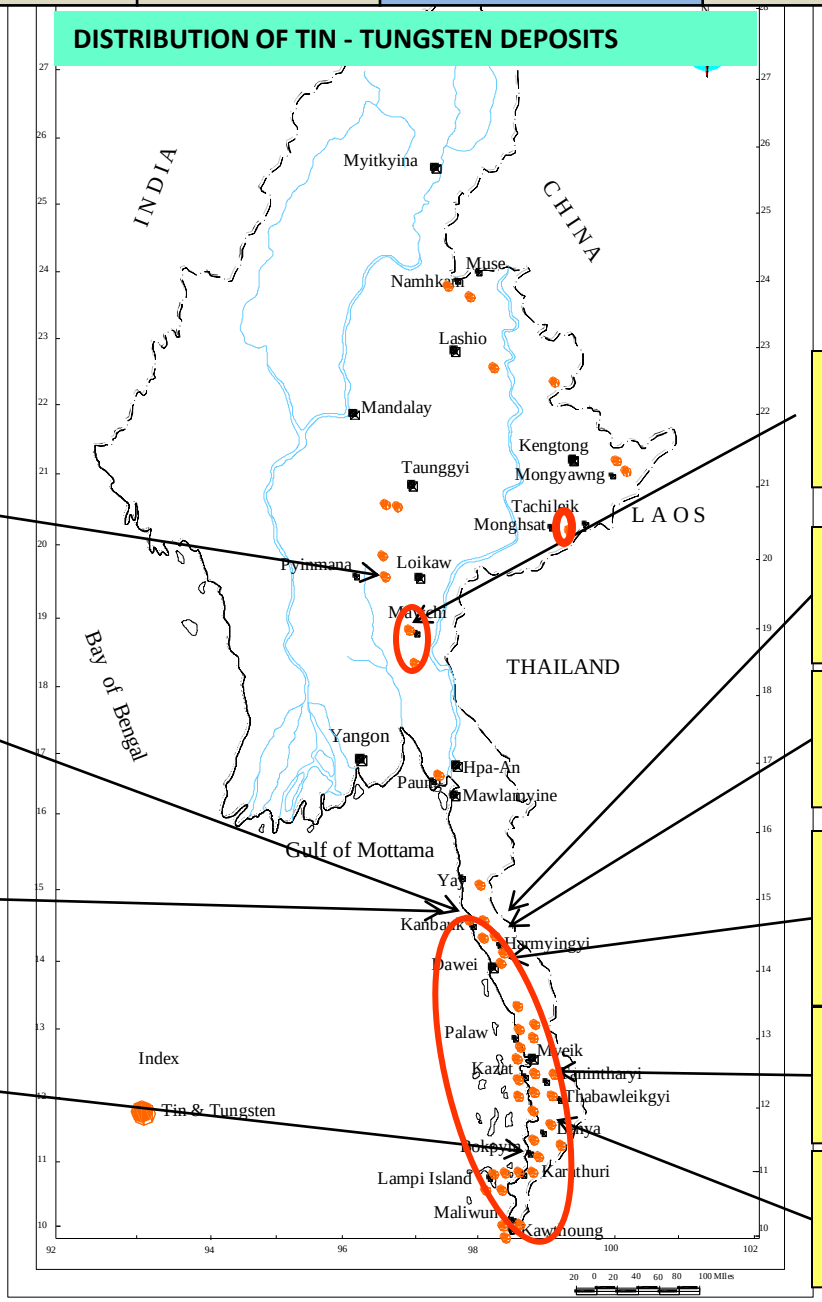
Lead Zinc Occurrences = 334
Potential = 44.38 million ton

Tin-tungsten Deposits

- **More than 400 Tin – Tungsten occurrences are recorded in Myanmar both in Primary and placer deposits.**
- **One of the most important mineral resources in Myanmar**
- **Occurs along the granitic belt in SE Asia peninsula (distributed over more than 1200 Km in Myanmar with more prominent in Tungsten toward the north, passing through the Tanintharyi Region, Kayin, Mon, Kayah & Shan states and East of Pyinmana and widespread also at Mong Hsat and Mongton of East Shan State.**
- **Tin-tungsten ores occur in close association with granitoids and related pneumatolytic rocks emplaced during Mesozoic. The country rocks of these intrusive masses consist of the clastic meta sedimentary rocks of Mergui Series, Taungnyo Group, Mawchi Series and Lebyin Group of Carboniferous age.**
- **Most of the cassiterite is mined from placers while tungsten is mined from hard rock veins.**

Tin- Tungsten deposits= 480

Potential = 40 million tons



Padatchaung (Primary)
Sn – 0.11%, WO_3 -0.81%
0.46 million (Probable)

Heinze (Placer)
Sn – 0.2- 0.3 lb/cu.yd.
0.012 million (Possible)

Kanbauk(Primary/ Placer)
Sn – 0.59%, 0.56 lb/cu.yd.
0.00865 million (Possible)

Atwin Bokpyin (Placer)
Sn – 0.56 lb/cu.yd.
0.0036 million (Probable)

Mawchi (Primary)
Sn – 0.32%
31 million (Probable)

Hermyingyi (Primary)
Sn – 0.37%
0.698 million (Probable)

Heinda (Placer)
Sn – 0.68 lb/cu.yd.
0.013 million (Probable)

KyaukmeTaung, Pagaye(Placer)
Sn – 0.5 lb/cu.yd.
0.001 million (Probable)

Theindaw(Placer)
Sn – 0.36 lb/cu.yd.
0.0016 million (Probable)

Manawlon(Placer)
Sn – 0.6 lb/cu.yd.
0.0021 million (Probable)

