DUAL AT THE WORLD MINING SUMMIT

" Rarest & Most Valuable "

POLYMETALLIC PYRRHOTITE
" Ni,Co,Cu,PGM,Au,Ag "

KIMBERLITE
" DIAMOND "

Magmatic Sulfide Deposits Main Mineral PYRRHOTITE and KIMBERLITE are very difficult exploration targets. Their discovery can only be determined by " MANTLE-DERIVED INDICATOR MINERALS " method.

COMMON INDICATOR MINERALS OF MAGMATIC SULFIDE DEPOSITE

- Magmatic Ni-Cu Minerals
- Gold grains – Native Copper
- K.I.M Kimberlite Indicator Minerals
- Platinum Group Minerals
- Sulphide Minerals
- Metamorphosed Sulphide Minerals
- Cassiterite – Schellite - Cinnabar

COMMON INDICATOR MINERALS OF KIMBERLITE/DIAMOND

- Chrome-Pyrope Garnet
- Eclogitic Almandine Garnet
- Chrome Diopside
- Chromite (chrome spinel)
- Ilmenite
- High magnesium Olivine

AEX
#F3 Project Guide

AEX
Strategic and Critical Metals
Innovation Company

MAGMATIC SULFIDE DEPOSITS
&
POLYMETALLIC PYRRHOTITE

" Pyrrhotite is chemical combination of Iron-Sulphur and containing Nickel, Cobalt, Copper, PGM, Au, Ag "

● Magmatic Ni,Co,Cu & Precious Metals Sulfide deposits represent extremely challenging exploration targets.

● The prediction of their location area is generally reliable, but detectingt their exact position represents the real challenge.

● In conclusion, Magmatic Nickel Sulfide ore bodies remain very difficult exploration targets, and to this date no completely effective tool (geochemical or geophysical) allow their detection.

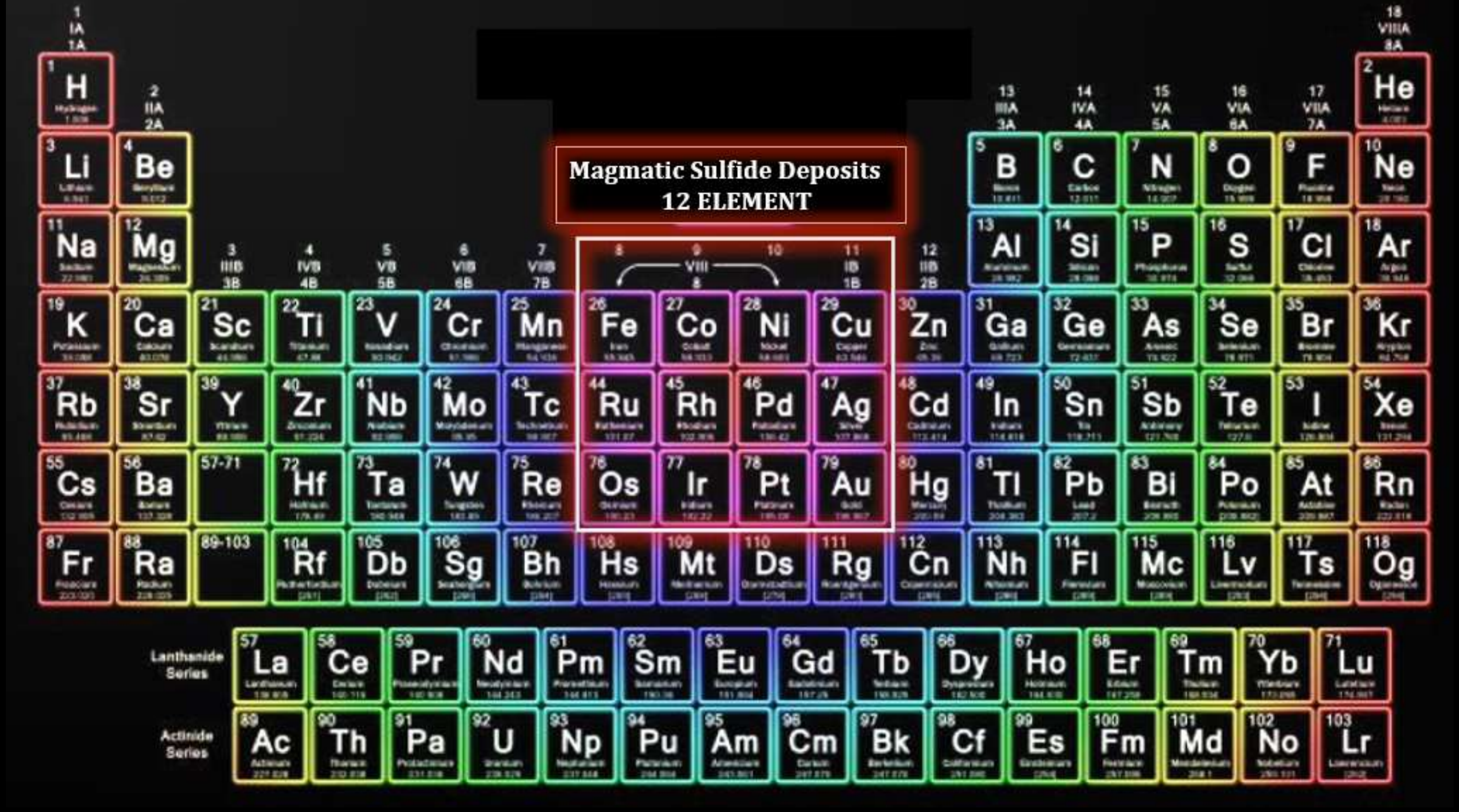
● Sudbury - Canada, Norilsk - Russia, Jinchuan - China, Bushveld Igneous Complex - South Africa and other Magmatic Sulfide Deposite Main Mineral is PYRRHOTİTE.

● When Pyrrhotite is affected by surface conditions, sulfur minerals react with water and oxygen to transform into Iron oxide (Magnetite-Hematite) minerals, which is why it is very difficult to find in geochemistry and surface surveys.

EARTH & ELEMENT/MINERAL/ROCKS

" Elements form Minerals, Minerals form Rocks "

- Elements were created first in the Universe.
- 118 Elements form Minerals and there are more than 5,000 Minerals on Earth.
- A rock is a solid collection of minerals. There are 155 known rocks.



GENERAL INFORMATION OF " MANTLE DERIVED MINERALS "

EARTH & PLATE TECTONIC

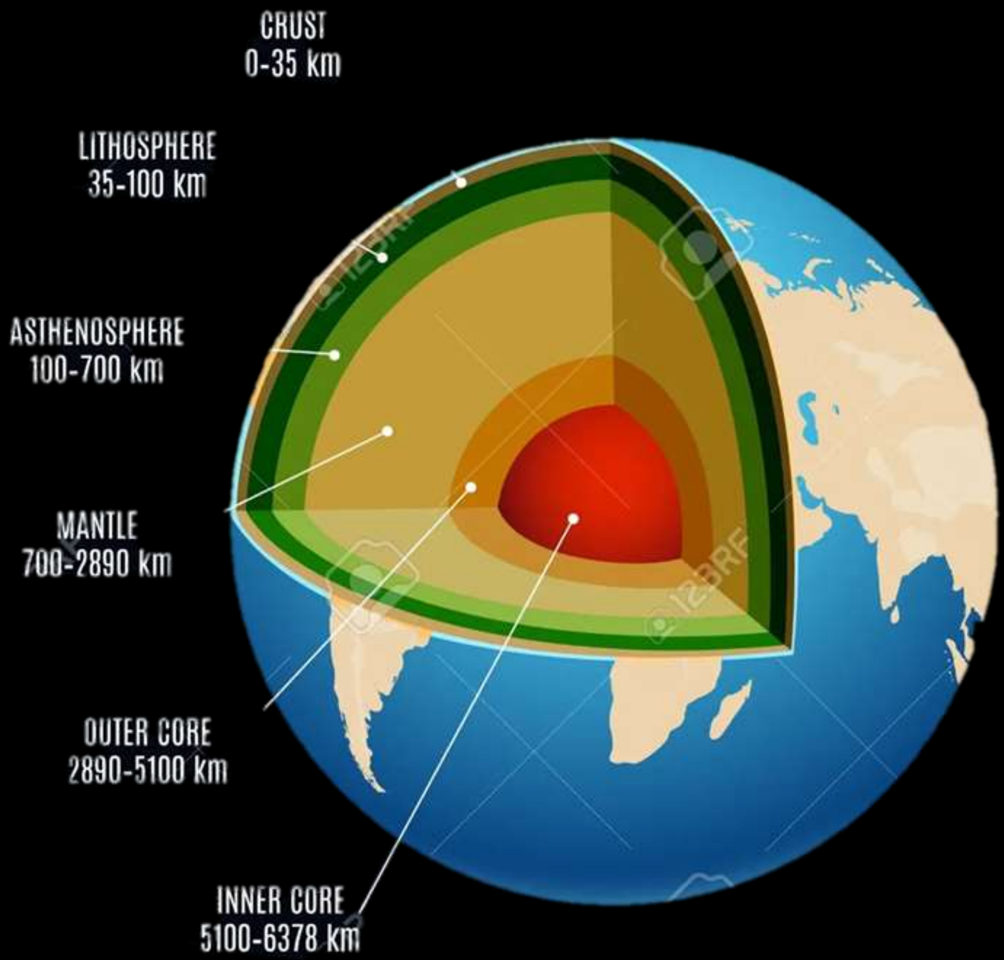
Pangea, supercontinent that incorporated almost all the landmasses on Earth began to break apart about 200 million years ago, during the Early Jurassic Epoch (201 million to 174 million years ago), eventually forming the modern continents and the Atlantic and Indian oceans.

