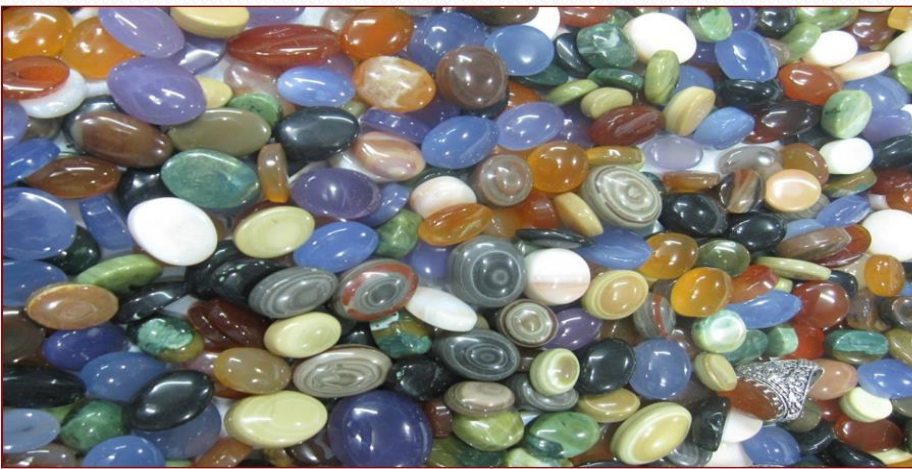




The Field of Mineral Potential of The Sudan.