Nickel and Chromite Deposits

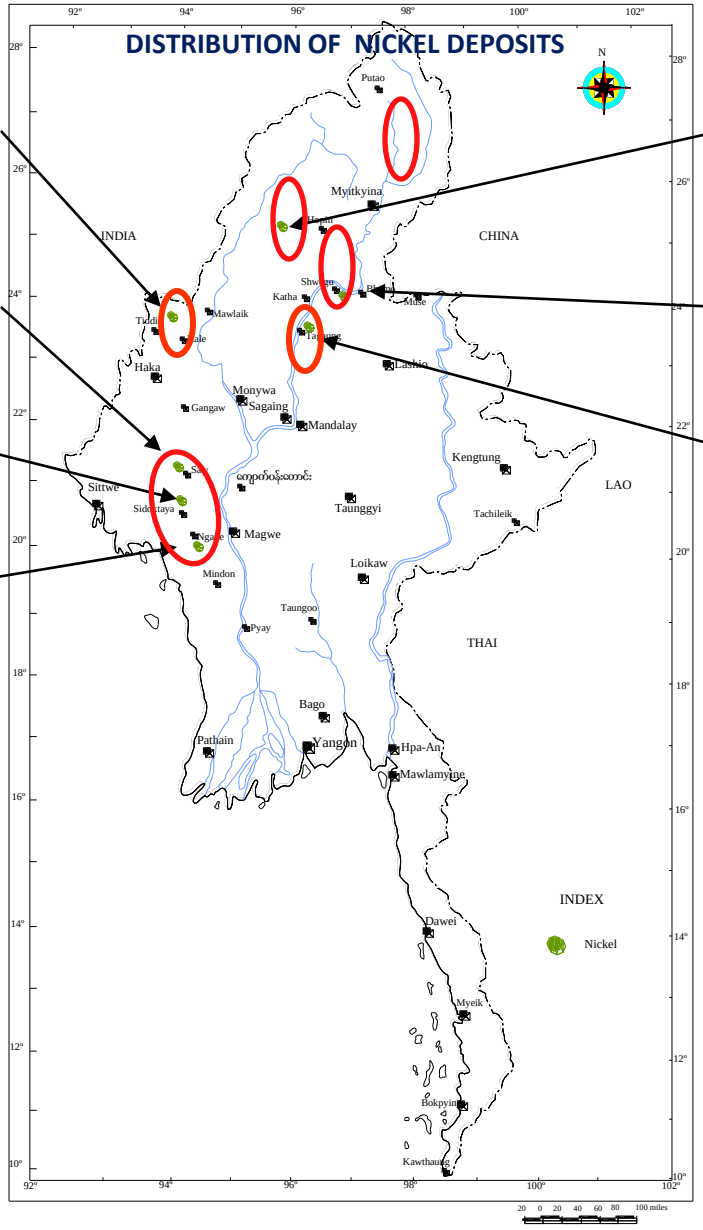
- **Ni-Cr mineralization occurs in close association with ultramafic igneous rocks (Ophiolite belt) emplaced during Late Cretaceous-Early Eocene.**
- **At Mwetaung & Tagaung Taung, the deposits have formed as a result of tropical weathering of ultramafic rocks (Ni laterite deposits)**
- **Cromite deposits are of widespread in Myanmar being related to N-S trending Ophiolite lines closed to Nickel deposits. They are found as podiform Chromite and residual deposits dispersering near the primary sources.**
- **Over 10 Nickel and 40 Chromite occurrences are recorded and widespread most part of the Tagaung Myitkyina belt and the Western Ranges.**

MWETAUNG
Ni- 1.19%
110 mt (Probable)

MAUNGDAW-NANMADAW
Ni- 0.41%
0.49 mt (Possible)

MINDINKYIN
Ni- 0.45%
0.02 mt (Possible)

UKINTAUNG,HKAKYINTAUNG
Ni- 0.4%
0.046 mt (Possible)



INDAWGYI
Ni- 0.41%
5.0 mt (Possible)

TAUNGGADON
Ni- 0.67%
0.028 mt Possible)

TAGAUNGTAUNG
Ni- 2.06%
40 mt (Possible)

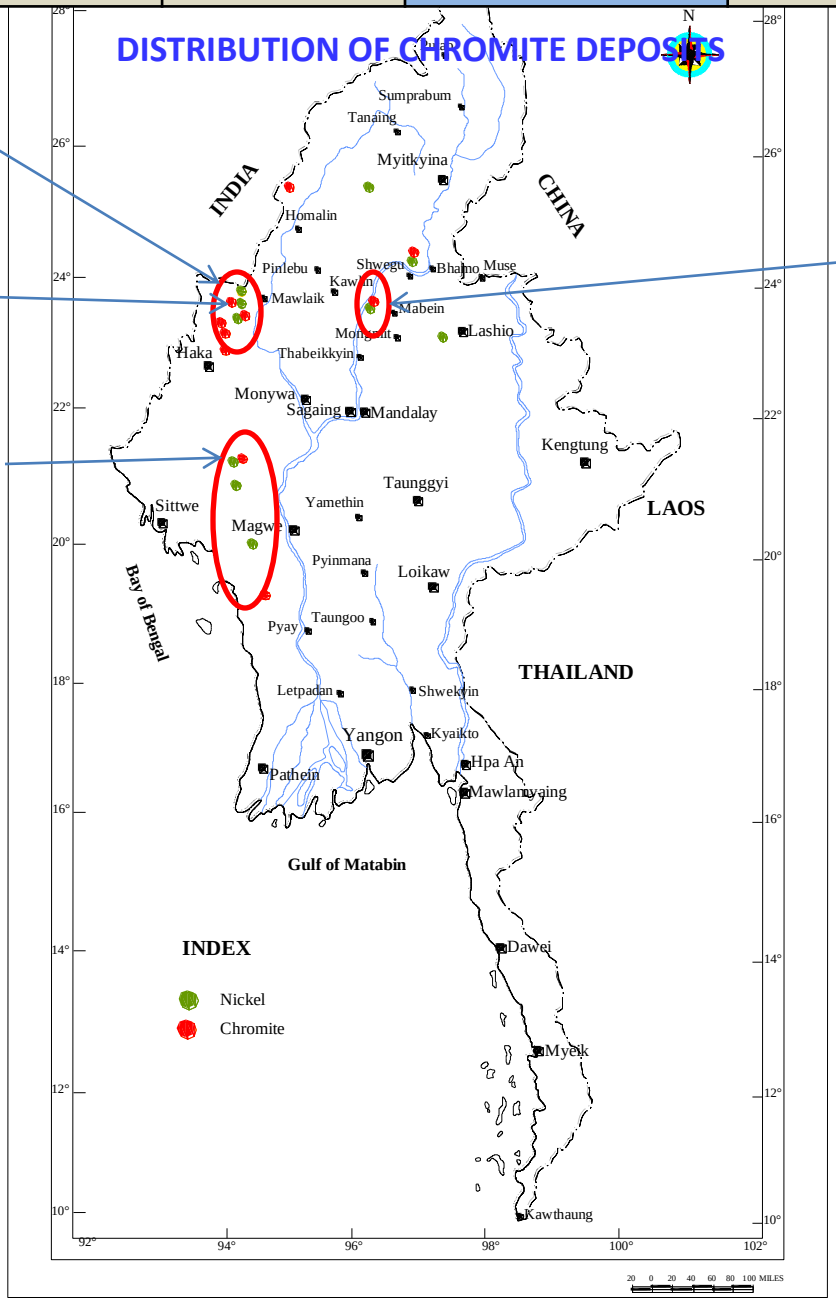
Nickel Occurrences =14

Potential = 162 million tons

Mwe Taung
Cr- 47%
0.028 million t (Possible)

BopiBum
Cr- 40%
0.004 million t (Possible)