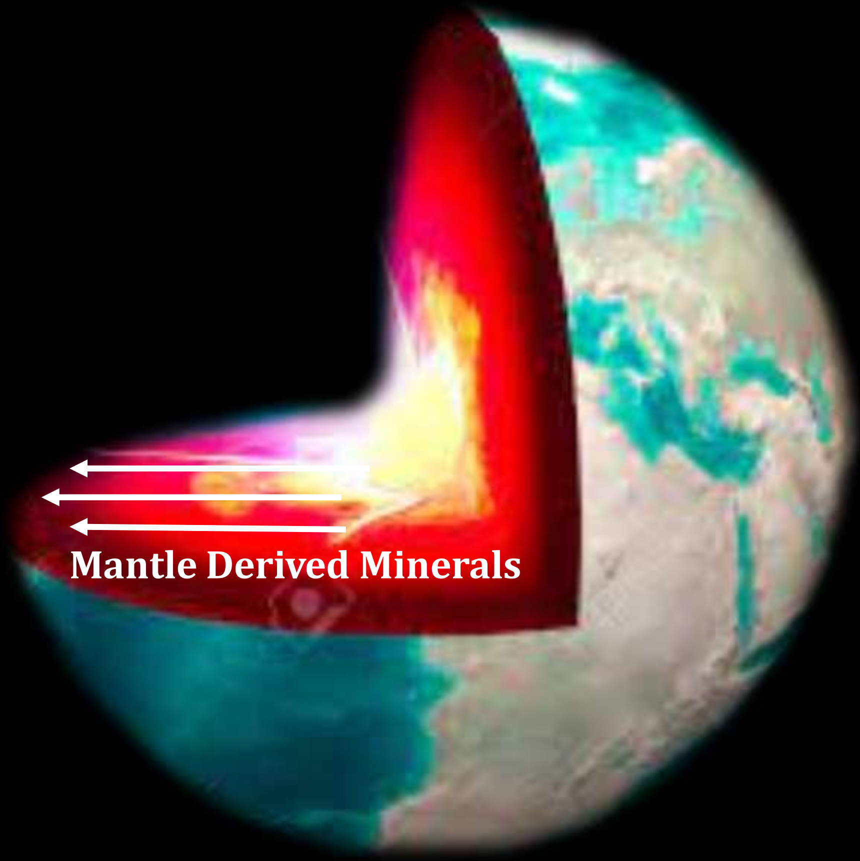
Pangea Super Continent

Present Day

EARTH & LAYERS & MANTLE DERIVED MINERALS

The Earth is made up of three different layers: Crust, Mantle and the Core.





EARTH & MAGMATIC SULFIDE DEPOSITS

3 MAJOR MAGMATIC SULFIDE DEPOSITE OF WORLD
(Ni-Co-Cu-PGM-Au-Ag)

- **SUDBURY IGNEOUS COMPLES (SIC) - Canada**
- **NORİL'SK TUNGUSKA BASIN - Russia**
- **JINCHUAN Ni–Cu–PGE DEPOSIT – China**

ALANYA MASSIF AEX PROJECT

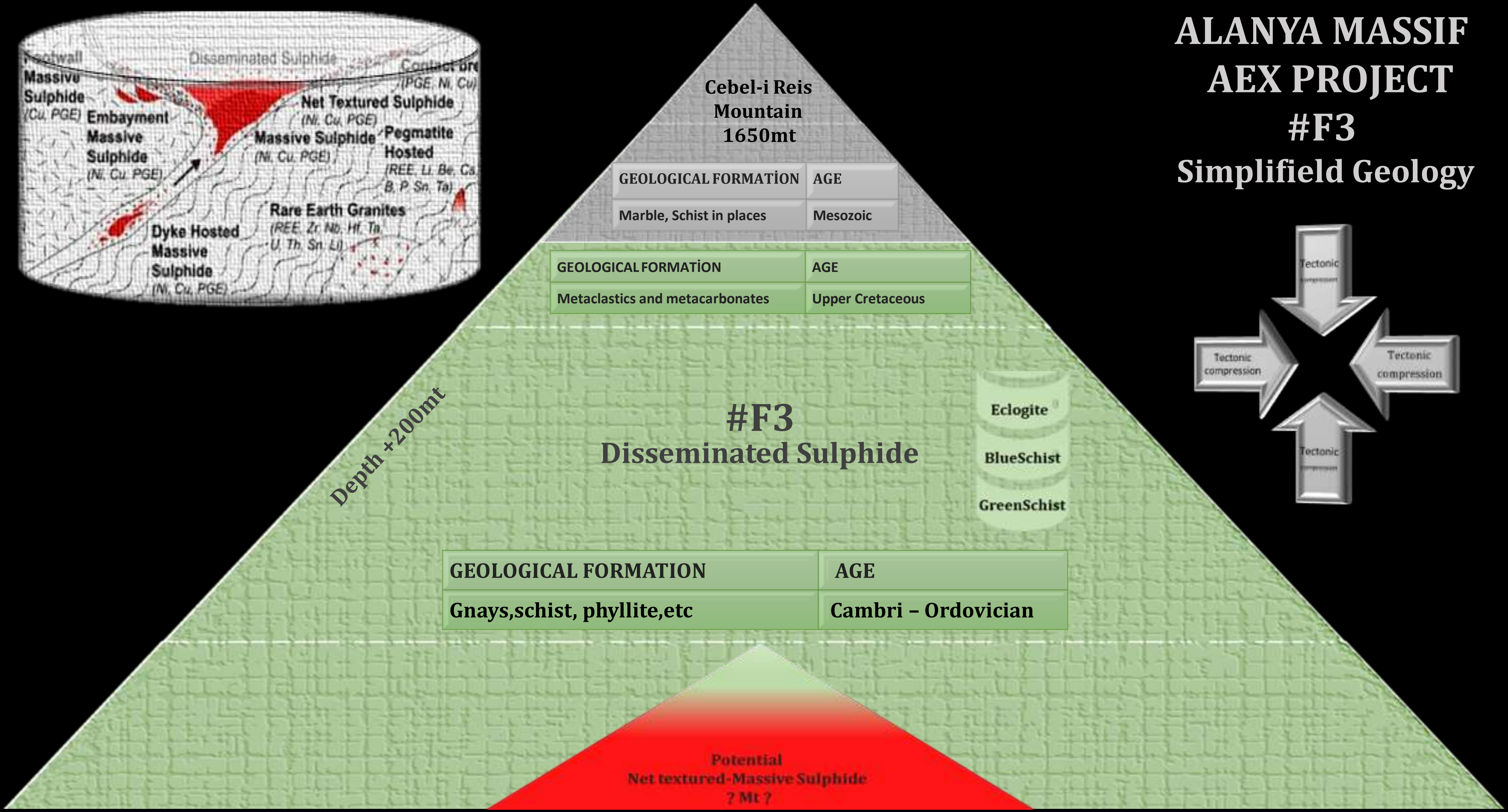
Same Primary Ore Mineral formation

Same Other Ore Mineral formation

Similar Petrographic formation

Similar Geologic formation

ALANYA MASSIF
AEX PROJECT
#F3
Simplifield Geology



GEOLOGICAL FORMATİON	AGE
Marble, Schist in places	Mesozoic

GEOLOGICAL FORMATİON	AGE
Metaclastics and metacarbonates	Upper Cretaceous

GEOLOGICAL FORMATION	AGE
Gnays,schist, phyllite,etc	Cambri – Ordovician

First Magmatic Sulfide Deposit Discovered in the World "SUDBURY"

A view of the Canadian Pacific Railway and the Murray Mine (from Geological Survey of Canada, Annual Report 1889–1890). The original discovery site is located where the rail line cuts through the low ridge in the upper right of the photograph.

"Nickeliferous Pyrrhotite" produced from the Sudbury mines; Enriched with Magnetic Separation by Thomas Edison and Patented by Edison in 1892.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

METHOD OF MAGNETIC-ORE SEPARATION.

SPECIFICATION forming part of Letters Patent No. 485,842, dated November 8, 1892.

Application filed July 20, 1892. Serial No. 440,637. (No specimen.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Treating Ores, (Case No. 958,) of which the following is a specification.

The object of this invention is to produce an effective and economical method for the treatment of low-grade nickeliferous pyritous ores, so as to recover the nickel therefrom and also the cobalt, gold, copper, and other metals or metallic ores that may be present.

I have discovered that where magnetic pyrites, called "pyrrhotite," is nickeliferous, as it usually is to a more or less extent, the nickel is not distributed generally throughout the whole body of the pyrrhotite, but certain crystals are pure pyrrhotite or magnetic pyrites, while other crystals have some of the iron replaced by nickel and sometimes by cobalt, and that the crystals containing the nickel or cobalt are considerably-less magnetic than the pure pyrrhotite.