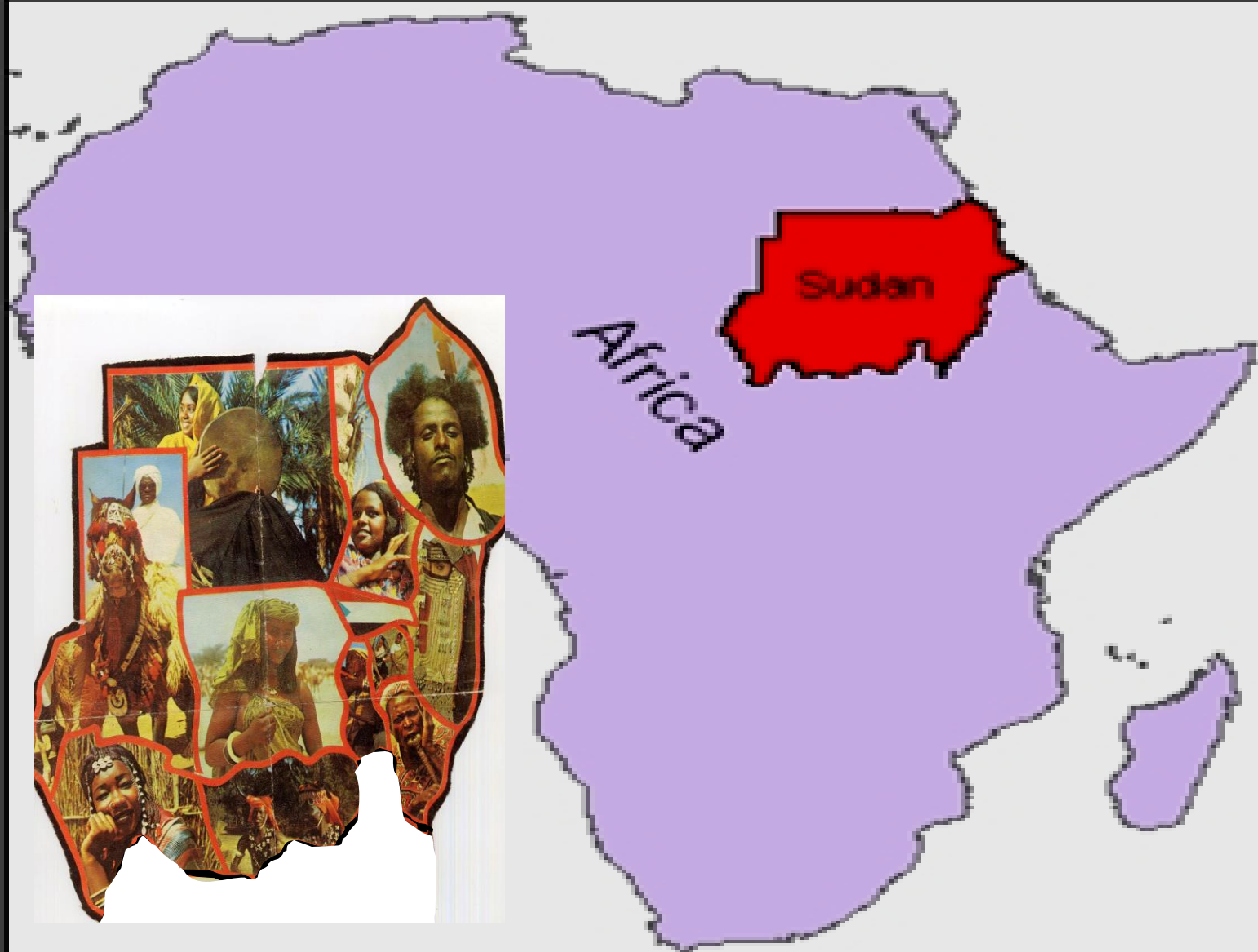
سيائك ذهب من أرياب معدة للتصدير

www.minerals.gov.sd
info@minerals.gov.sd

Sudan

A Past and Present

- Sudan is one of the largest countries in Africa, covering about 1,881,998 squared Km. It falls between latitudes 8.45-23.8 N and longitudes 21.49-38.34 E. It is inhabited by 33,419,625 millions population.
- The back bone of Sudan economy is Agriculture supported by huge animals wealth. Recently some oil resources have been developed which help the main infrastructures in the country.
- The mining sector contribution to the national economy is not exceeding 4% now a days. At present , the only resources mined in Sudan , are gold , chromium ores , gypsum , salt and building materials mainly cement raw materials.
- With such big area and diversified geology which merges across the boundaries between seven countries, Sudan has a huge mineral potential yet to be evaluated and developed.
- The Government is now undertaken important social and political changes in order to lead the country today into a plural and democratic political system, open to new economic initiatives and foreign investment.



2- Geology Of The Sudan



The Geology of Sudan is unique for its rock formation and composition

Which breaks down into the following;

- **Basement**
- **Sedimentary rocks**
- **Volcanic rocks**
- **Recent deposits**

40% Sedimentary Rocks

50% Basement Complex

History of Mining in Sudan

The history of mining in Sudan dates back to the era of the kingdom of Meroe old, known to draw iron, and mine gold in ancient times.

Particularly the kingdoms of Nubia since the Pharaonic era and As well as in the era of the Romans and finally invasions of the Arabs and the Turks. The English named the region the country of metal.

Nuba region derived from the word Neb or gold in the ancient Nubian language was a kingdom whose activity extended in the those eras west to North Kordofan



Mineral deposits

Research and exploration, field and laboratory studies that were made show the presence of metals in many areas of the country.