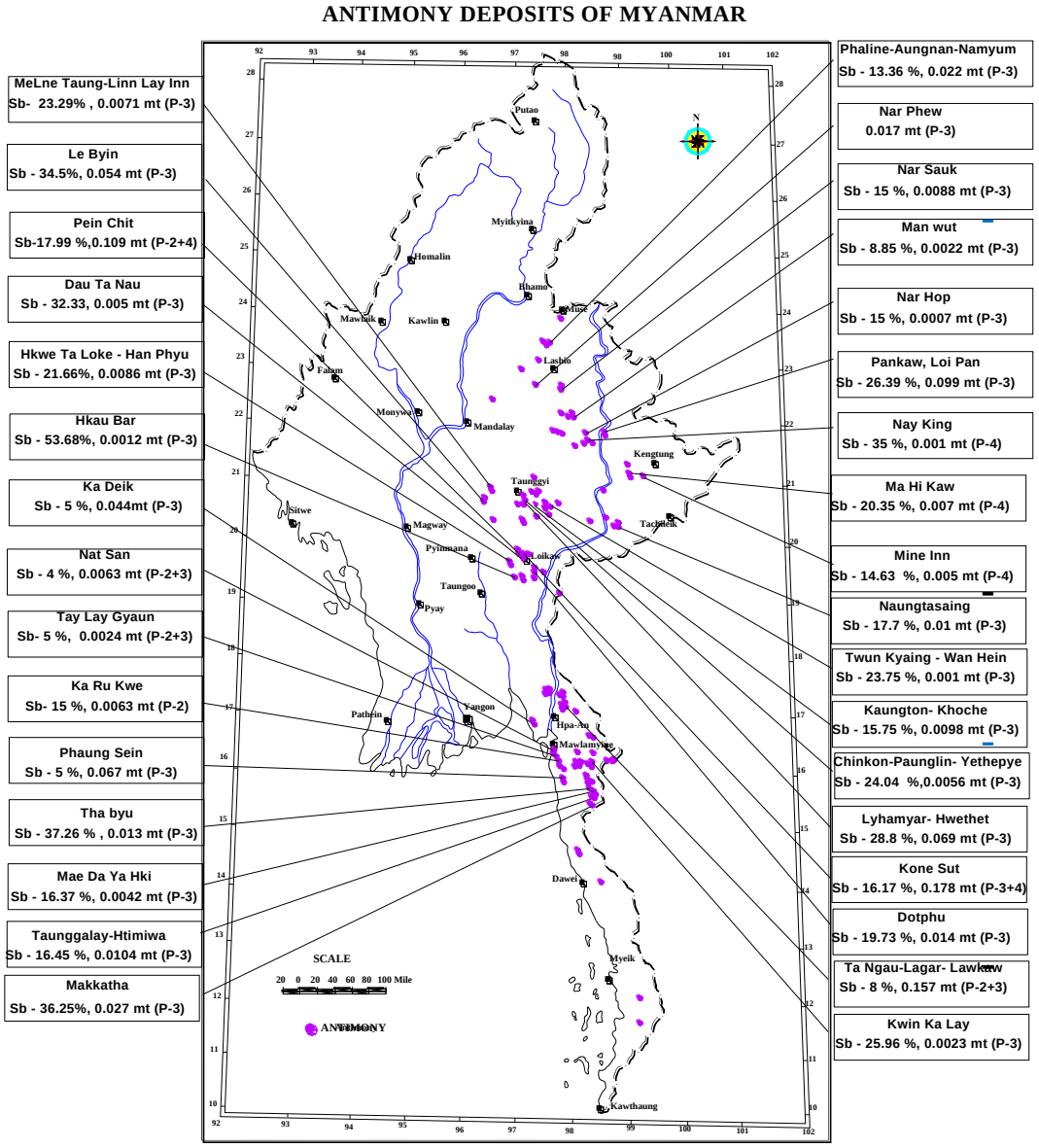
MaungDaw Nama Daw
Cr- 40%
0.0012 million t (Possible)



Tagaung Taung
Cr- 50%
0.034 million t (Possible)

Chromite Occurrences = 43

Potential = 0.1 million tons



Antimony Deposits

*** More than 100 occurrences of Antimony mineralization are recorded in Myanmar.**

***The majority of antimony mineralization occurs in clastic sediments of the Mergui Group of Carboniferous age and in the Paleozoic Carbonates of Ordovician , Silurian and Permian age.**

***Several Sb occurrences are in the late Paleozoic rocks.**

***Antimony ores are generally found in veins or lenses, pockets or both as epithermal origin.**

***The best known antimony deposit s is at Thabyu, Kayin State, near Thai Border. The ore is in high grade.**

Iron ore deposits

- **Over 300 Iron ore occurrences have been recorded in Myanmar and most of them are of minor importance.**
- **The iron ore deposits of Northern Shan State are residual type. At Kyatwinye, 22 meters thick limonite/hematite roll ores covering Devonian dolomite and sandstone. The reserves is about 3.0 mt with the grade of 54% Fe.**
- **At Pang Pet, near Taunggyi , the iron ore deposit is represented by primary hematite mineralization bounded in two regional fault system in the Plateau limestone seem skarn type?**
- **Iron ore deposit at Kathaing Taung, Lamaung of Phakhant and Taungnyo and Taungkadon of Shwegu area in Kachin state are related to the ultrabasic rocks.**

DISTRIBUTION OF IRON DEPOSITS

Lamaung (Kachin)
Fe -51.54%
8.9 million (Probable)

Kathaing Taung (Kachin)
Fe -50.56 %(Goe, Lim,He)
223 million (Probable)``

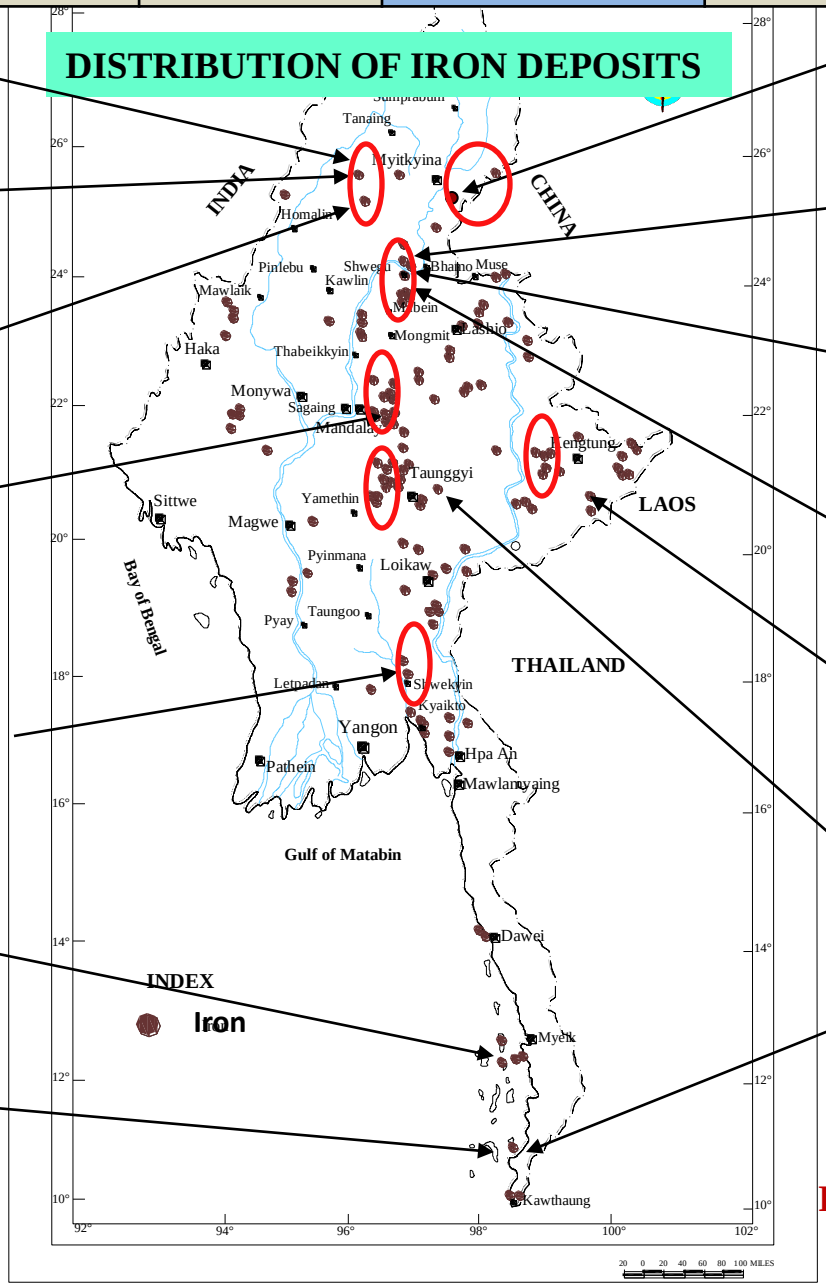
Sanleik (Kachin)
Limonite
10 million (Potential)