In carrying out my invention I proceed as follows, assuming the ore to contain nickeliferous pyrrhotite or magnetic pyrites, chalco-pyrites or copper pyrites, with gold, &c: I first grind the whole of the crude ore, so as to eliminate the pyrrhotite, gold, &c., from the worthless gangue. The crushed ore is then concentrated by jigging or vanning or by any other appropriate concentrating method, thus giving a concentrate containing the nickeliferous pyrrhotite, gold, blende, and galena without any material quantity of quartz or other worthless matter. This concentrate is then passed through a magnetic separator which is capable of working wet ores, or the concentrate is dried and passed through a magnetic separator adapted to work dry ores. The magnetism is so regulated that only the particles of magnetic pyrites which contain no nickel or cobalt are acted upon, the magnetism being too weak to draw away the less magnetic or nickeliferous pyrrhotite. After the pure pyrrhotite has thus been separated the remainder of the concentrate is run through a more powerful magnetic separator, which withdraws the nickeliferous pyrrhotite, leaving all the other or non-magnetic materials. The nickeliferous pyrrhotite which is obtained in this way, although small in quantity compared with the whole amount of ore, will be sufficiently rich to be put into a matte by the regular methods. The remainder of the concentrate is then roasted in a closed cylinder with slight access of air, if desirable, to render the copper pyrites magnetic, when the magnetic copper pyrites may be withdrawn from the rest of the material by a magnetic separator, as explained in my patent, No. 465,250. After the copper pyrites have been withdrawn from the concentrate the remainder, containing the gold, silver, zinc, lead, &c., of the original ore, is worked in the wet way or matted and worked electrolytically, as will be well understood.

What I claim is—

1. The process of separating nickeliferous from non-nickeliferous pyrrhotite where both occur in the same ore, consisting in subjecting the crushed material to a magnetic action of such strength that, due to the difference in magnetic capacity of the nickeliferous and non-nickeliferous pyrrhotite, the non-nickeliferous pyrrhotite will be acted upon magnetically, while the nickeliferous pyrrhotite will not be thus acted upon, substantially as set forth.

2. The process of treating ores containing nickeliferous and non-nickeliferous pyrrhotite, consisting in first crushing the ore to free the particles of pyrites from the gangue and other metals, passing the material through a magnetic separator of a sufficient strength to withdraw all the magnetic pyrites, and then passing the magnetic pyrites through another magnetic separator having a sufficient strength to act upon the non-nickeliferous pyrrhotite, but not upon the nickeliferous pyrrhotite, substantially as set forth.

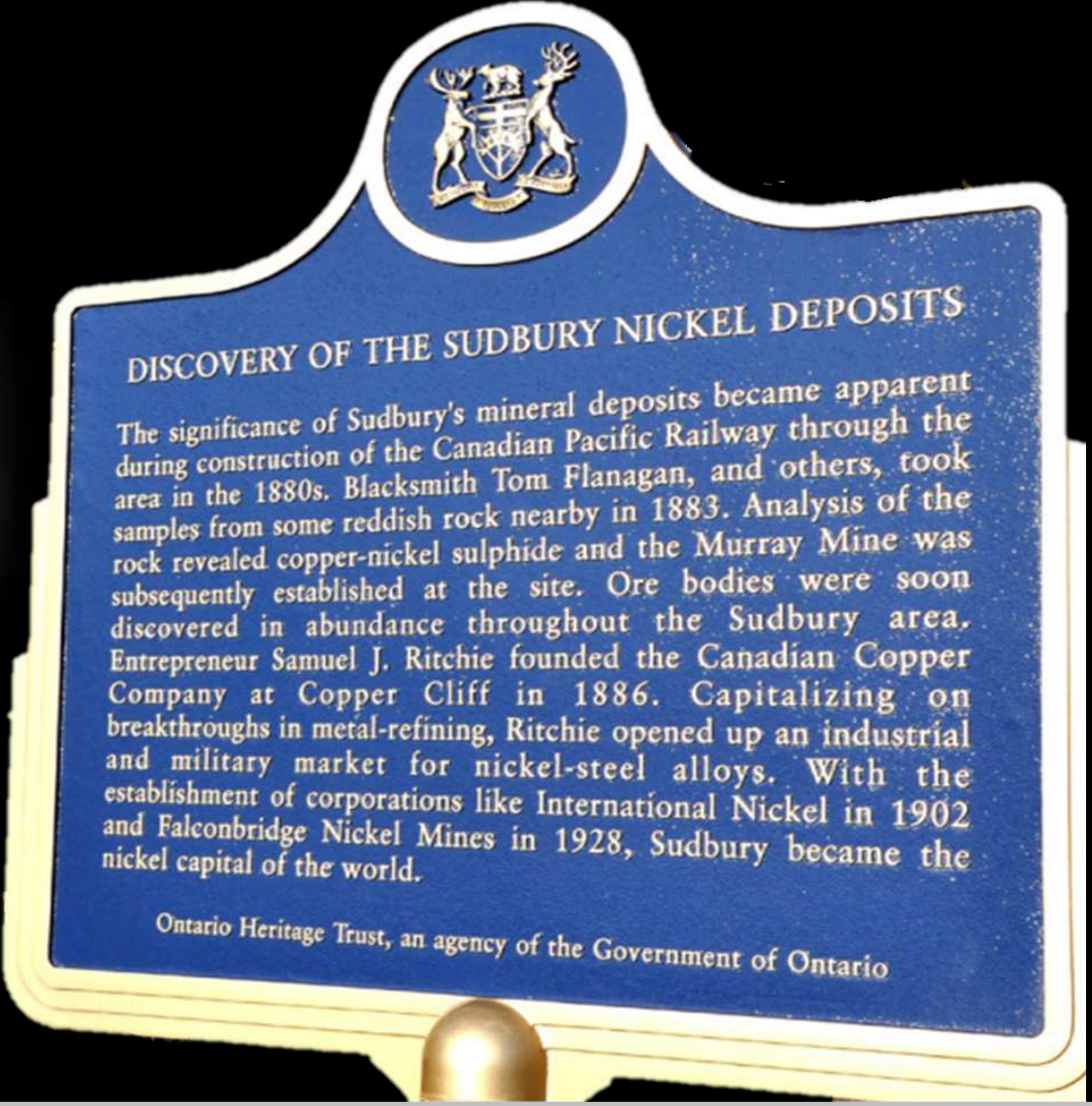
This specification signed and witnessed this 9th day of July, 1892.

THOS. A. EDISON.

Witnesses:
RICHARD N. DYER,
EUGENE CONRAN.

The Big Nickel Monument, Copper Cliff, Sudbury.

Discovery of the Sudbury Nickel Deposits



" NORNICKEL " The Norilsk Nickel Group is Russia's leading Metals and Mining company, the largest Palladium and refined Nickel producer in the world, and one of the biggest Platinum producers.
In addition, the produces Copper, Cobalt, Rhodium, Silver, Gold, Iridium, Ruthenium, Selenium, Tellurium, and Sulphur.

" 80 YEARS OF NORNICKEL "
1935 The USSR Goverment resolved to build Norilsk Plant. 1942 The first produced. 1994 Norilsk Nickel's were privatised.

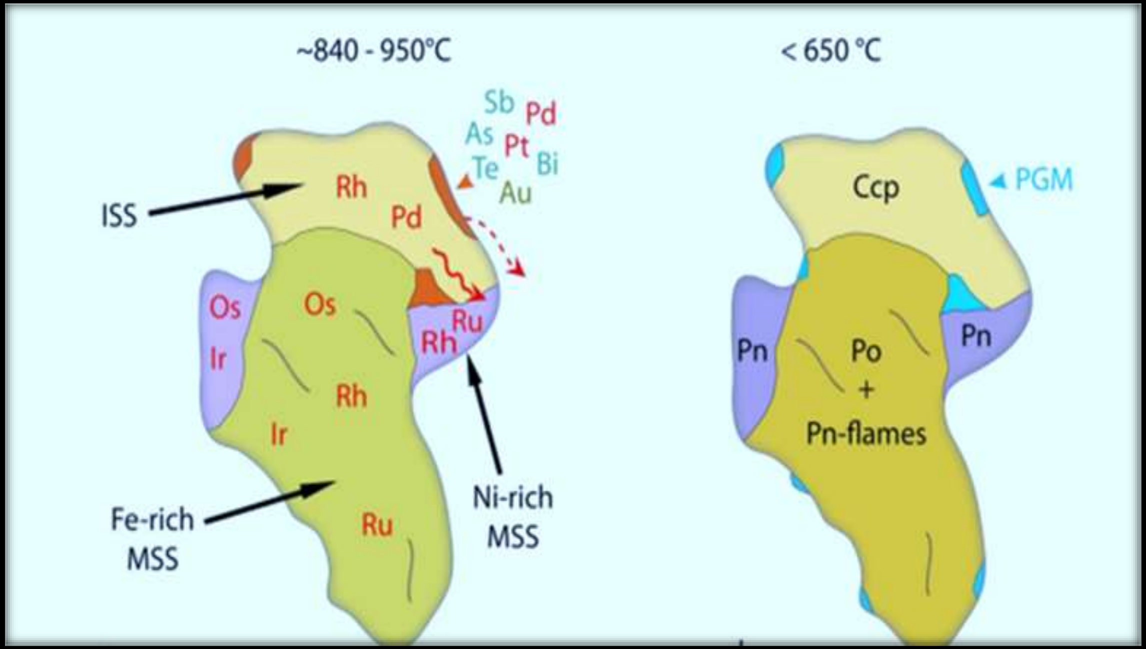
The Jinchuan Ni-Cu-PGE deposit is one of the three largest magmatic Ni deposits in the world.
Disseminated, Net-textured, Cu-rich sulphide ores and Massive sulphide ores are the most important ore types.