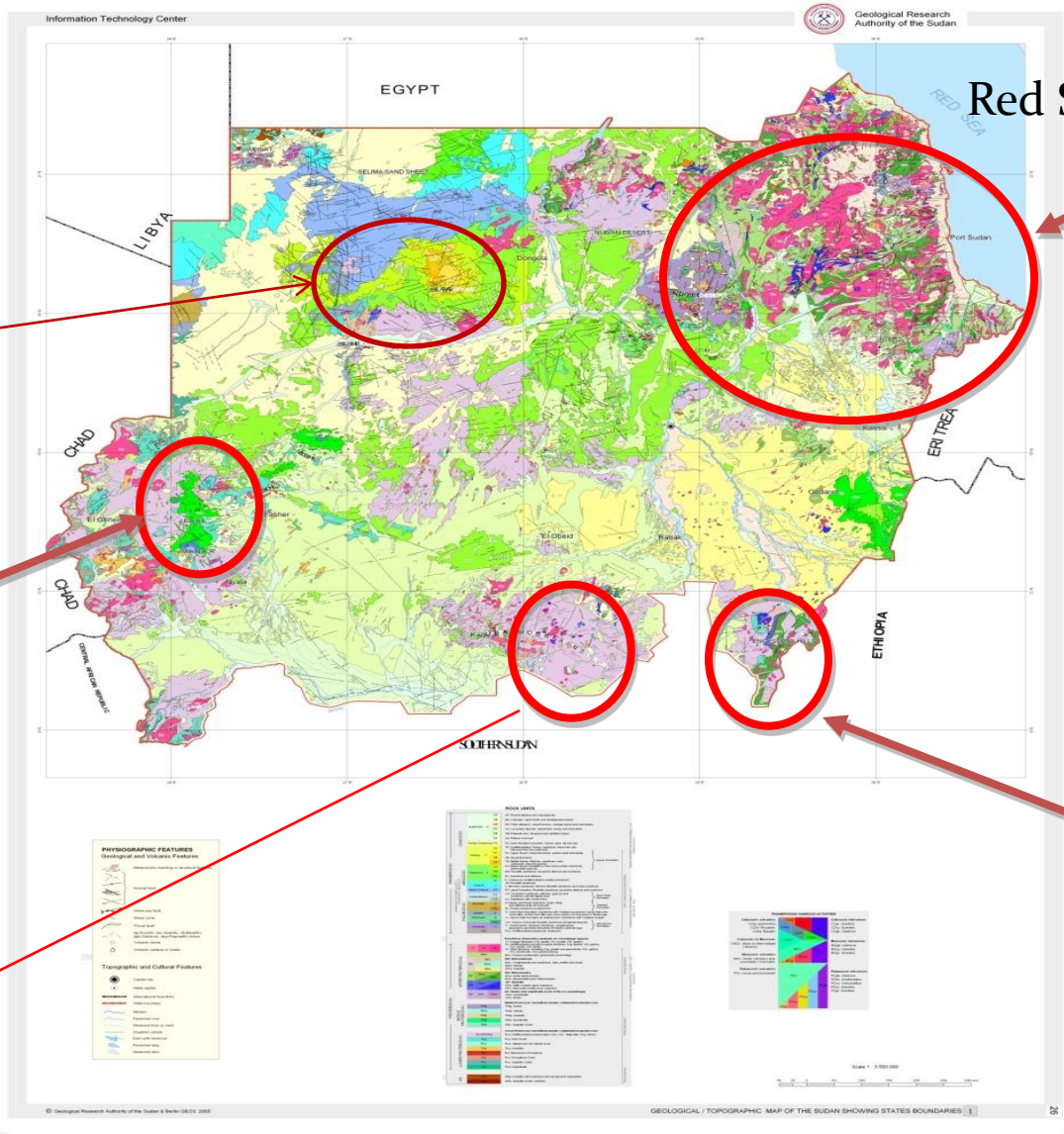
These resources are summarized in the form of various metal ores including precious, strategic, base metals and industrial minerals.

The most important: -

- Precious metals such as gold, silver and platinum
- Gems such as Opal
- Base metals such as copper, zinc and lead
- Strategic minerals such as iron, manganese, chromium and pentanium
- Rare metals such as tungsten sheets
- Industrial metals such as calcium carbonate, salt, talc and kaolin, silicon, and zircon.
- Ornamental Stones
- Building stones

Mineral occurrences in selected areas

- 1. THE RED SEA HILLS AREA (NE Sudan)**
- 2. BAYODA DESERT (North Central Sudan)**
- 3. THE J. RAHIB & J. ABYAD AREAS (NW Sudan)**
- 4. THE J. MARRA (Western Sudan)**
- 5. THE NUBA MOUNTAINS (South central Sudan)**
- 6. INGASSANA COMPLEX (Eastern Sudan)**
- 7. COPPER PIT (South Darfur)**