Kyatwinye, Inya (Mandalay)
Fe- 54 % (He ,Mag)
3.7+ 4.5 million (Probable)

Minlan Thanseik, ShweGyin (Bago)
Fe -28-56.7 %(Lim,)
75.53 million (Possible)

Kanmaw Island(Tanintharyi)
Fe -36 % (Lim, Mag)
21.2 million (Probable)

Kho Island (Tanintharyi)
Fe -46.05 %
(He,Lim,Mag)
7.6 million (Probable)



Kantawyan(Kachin)
Fe -49-69% (He, Mag)
2.354 million (Possible)

Taungkaton Taung (Kachin)
Fe -37- 45 %(He,Lim)
2.3million (Potential)

TaungNyo Taung (Kachin)
Fe -40.67 %(He,Lim)
18.9 million (Potential)

Haemaung (Kachin)
Fe -45.93 %(He,Lim)
1.1 million (Potential)

Mongkannwe (Shan East)
Fe -39- 66 %(He,Lim)
21.5 million (Potential)

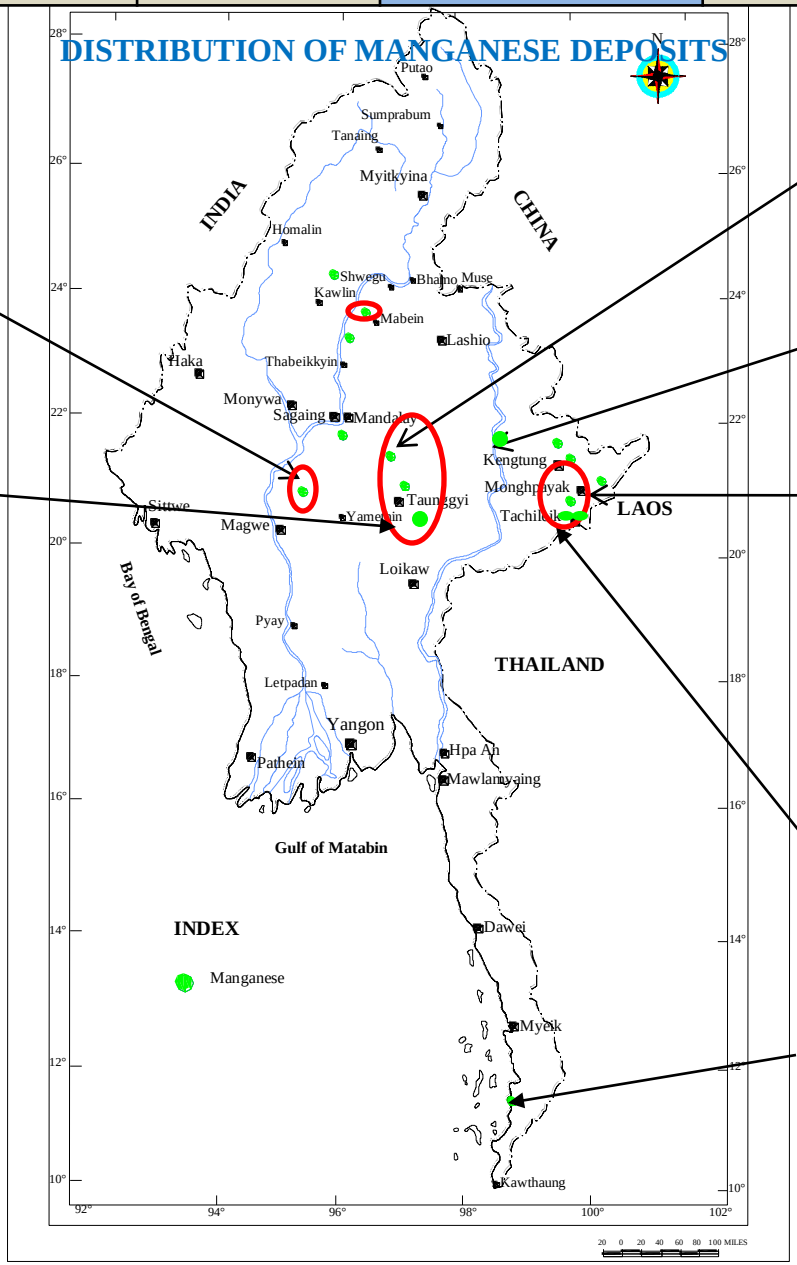
Pinpeg (Shan South)
Fe -56.4 %(He,Lim)
80 million (Probable)

Maputae Island (Tanintharyi)
Fe -42 %(He,Lim,Mag)
1 million (Probable)

Iron Occurrences = 399
Potential = 510 million tons

Manganese deposits

- **Over 50 Manganese occurrences have been recorded in Myanmar at the Tachileik and Mong Pyat area of Eastern Shan State, near Kyaukpadaung of Central Myanmar, Hopone area, Southern Shan State and the Southern Tanintharyi archipelago of Powel Island.**
- **The Manganese ore deposits of Eastern Shan State, Central Myanmar and Powel Island are associated with volcanogenic sediments and volcanic rocks while non volcanogenic at Southern Shan State associated with Limestone.**
- **The Manganese deposits at the Eastern Shan State were recently found and seem a huge potential.**



Kyaukpadaung (Mandalay)
Mn - 51.%
0.0115 million (Possible)

Konnyu (Shan)
MnO2 - 58.%
0.012 million (Possible)

Monpyin (Shan South)
Mn - 38.76%
0.096 million (Probable)

Tar Pin (Shan East)
Mn - 6.6%
0.65 million (Possible)

Wansaw Wanpaing (Shan East)
Mn - 12.53%
4.95 million (Possible)

Areye (Shan East)
Mn - 25%
1 million (Possible)

Wansalot (Shan East)
Mn - 14%
0.135 million (Possible)