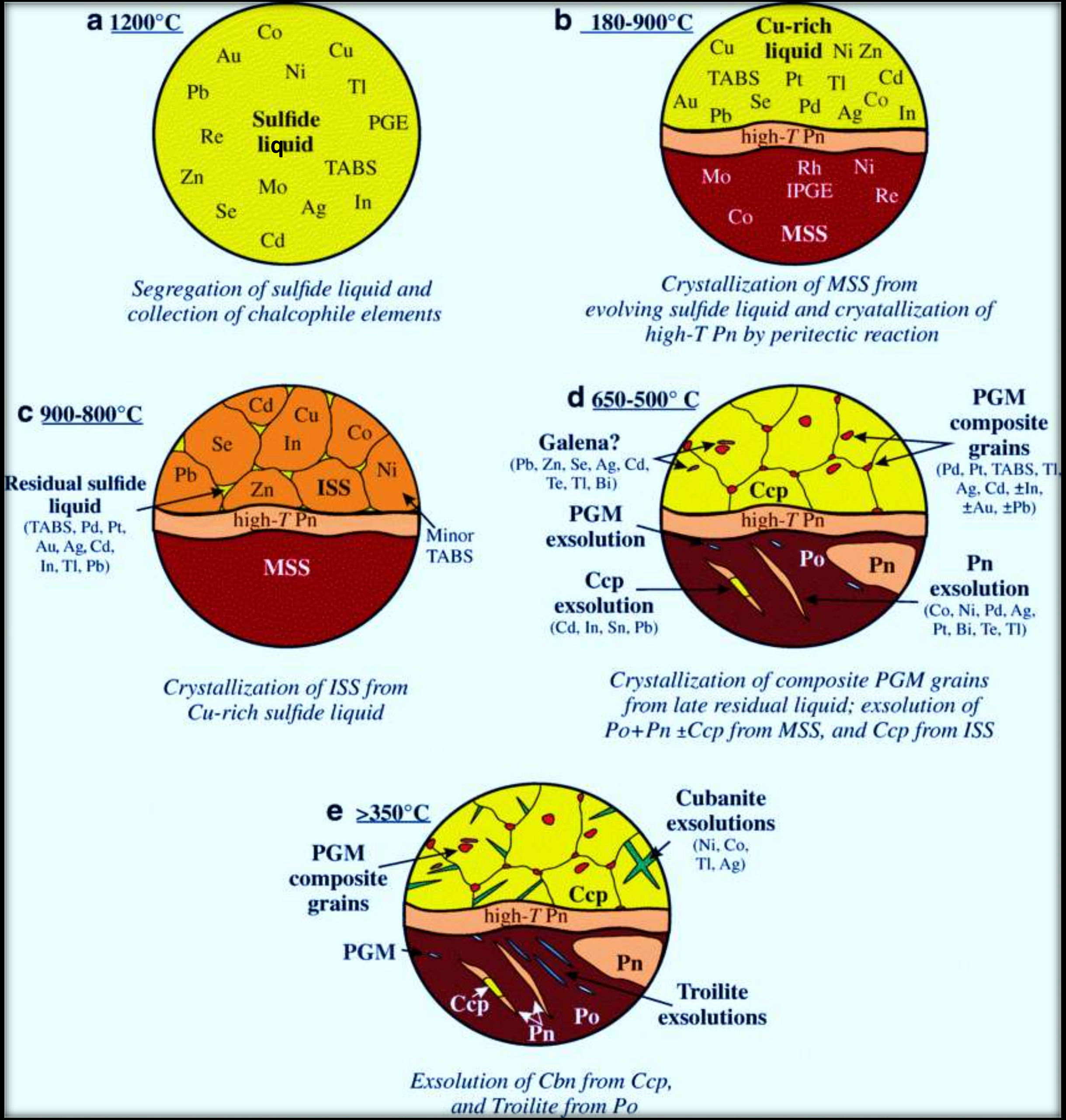
https://sci-hub.se/10.1002/gj.3180

Jinchuan Group

EARTH & MAGMATIC SULFIDE DEPOSITS

In most magmatic sulfide deposits, Platinum group elements (PGE) are found both within the structure of the base metal sulfides (BMS), Pyrrhotite (Po), Pentlandite (Pn), Chalcopyrite (Ccp) and Cubanite (Cbn) and as platinum-group minerals (PGM). Tellurium, As, Bi, Sb and Sn (TABS) are essential elements in many of these PGM.





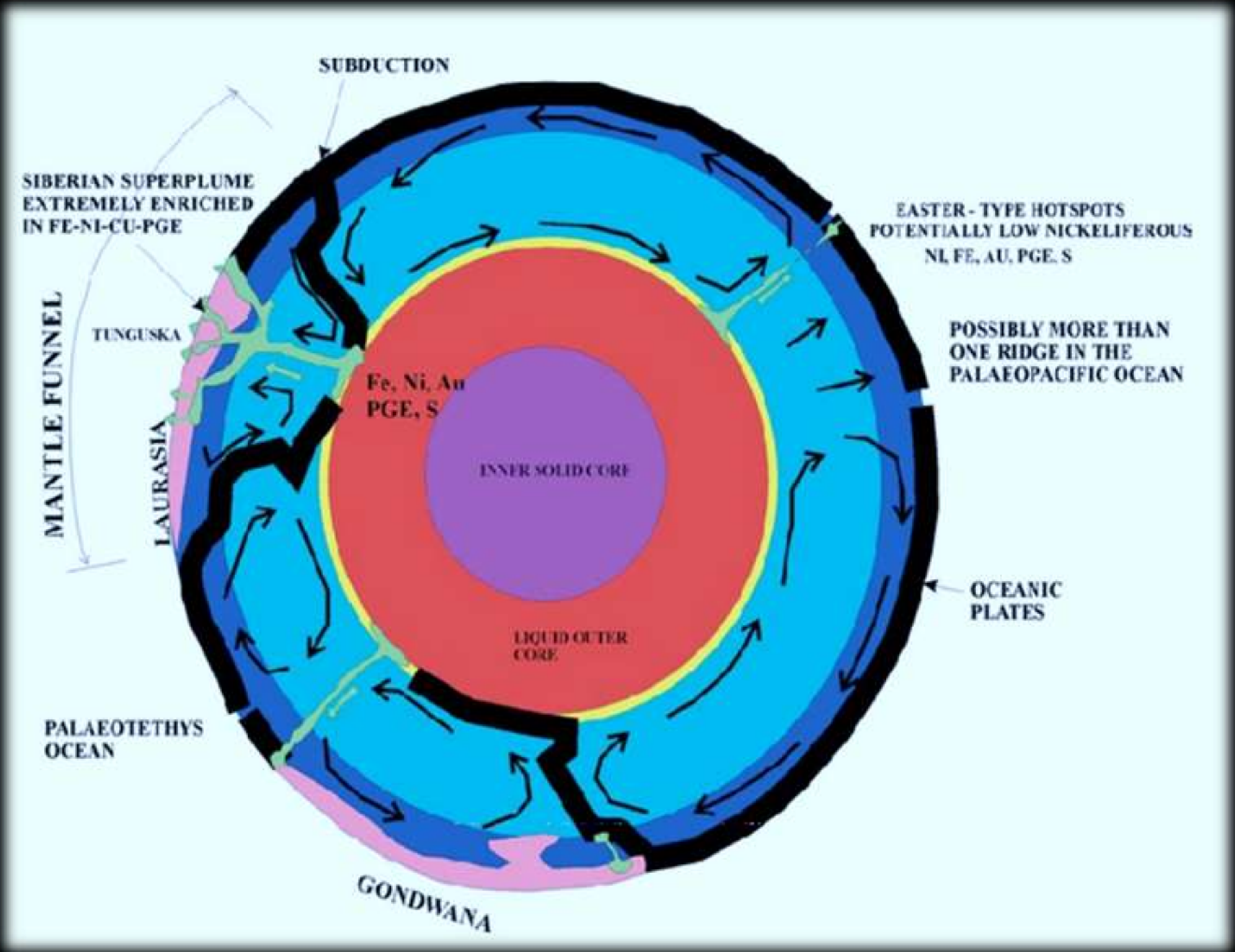
https://sci-hub.se/10.1007/s00126-019-00926-z

EARTH & MANTLE

- Possible structure of the Earth at the Permian– Triassic transition

- The presence of a whole-mantle subduction funnel under Laurasia, which might stimulate focused ascent of the Cu–Ni–PG rich mantle plume (green) in the geometric centre of the continent.

- Black arrows show possible convection in the mantle.



Ref.
Noril'sk–Talnakh Cu–Ni–PGE deposits:
A revised tectonic model
Alexander Yakubchuk - Anatoly Nikishin

https://spiral.imperial.ac.uk/bitstream/10044/1/80518/6/hoggard_etal_2020_base_metals.pdf

Global distribution of sediment-hosted metals controlled by craton edge stability

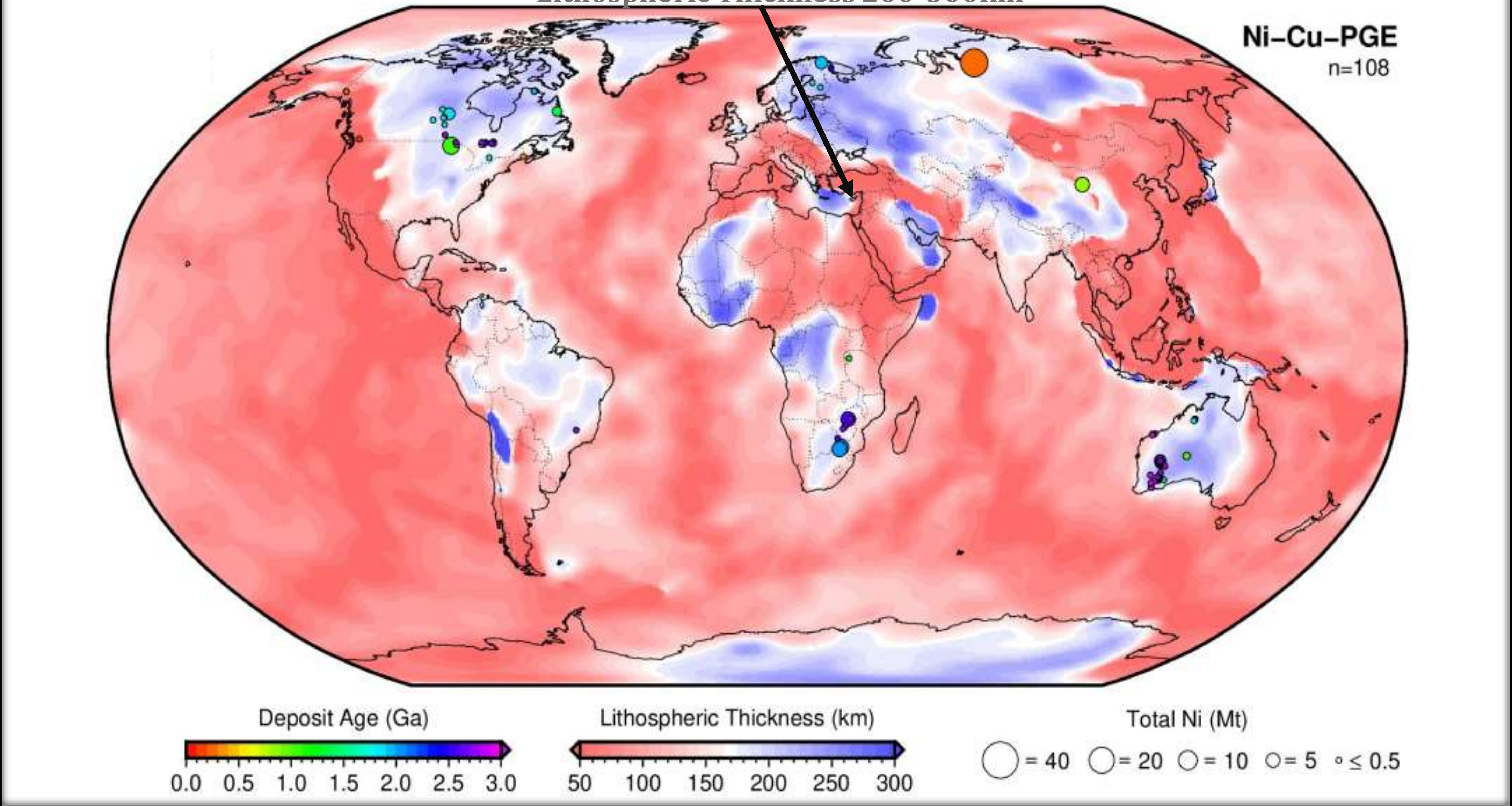
Mark J. Hoggard, Karol Czarnota, Fred D. Richards, David L. Huston, A. Lynton Jaques & Sia Ghelichkhan

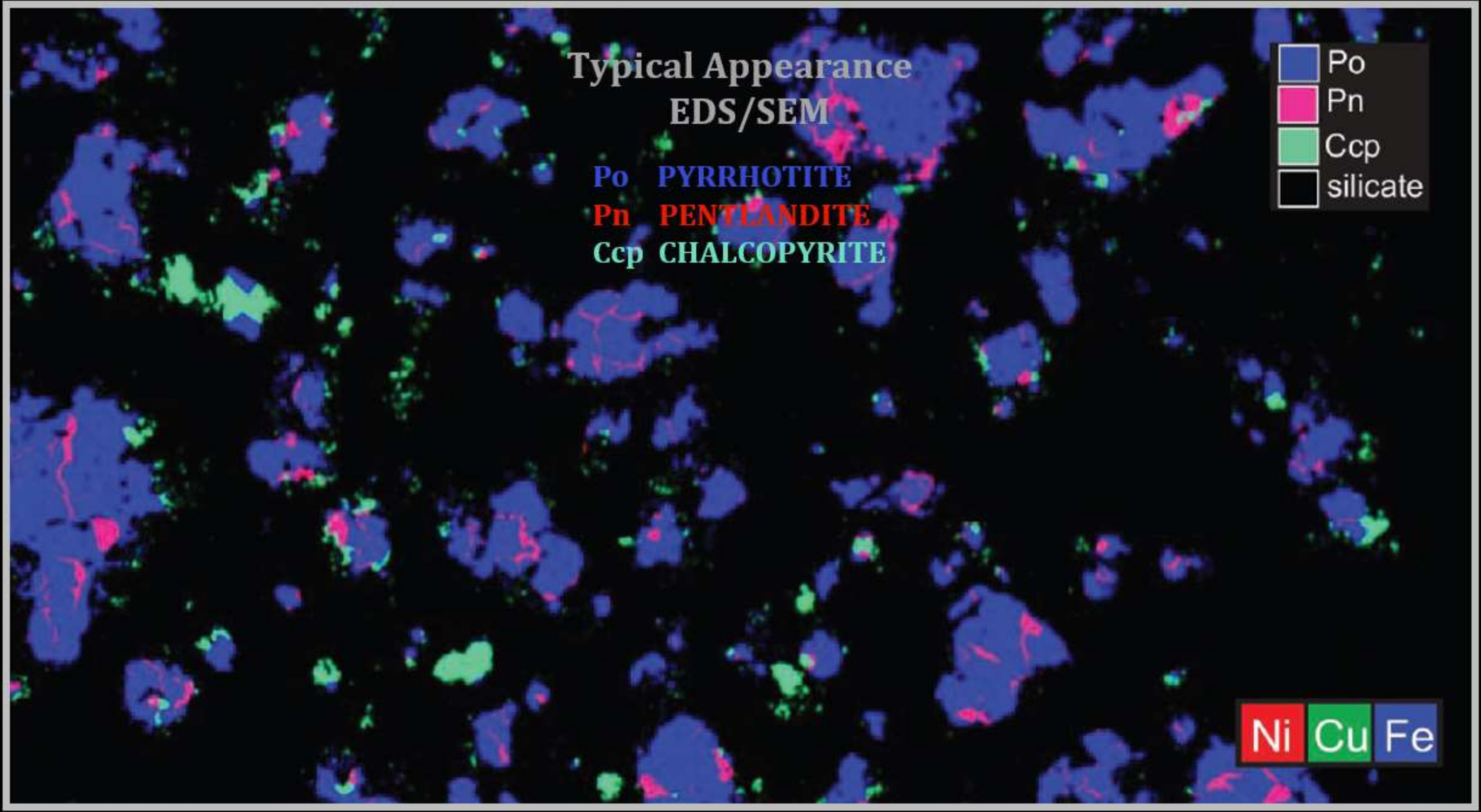
Nature Geoscience   Published: 29 June 2020

Sustainable development and the transition to a clean-energy economy drives ever-increasing demand for base metals, substantially outstripping the discovery rate of new deposits and necessitating dramatic improvements in exploration success.
Rifting of the continents has formed widespread sedimentary basins, some of which contain large quantities of copper, lead and zinc. Despite over a century of research, the geological structure responsible for the spatial distribution of such fertile regions remains enigmatic.
Here, we use statistical tests to compare deposit locations with new maps of lithospheric thickness, which outline the base of tectonic plates.
We find that 85% of sediment-hosted base metals, including all giant deposits (>10 megatonnes of metal), occur within 200 kilometres of the transition between thick and thin lithosphere.
Rifting in this setting produces greater subsidence and lower basal heat flow, enlarging the depth extent of hydrothermal circulation available for forming giant deposits. Given that mineralization ages span the past two billion years, this observation implies long-term lithospheric edge stability and a genetic link between deep Earth processes and near-surface hydrothermal mineral systems.
This discovery provides an unprecedented global framework for identifying fertile regions for targeted mineral exploration, reducing the search space for new deposits by two-thirds on this lithospheric thickness criterion alone.