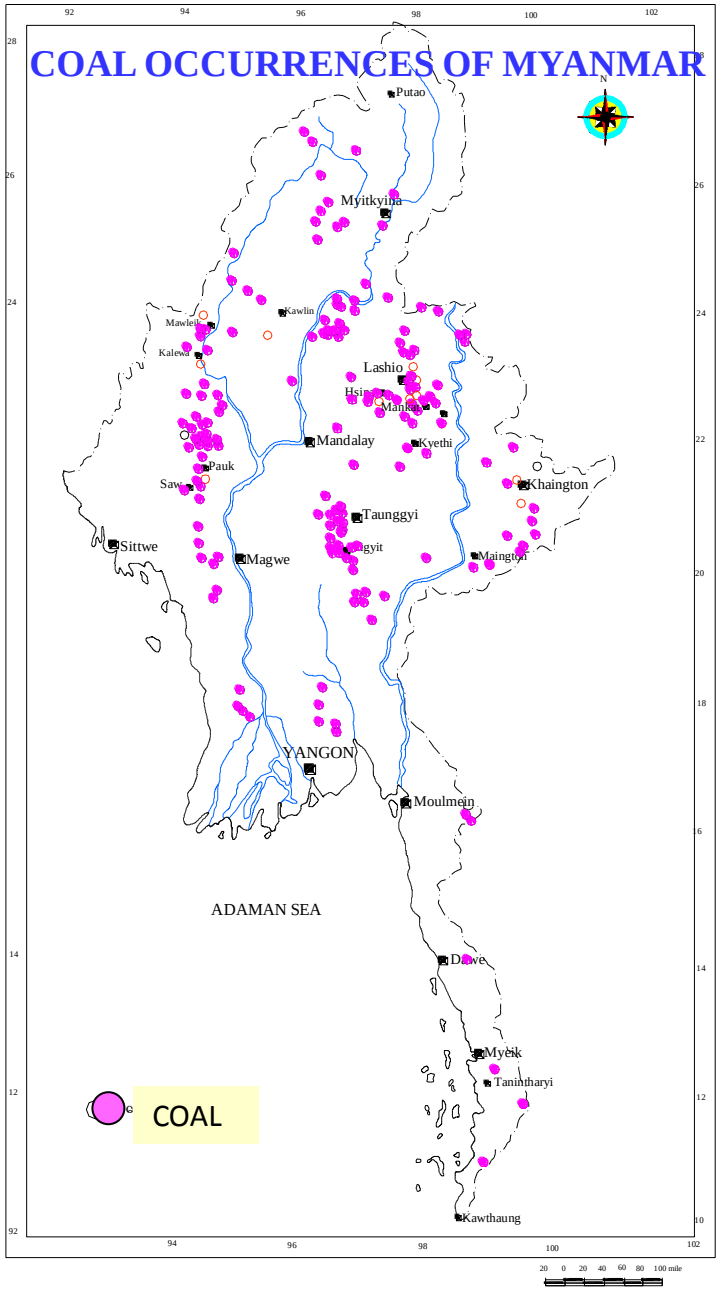
Powel Island(Tanintharyi)
Mn - 27%
2.8 million (Probable)

Manganese Occurrences= 61

Potential = 11.27 million tons

- **Over 500 Coal occurrences are recorded in Myanmar mainly in Tertiary basin of the Central Cenozoic Belt and late Tertiary intermontane basins developed within the Shan-Thai block.**
- **Tertiary Sediments Environs - Lignite to Sub bituminous**

Jurassic Sediments Environs- Sub bituminous



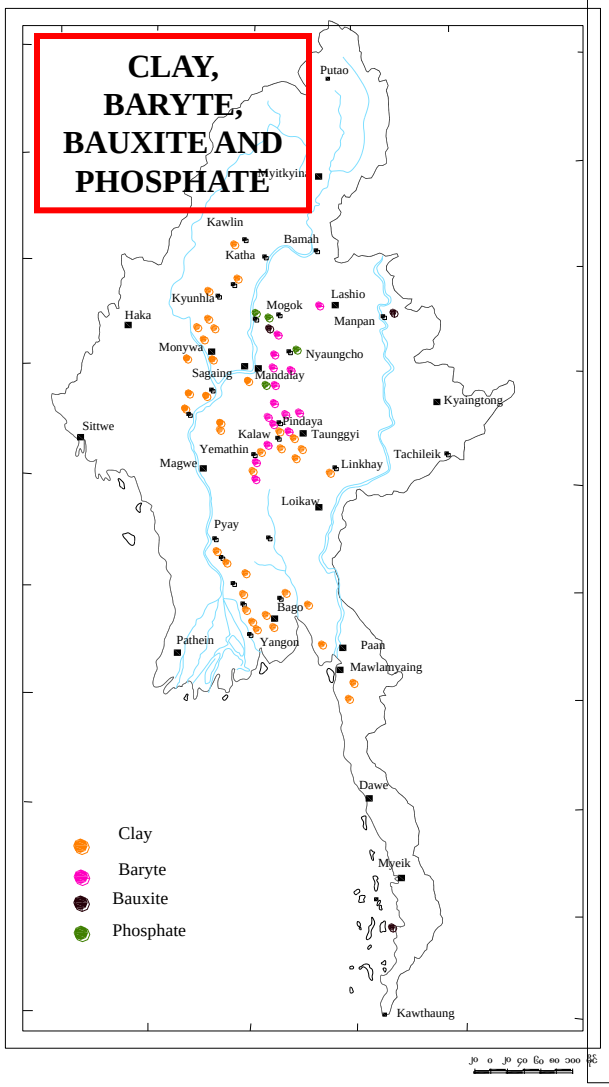
Coal Resources

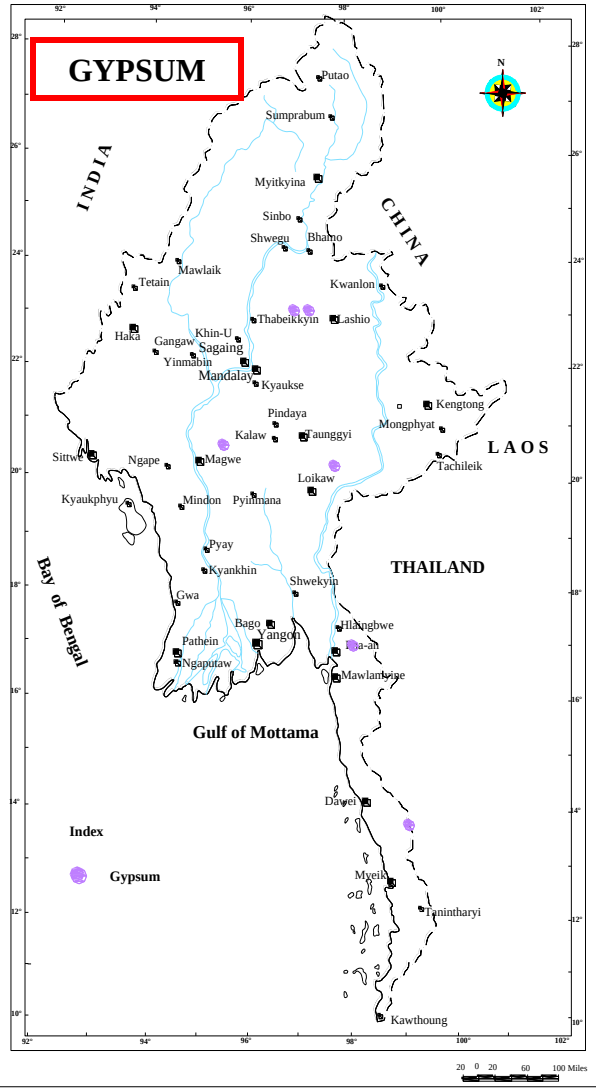
Over 510 Coal occurrences were being found