https://www.nature.com/articles/s41561-020-0593-2

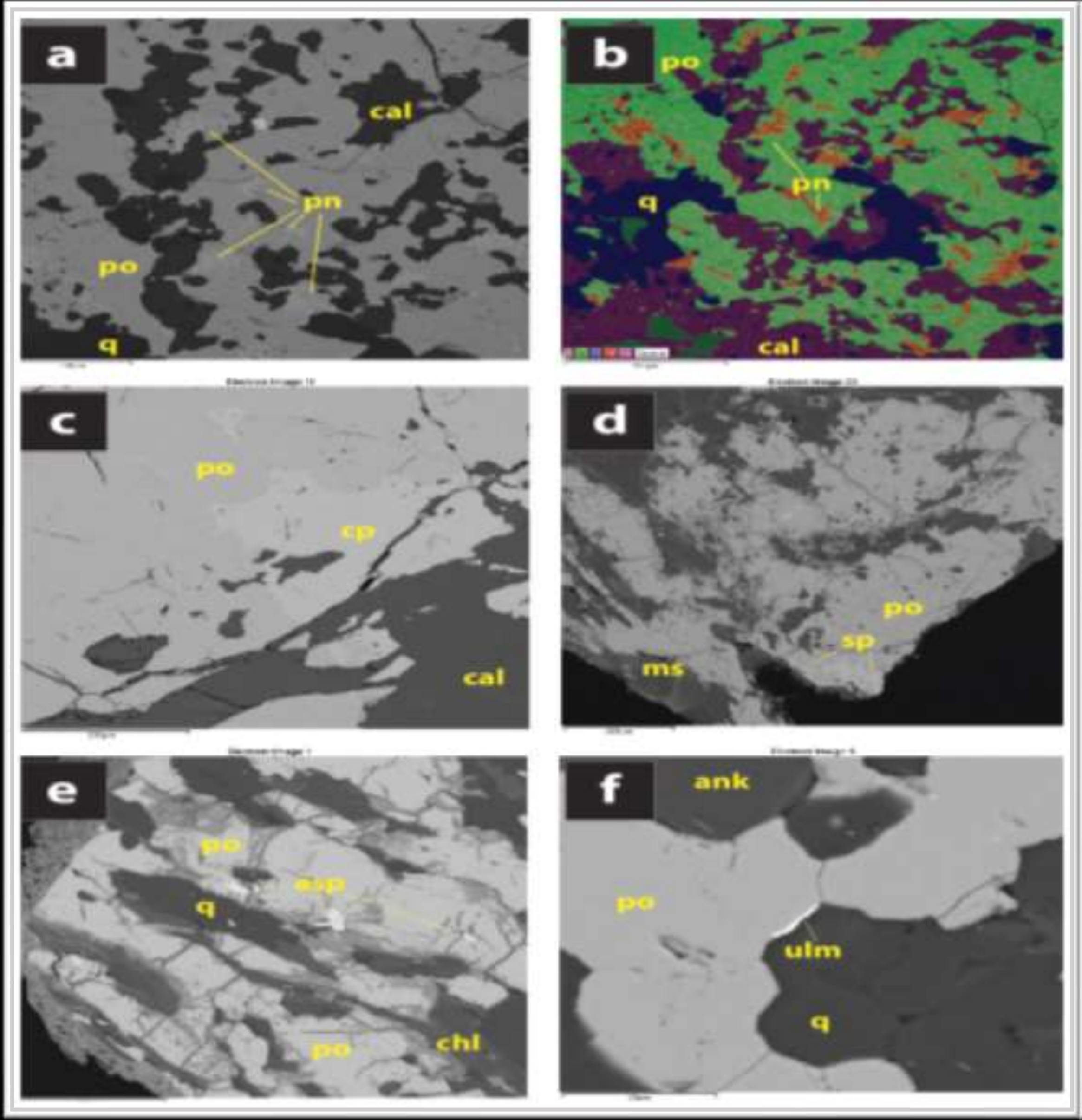
Alanya Massif
Lithospheric Thickness 200-300km

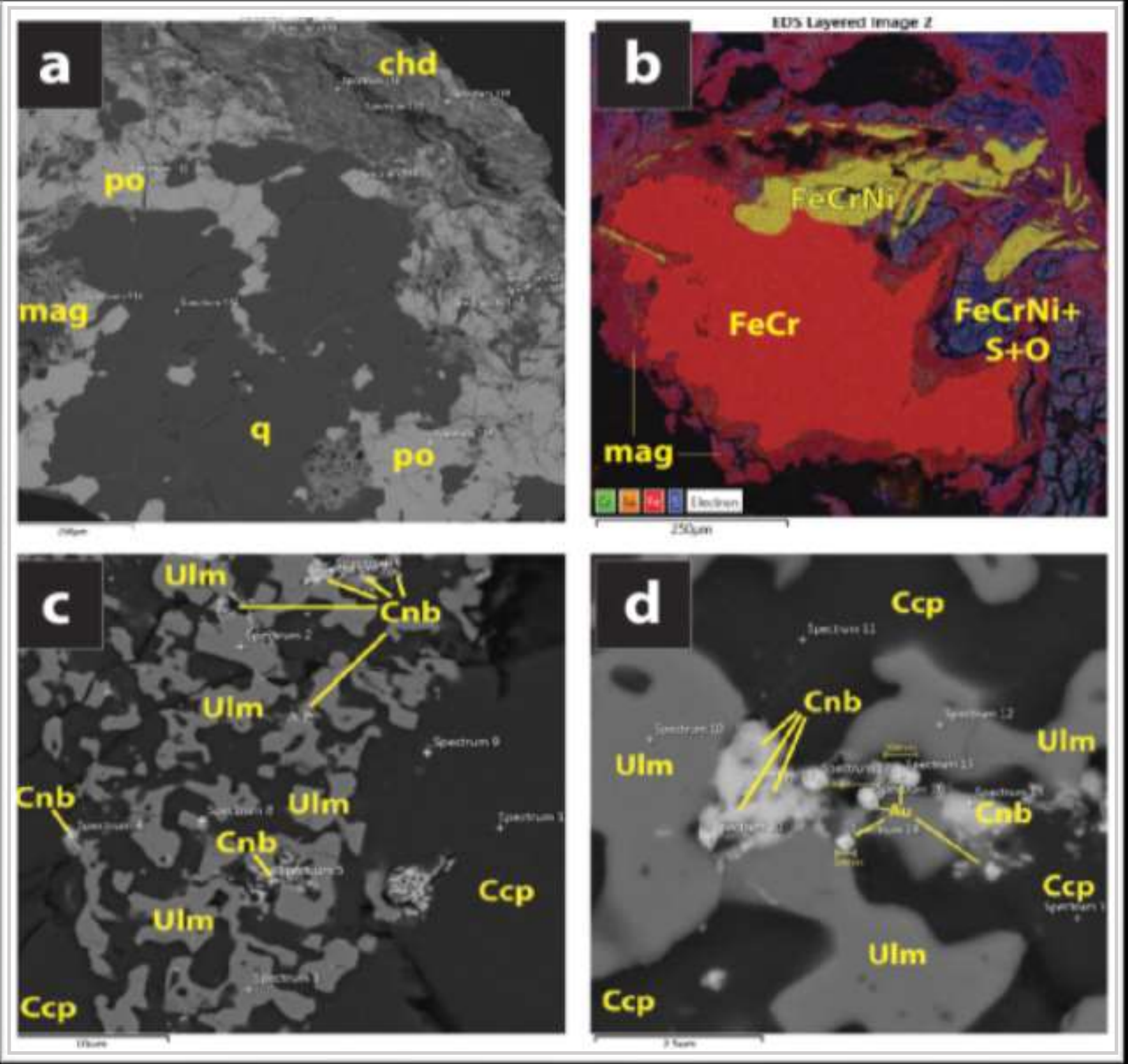




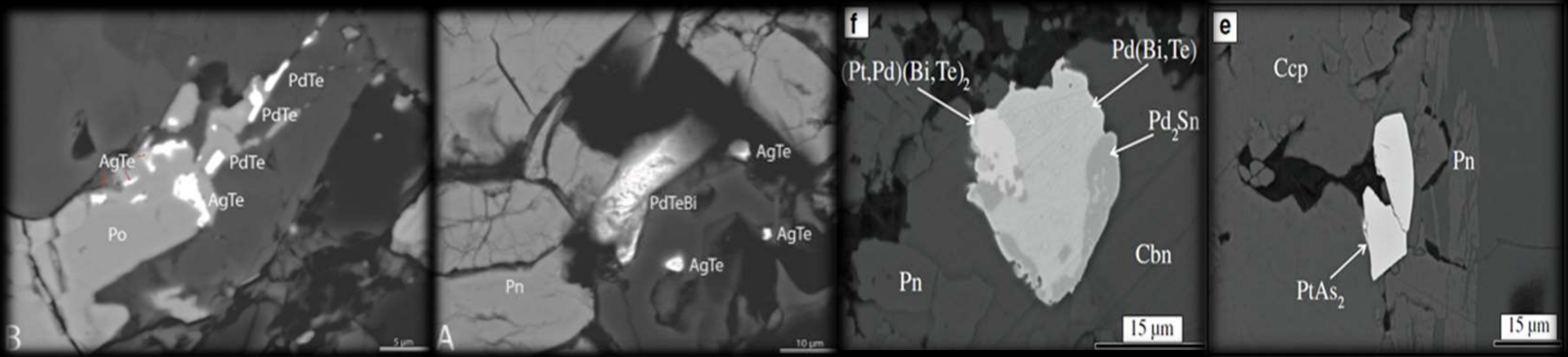
Typical Appearance
EDS/SEM
Po PYRRHOTITE
Pn PENTLANDITE
Ccp CHALCOPYRITE
Po
Pn
Ccp
silicate
Ni
Cu
Fe

Alanya Massif AEX #F3 Pyrrhotite-Pentlandite-Chalcopyrite-Cobaltoan Arsenopyrite-Gold





EARTH & Precious 8 Metals



Precious Metals Price

PRECIOUS METALS	Pt PLATINUM	Pd PALLADIUM	Rd RODIUM	Ir IRIDIUM	Os OSMIUM	Ru RUTENIUM	Au GOLD	Ag SILVER
PRICE - LME 04.04.2022	31.8 $/gr	73.4 $/gr	626.9 $/gr	157.5 $/gr	26.0 $/gr	19.9 $/gr	62.0 $/gr	0.80 $/gr

28
Ni
Nickel
27
GAR
Co
Cobalt
58.993195
NICKEL
Ni
COBALT
Co
99.99
FINE
PLATINUM
999.5
NET WT
1000 g
FINE
PALLADIUM
999.5
NET WT
1000 g
FINE
RHODIUM
999.0
NET WT
1000 g

KIMBERLITE & DIAMOND

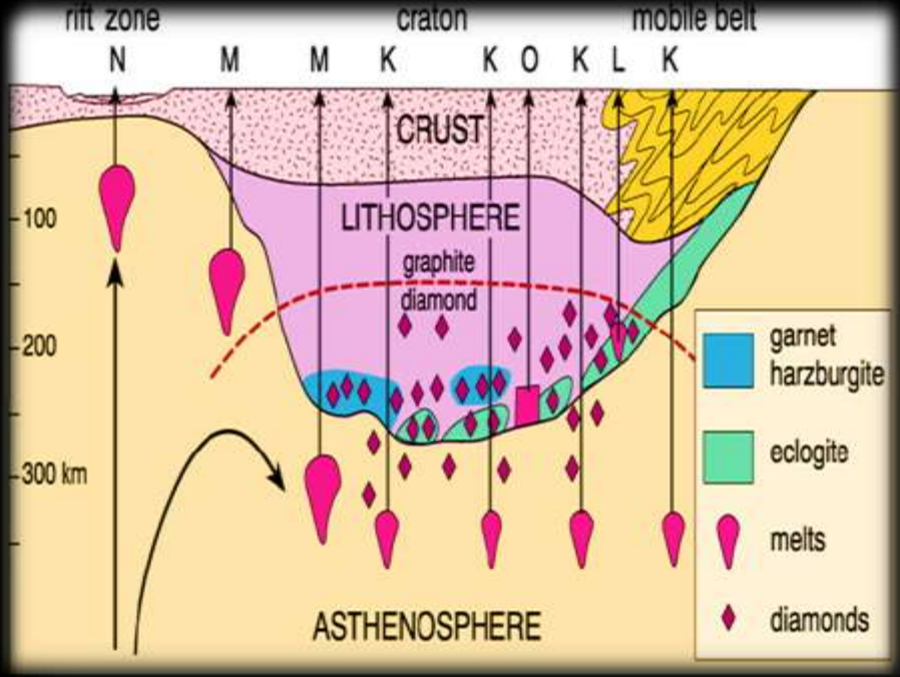
● Natural diamonds form and are preserved in a high pressure environment present in nature at depths of over 120 kilometres.

● Regional Setting of Primary Diamond Deposits“Clifford’s Rule”, states that diamondiferous kimberlites are almost exclusively foundin regions underlain by Archaean craton, that is continental crust older than 2.5 billion years in age.

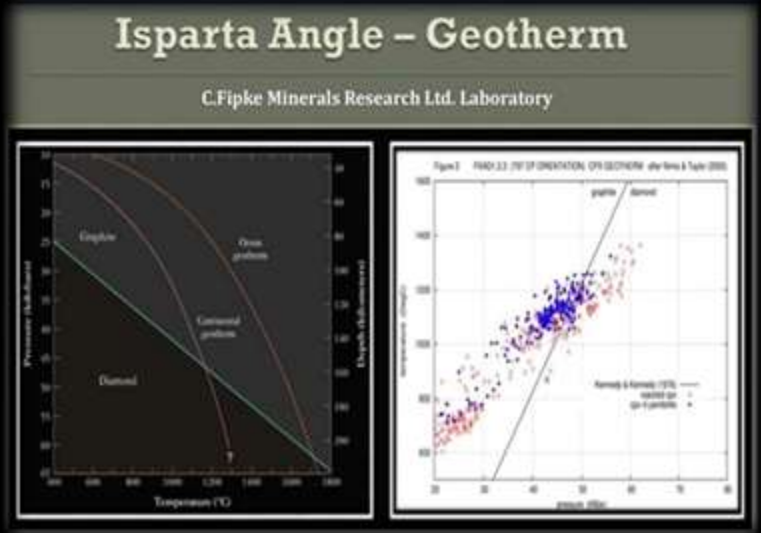
● In Africa, Russia and Canada, all of the significantly diamondiferous kimberlites are “on-craton”.

● During the Exploration and Development period, the most important indicator mineral is Cr-Diopside.

● As a result of SEM/EDS chemical analysis of Cr-Diopsides; "on-craton" determination, how many kilometers deep the Kimberlites originate, P/T determinations and whether the Kimberlites contain diamonds are determined.