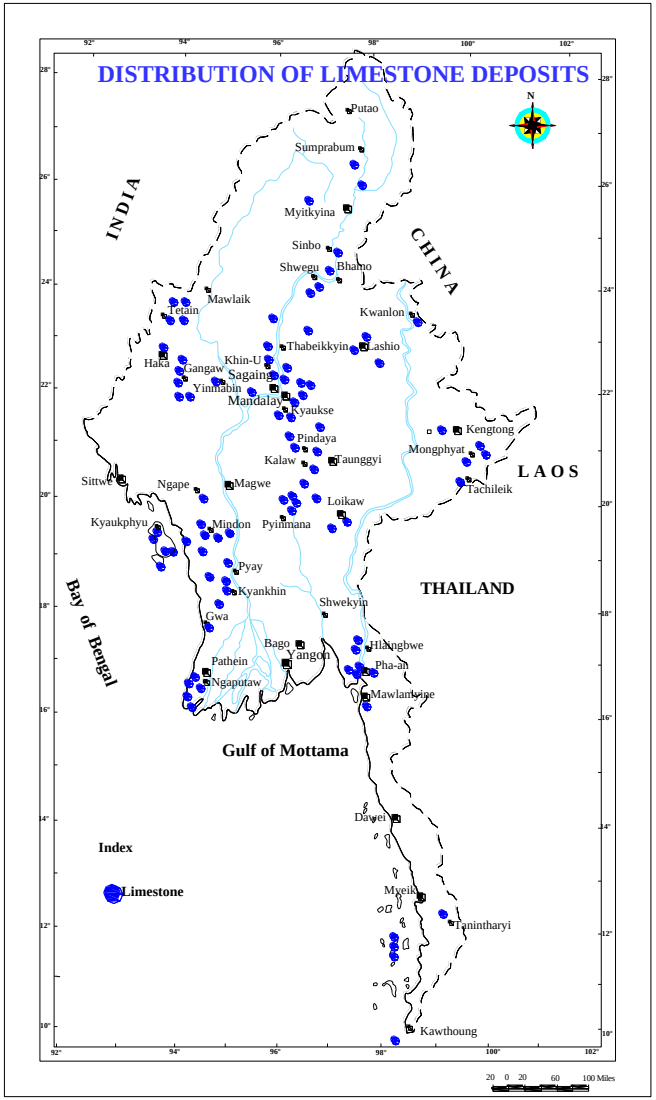
Potential Coal Reserves

281 Coal deposits were being reserve estimated

494 millions tons







Lime stone deposits = 468

Potential = 60680 million tons

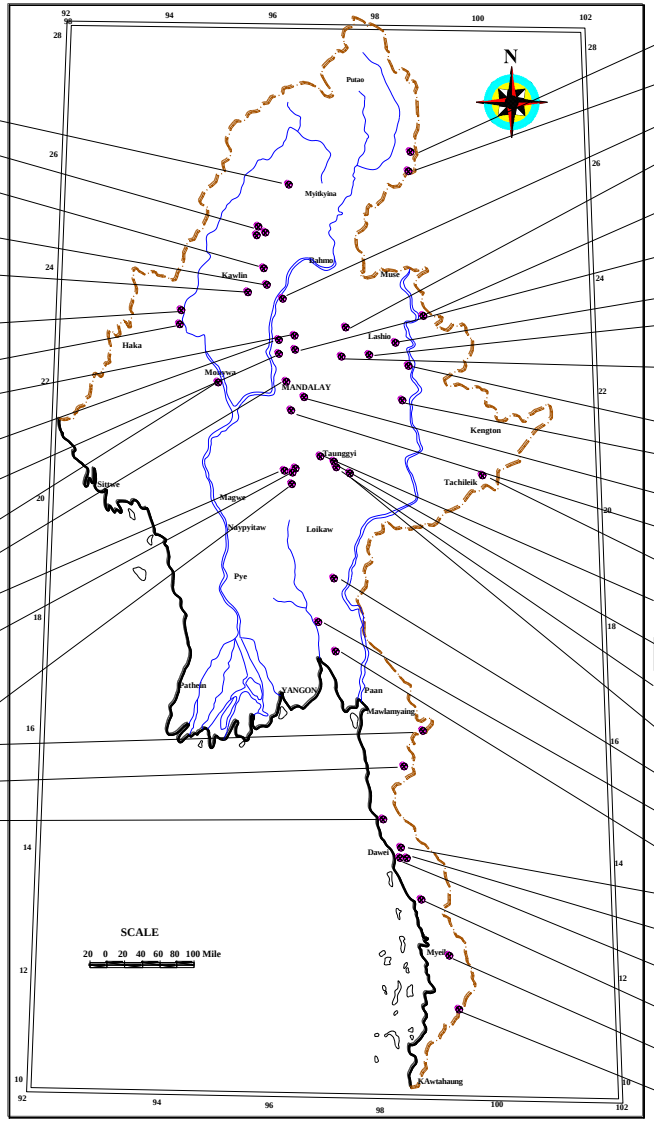
Jade and Gems Deposits

- **Myanmar is well known for famous Jadeite – Jade and Gemstones.**
- **The world largest Jadeite deposit is found in Phakhant and Lonkhin area of Kachin State, North of Myanmar both in Primary Jadeite Dykes associated with Ultrabasic and Uru boulder conglomerate of Pleistone age as placer deposits.**
- **One of the most important mineral resources in Myanmar**
- **The world finess and famous Ruby, Sapphire and other assorted Gemstones are produced from Mogok, Kyatpyin of Mandalay Region, Monghsu of Shan State.**