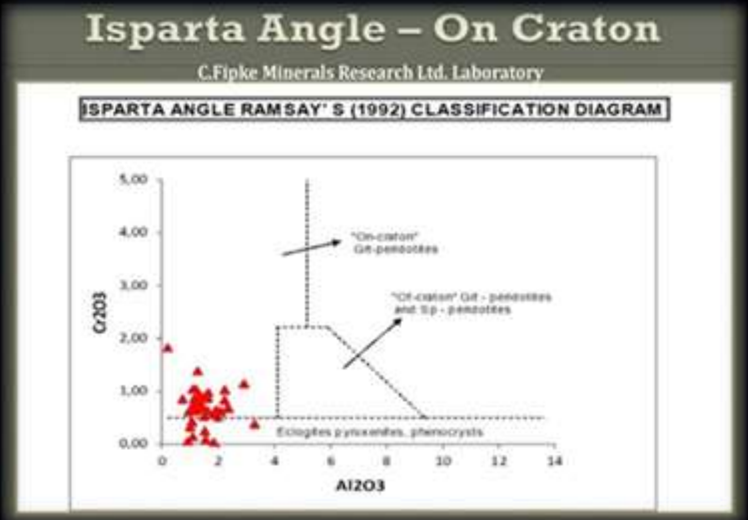


Isparta Angle – Alanya Massif



On-Craton & Precambrian Age
1000-1250 C° Temperature
40-50 Kbar Pressure

One Micro Diamond
Hundreds of Natural Moissanite
Thousands of Indicator Minerals



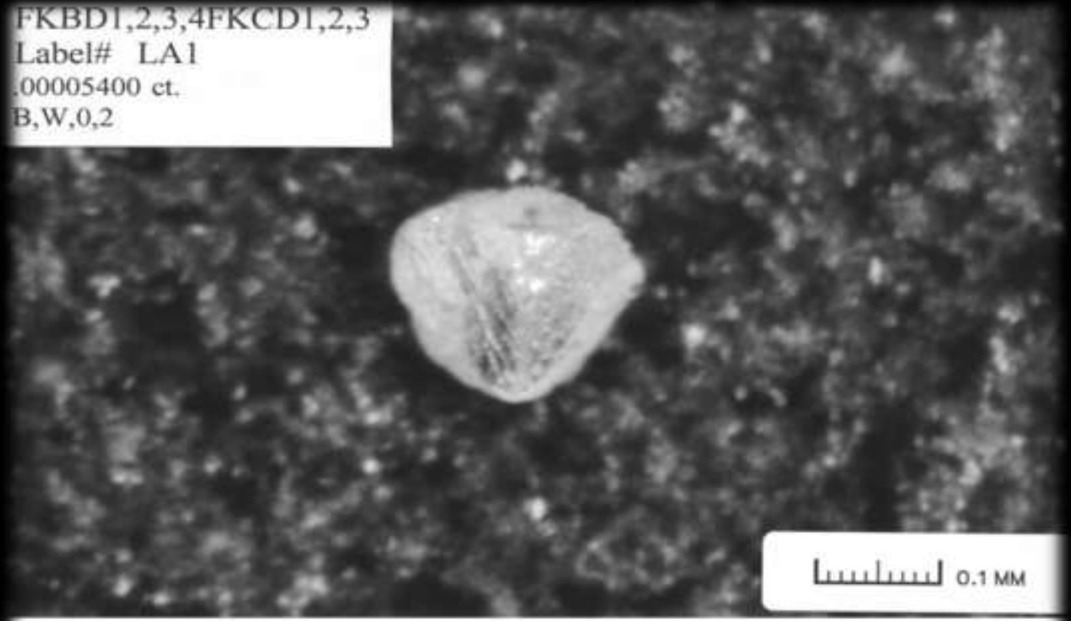
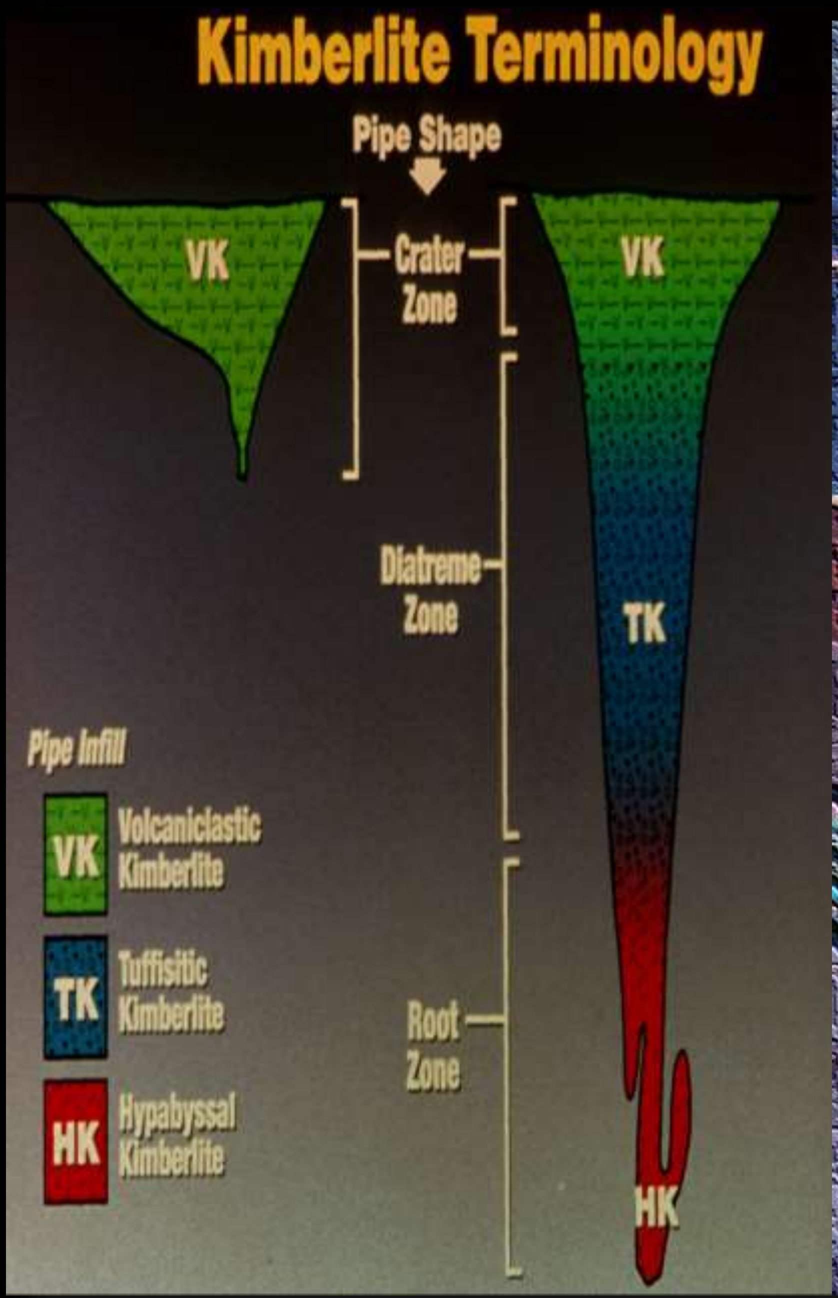
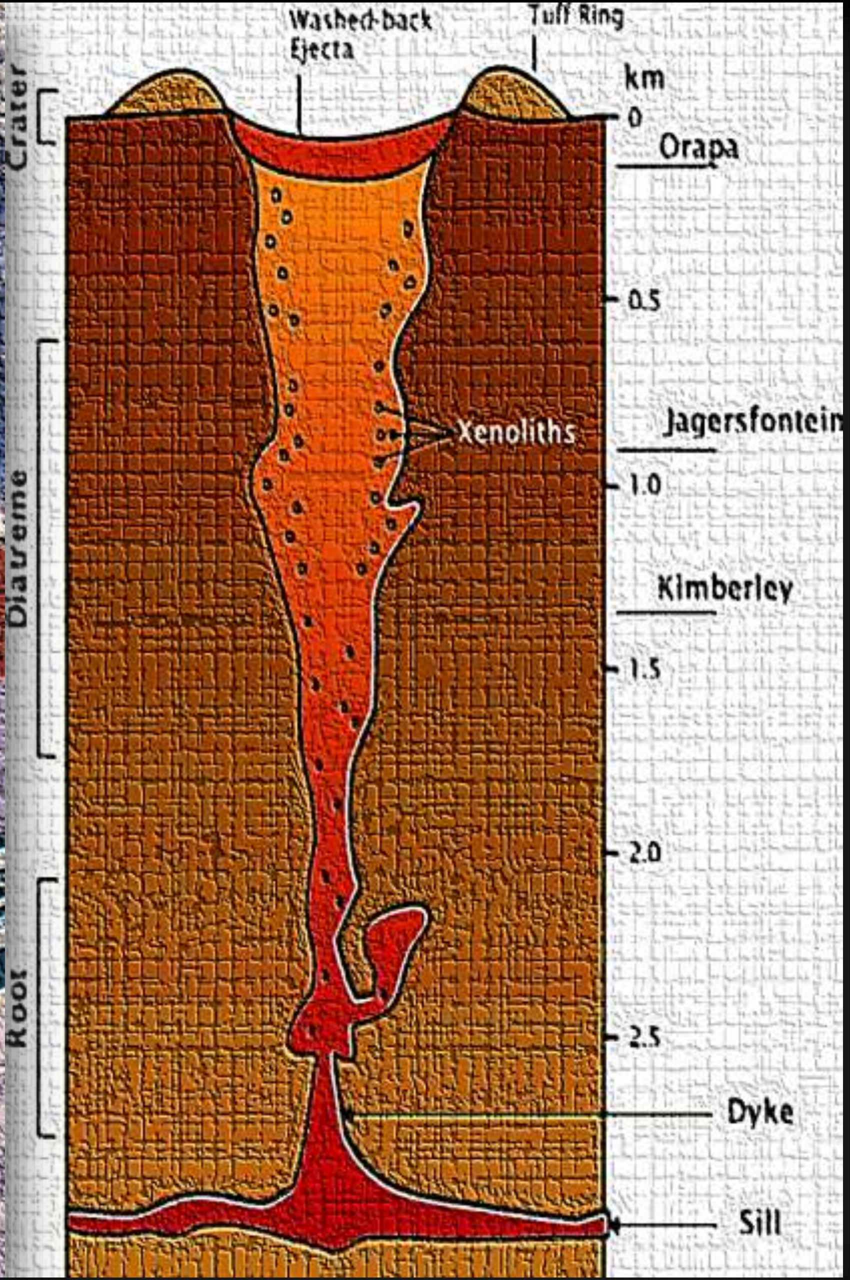


PLATE 1 – Photograph of a Recovered Microdiamond

PLATE 4b – Photograph of a Moissanite

C.F. Mineral Research Limited Work Order : IA80 03 March 2010


Kimberlite Terminology
Pipe Shape
VK
Crater Zone
VK
Diatreme Zone
TK
Root Zone
HK
Pipe Infill
VK
Volcaniclastic Kimberlite
TK
Tuffisitic Kimberlite
HK
Hypabyssal Kimberlite

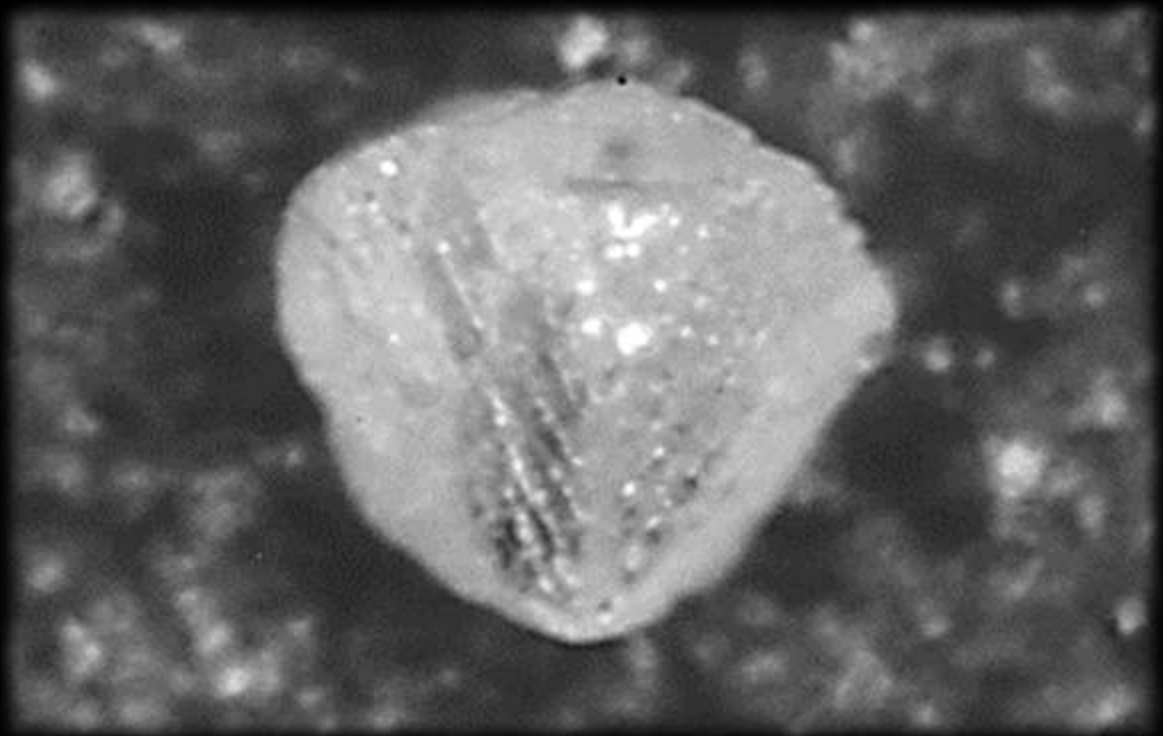

Washed-back Ejecta
Tuff Ring
km
0
Orapa
0.5
Xenoliths
Jagersfontein
1.0
Kimberley
1.5
2.0
2.5
Dyke
Sill
Crater
Diatreme
Root

The story of the modern Diamond market begins on the African continent, with the 1866 discovery of Diamonds in Kimberley, South Africa.

First Polymetallic Pyrrhotite Discovery in Turkey

AEX Alanya Laboratories November 2019

First Diamond Discovery in Turkey



Charles Fipke Mineral Research Limited-Canada

Prepared by: Olgun Kömürcü
Mantle-Derived Minerals
Geosciences Multidisciplinary Engineering

Conventional Green Mining

Hıgh Technology Green Metals

A E X

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