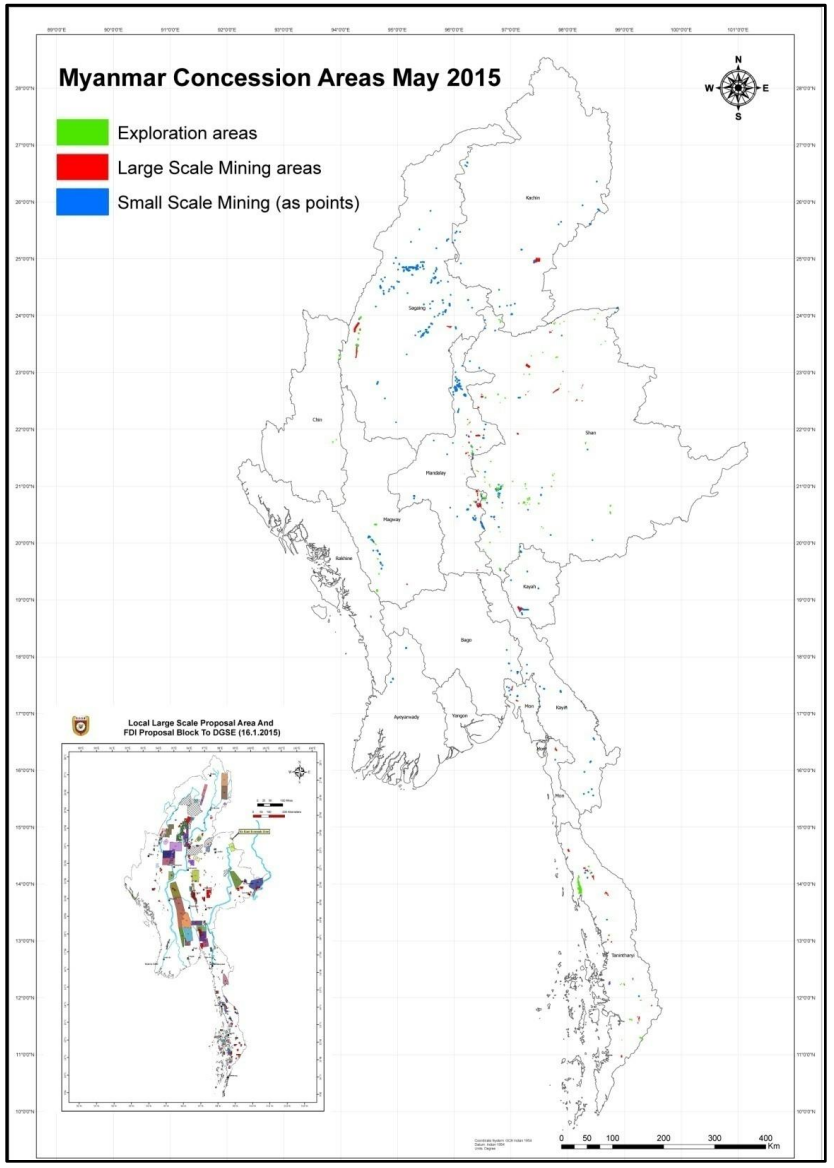

Jade mine site, Phakant


Ruby mine site, Mongshu

MAJOR MINING SITES OF MYANMAR



- Lonkhin (Jade)
- Banmauk (Gold)
- Kyaukpazat (Gold)
- Kyaukpahto (Gold)
- Shangalon (Copper)
- Paluzawa (Coal)
- Kalaewa (Coal)
- Mogok (Gems)
- Thabeikkyin (Gold)
- Singu (Gold)
- Monywa (Copper)
- Phayaungtg(Gold)
- Paungdaw (Lead)
- Lebyin (Antimony)
- Shweminbon(Gold)
- ModiTaung (Gold)
- MawKhee (Zinc)
- Thabyu (Antimony
- Kanbauk (Tin)
- Powerhku (Molybdenum)
- Panwa/ Lagwi (Lead)
- Tagaung (Nickel)
- Bawdwin (Lead)
- Phalin (Lead)
- Yadanatheingi (Lead)
- Manpan Monma (Coal)
- Namma (Coal)
- Hsipaw (Gypsum)
- Maung main (Zinc)
- Monghsu (Gems)
- Kyatwinye (Iron)
- Sabetaung (Copper)
- Aryee (Manganese)
- Bawsaing (Lead)
- Pingpet (Iron)
- Liharmyar (Antimony)
- Lonchein (Zinc)
- Mawchi (Tin- Tungsten)
- Shwegyin (Gold)
- Mewaing (Gold)
- Hermyingyi (Tin)
- Heinda (Tin)
- Pakarye (Tin)
- Nanthilar (Tin)
- Theindaw (Tin)
- Yadanabon (Tin)



Procedures of Foreign Investment in Mining Sector of Myanmar (Foreign Investors)

1. Courtesy Call with the Officials from Ministry of Mines
2. Detail discussion on Concerned minerals between Investors and respective departments
3. Site Visit
4. Submit Proposal

- Before investing in Myanmar, foreign investors need to understand a number of regulatory and legal topic as well as business climate.
- Some of these are corporate registration, legislation, work permits, industrial licensing, taxation, investment promotion and the availability of infrastructure and facilities.

The Proposal must include .....

Types of Permit

- **Prospecting Permit**

  (1 yr + extension = 12 months)

- **Exploration Permit**

  (3 yrs + extension = 1 yr (2) times)

  - Feasibility Study

    (1 yr + extension = 12 month)

- **Small Scale Mining Permit**

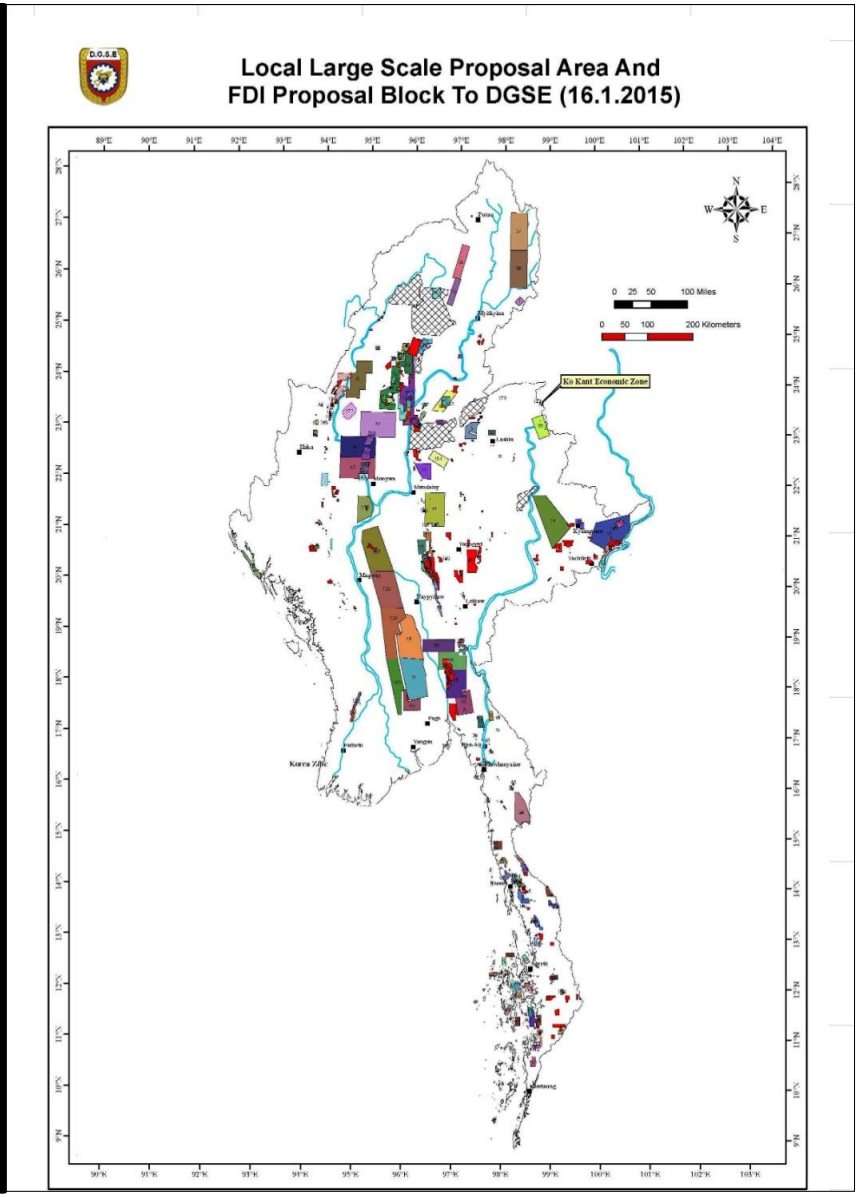
  (5 yr + extension (1) yr (4) times)

- **Large Scale Mining Permit**

  (15 yrs + extension (5)yrs (4) times)

- **Subsistence Mining Permit**

  (only 1 yr)

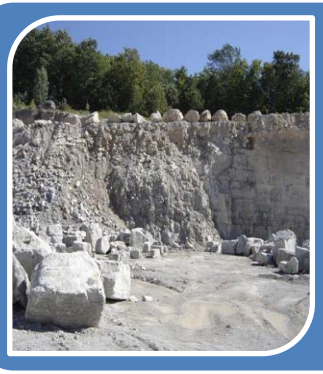


Large Scale Mining Permit

- Minerals - Precious Metallic, Industrial and Decoration Stones
- Max :15 yrs + Extension (5) yr for (4)times
- **Needing to get an approval from MIC and Union Government.**

Small Scale Mining Permit

- Ministry can issue the permit.
- Gold (20) Acres, Minerals (50) Acres, Industrial Minerals (247.1) Acres, Gems Stones (1) Acres
- Max: 5 yrs + Extension (1) yr for (4)times
- Restricted to use of heavy machineries.



Subsistence Mining Permit

- Minerals
- Industrials Minerals
- Stone
- Only (1) yr

Restrictions of Permit

COOPERATION WITH CHINA GEOLOGICAL SURVEY

- **China geological Survey invited DGSE in 2006 to participate in the 1:5M International Geological map of Asia (IGMA 5000) based on the combination of geology ,GIS and cartography. (ONE GEOLOGY ONE COUNTRY)**
- **Two participants attended the 2nd and 3rd workshop held in China and presented the "STRATIGRAPHY AND TECTONO- MAGMATISUM OF MYANMAR" AND "THE CORRELATION OF MYANMAR STRATIGRAPHY AND CHINA STRATIGRAPHY AT THE BORDER AREA"**
- **DGSE contributed 1:5M scale of Geological map in GIS format to IGMA 5000 project in 2010.**

COOPERATION WITH KOREA

- **MINISTRY OF MINES HAS BEEN COOPERATING WITH KOREA FOR 20 YEARS.**
- **D.G.S.E HAS BEEN COOPERATING WITH KOREA SINCE 2003,AND KOICA EXPERT DR MOON KUN JOO TRAINED TO GEOLOGISTS FROM 30-10-2003 TO 31-1-2004 AT YANGON, MYANMAR.**
- **FORMER YEARS AND LAST YEAR MANY GEOLOGISTS FROM MINISTRY OF MINES LEARNT AT KIGAM FOR TRANINING COURSE.**
- **IN THE YEAR 2011,DIRECTOR GENERAL DR .YE MYINT SWE VISITED AND DISCUSSED AT KIGAM TO IMPROVE THE RELATIONSHIP OF KOREA AND MINISTRY OF MINES.**

COOPERATION WITH GEOLOGICAL SURVEY OF FINLAND

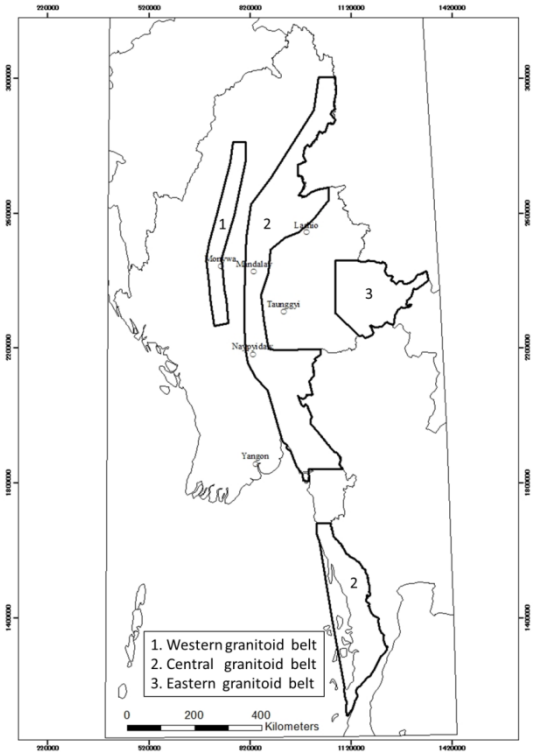
- **The MoU between , the Ministry of Mines, D.G.S.E and DOM on one side and Geological Survey of Finland (GTK) on the other was officially signed during in the year 2014 for the Sustainable Development of Mineral Resources in Myanmar (SUSMIN).**

- **According to the MoU , the GTK experts have been teaching to geologists of Ministry of Mines for the GIS aided geological mapping and mineral resources since March, 2014.**

COOPERATION WITH JAPAN

2013/Oct：JOGMEC x DGSE concluded New Minutes of Meeting

Dr Ye Myint Soe and Mr. Ueda



Target Area

We choose three granitoid belt.

1. Western: for Base Metals
2. Central: for Rare Metals
3. Eastern: for Base Metals

・Modification compared with previous Version.

① Survey Area: Reduced Kachin and Chin state area.

② Term of Survey: Extended to 2016 Mar (more two year survey term.)

③ Confidentiality::

COOPERATION WITH CCOP

COOPERATION WITH CCOP

Harmonized Geology Project

(Seamless Geology Project)

Target:

1) To create
   - ASEAN/CCOP Standard of Geology Legend
   - Digital ASEAN/CCOP 1:1 million seamless geology
   - User friendly Data Management system
2) To create information technology platform and an information technology infrastructure among ASEAN/CCOP countries.

Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP)

- **Myanmar is endowed with variety of minerals and completed long geological history of Precambrian to Tertiary age.**
- **Extensive mineral occurrences and well established centuries old mining industry.**
- **Mineral resources potential remains under-estimating and still collecting necessary geological information.**
- **Traditional method is still used for geological mapping ,mineral exploration and mining in Myanmar , eastern parts of Myanmar are planned to do mineral exploration and rechecking for seamless geological map along the borders.**
- **We do hope, this FORUM will be provided the sustainable development in mining sector between China and Myanmar.!!!!!**

- **Myanmar is striving to amend the Mines Law and Regulations ;**
  - **To meet with the International Standard of the World Leading Mining Countries .**
  - **To invite the Foreign Investor to the mining sector of Myanmar.**
  - **To overcome the challenges on the mining sector.**
  - **To develop of Myanmar's Mining Sector, we need new advanced technique of Mineral Exploration and Mining application method.**

- **Also reforming the financial sector especially the banking system which urgently need to reform for the foreign Investors.**

THANK YOU FOR YOUR ATTENTION!