Red Sea NE Sudan

J. Abyed & Rahib

J. MARRA

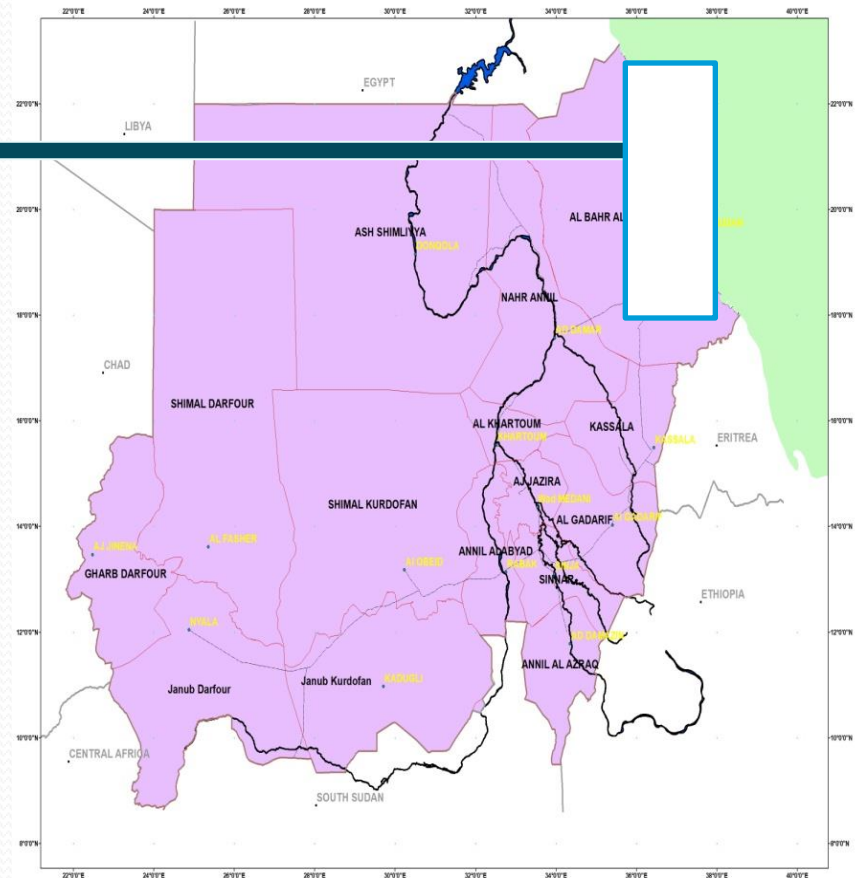
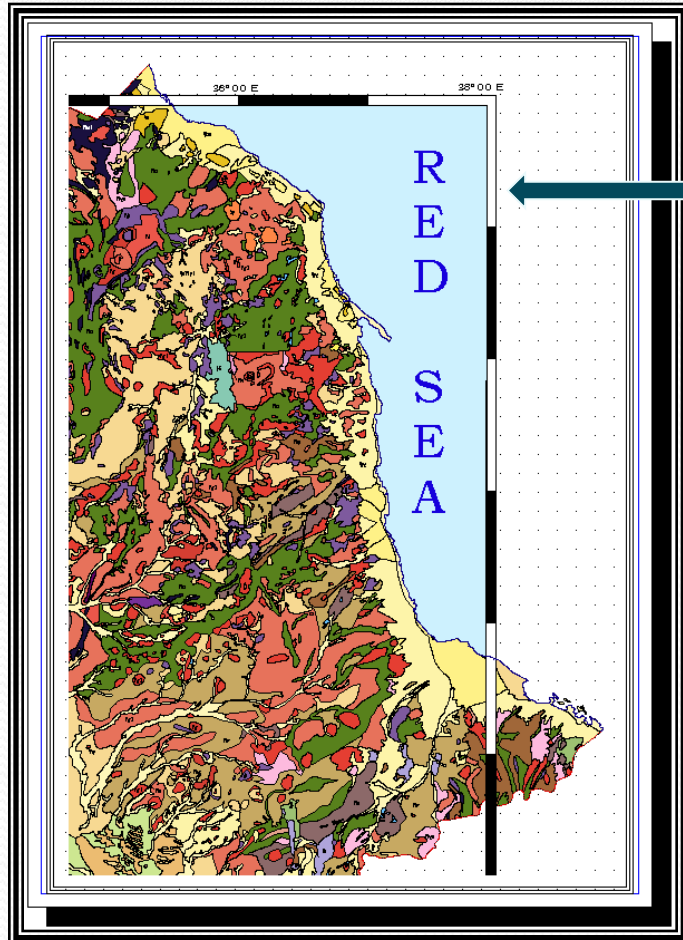
Nuba Mountains

Ingessana Area

1. THE RED SEA HILLS AREA (NE Sudan)

Minerals potential:

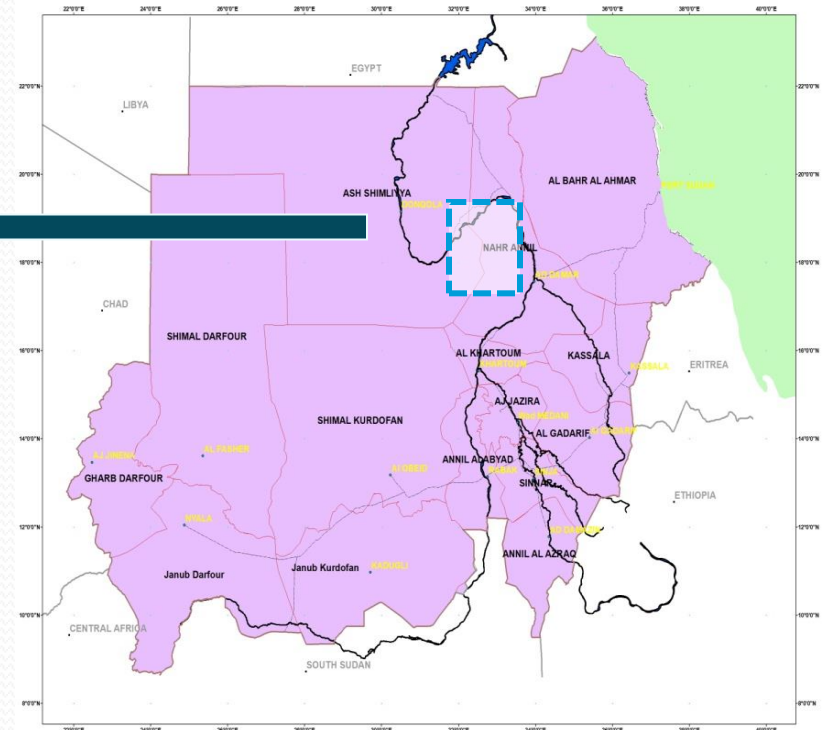
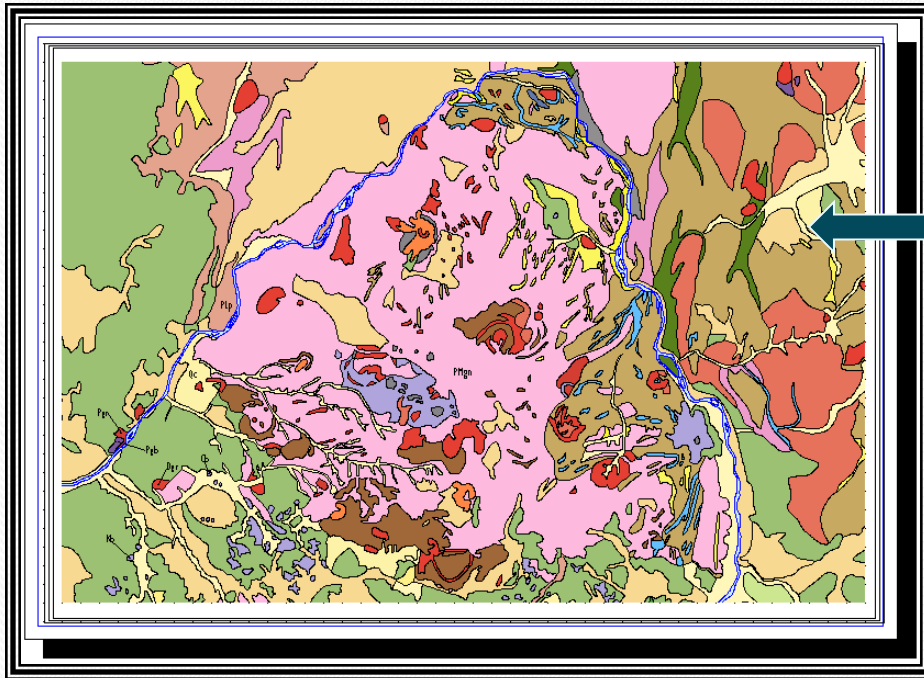
1. Gold.
2. Silver
3. Copper
4. Zinc
5. Manganese
6. Iron
7. Black Sands
8. Garnet
9. Talc
10. Salt
11. Gypsum.
12. REE



1. BEYODA DESERT

Minerals potential:

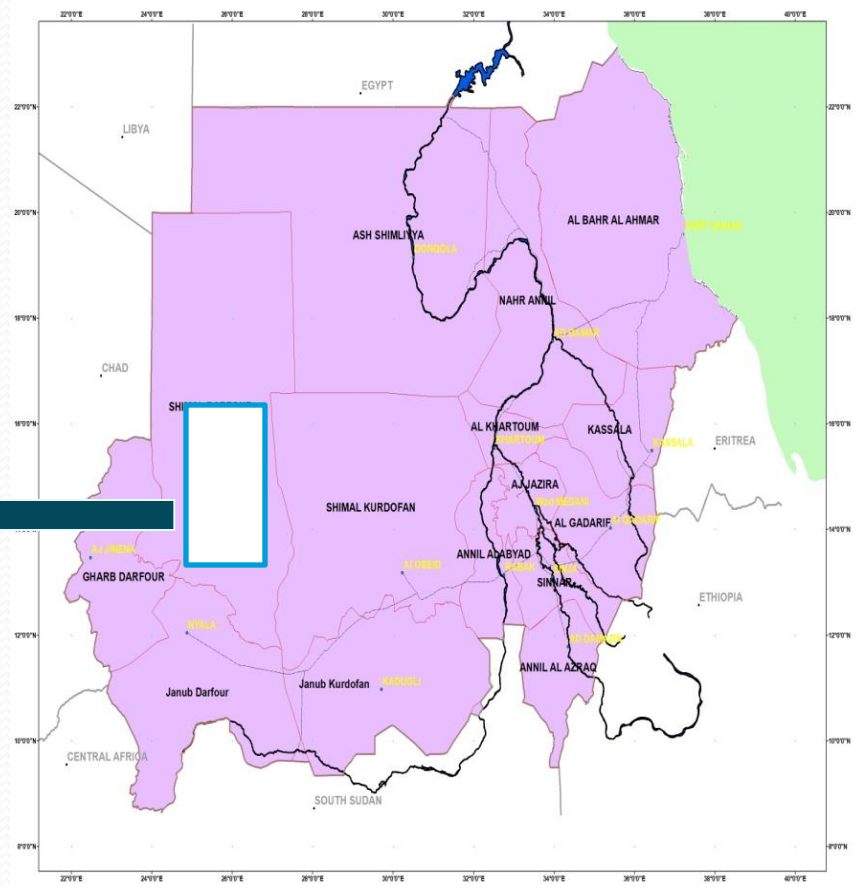
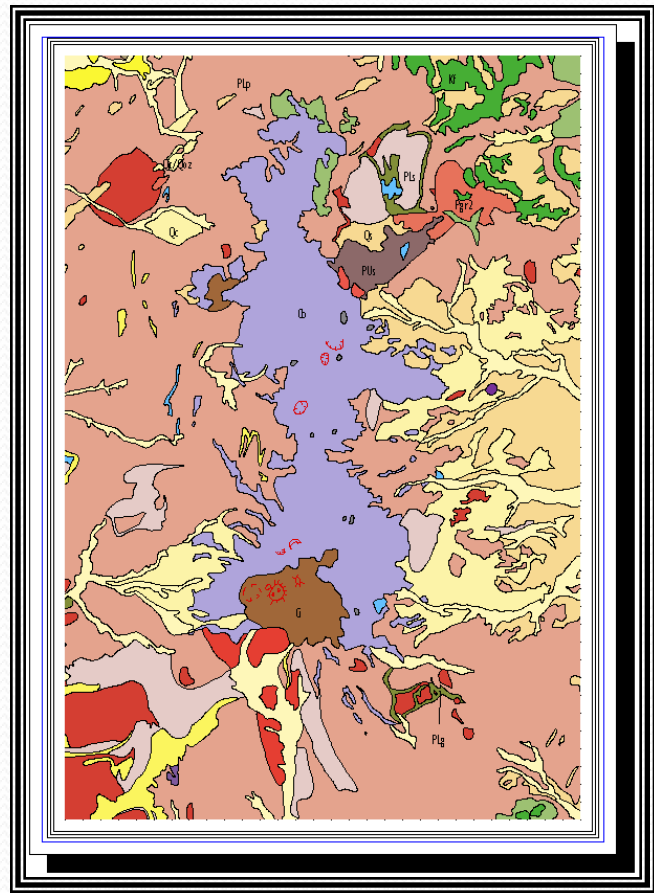
1. Gold
2. Iron
3. Semi Precious Metals
4. Kyanite
5. Marble
6. Mica
7. Silicate
8. Feldspar
9. Manganese



4. THE J. MARRA Volcanic Field (Western Sudan)

Minerals Potential:

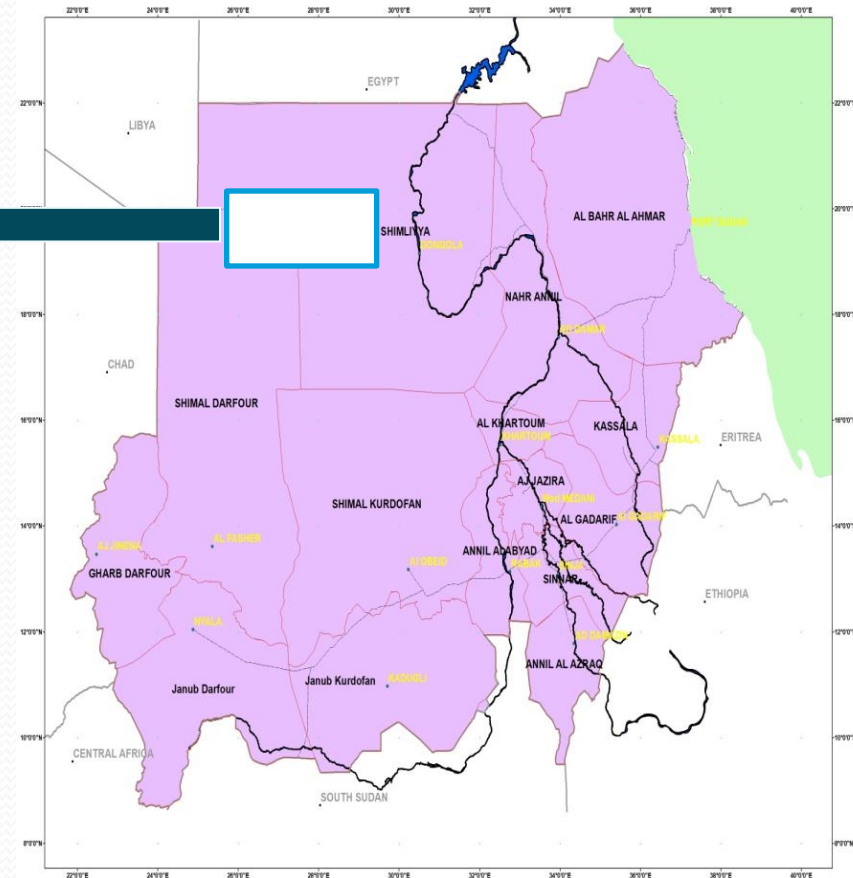
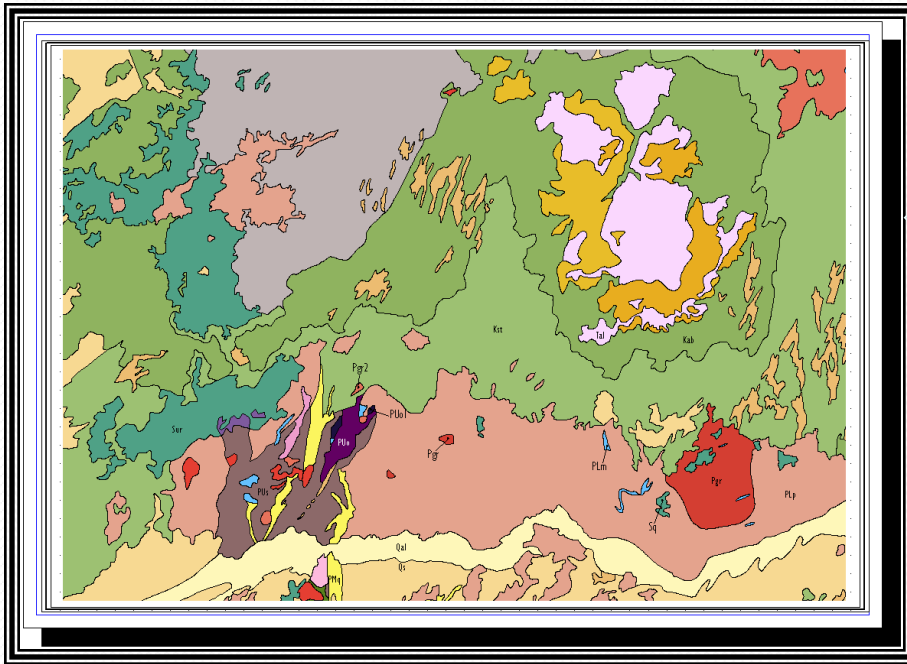
- 1. Base metals
- 2. Garnet
- 3. Kyanite
- 4. Sulphur
- 5. Salt



3. THE J. WAHIB & J. ABYAD AREAS (NORTHERN WADI HAWAR)

Minerals Potential:

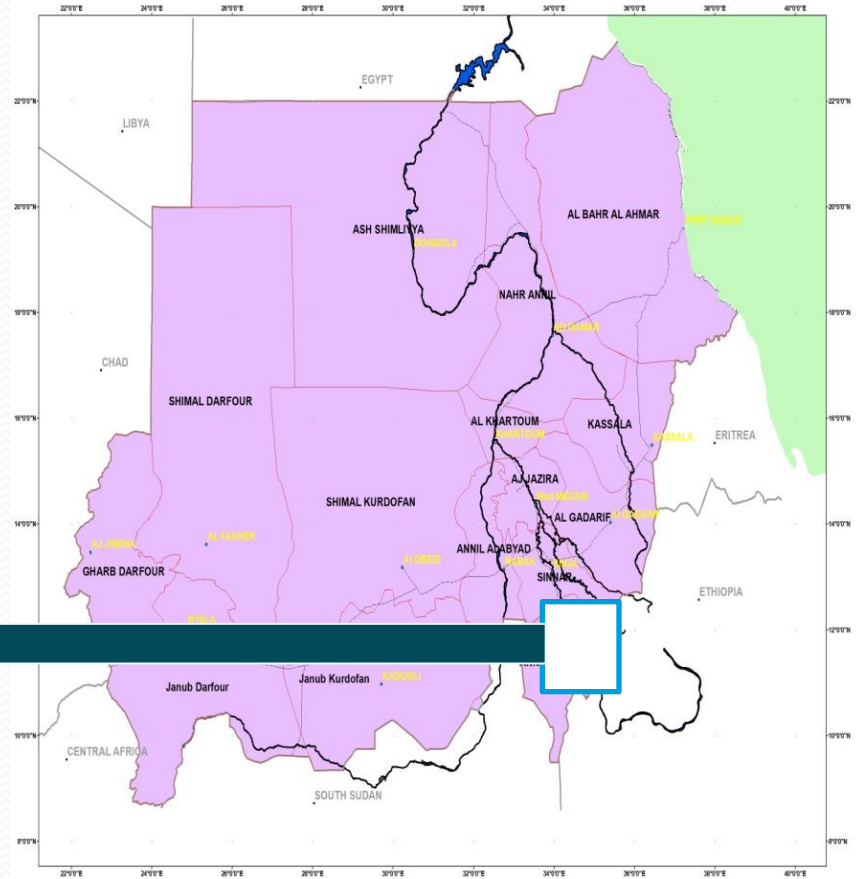
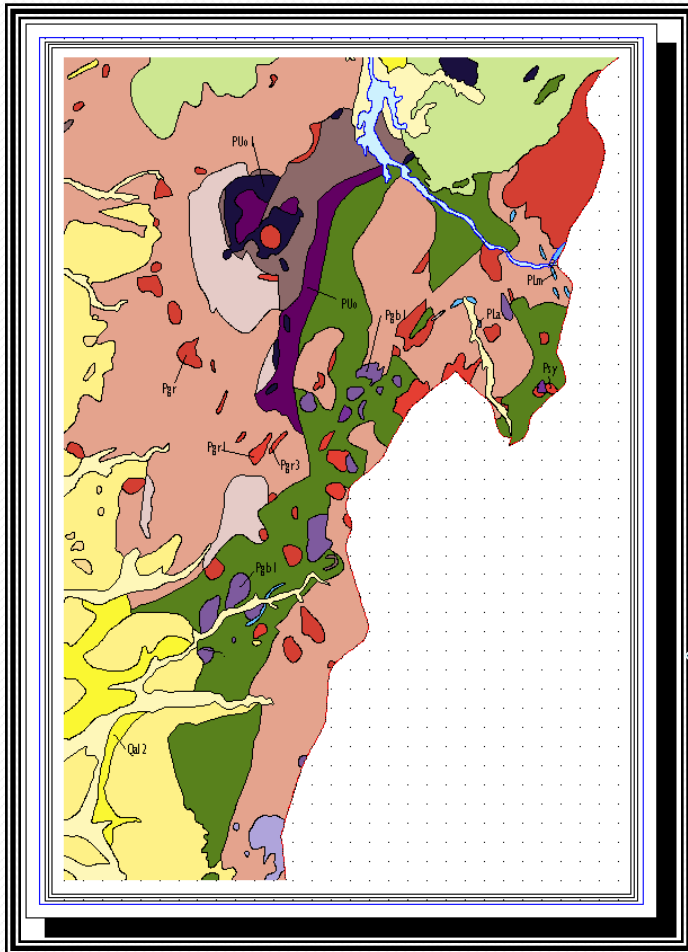
1. Chromites 2. PGM 3. Gold 4. Bauxite 5. Phosphate



6. INGASSANA COMPLEX (BLUE NILE)

Minerals Potential:

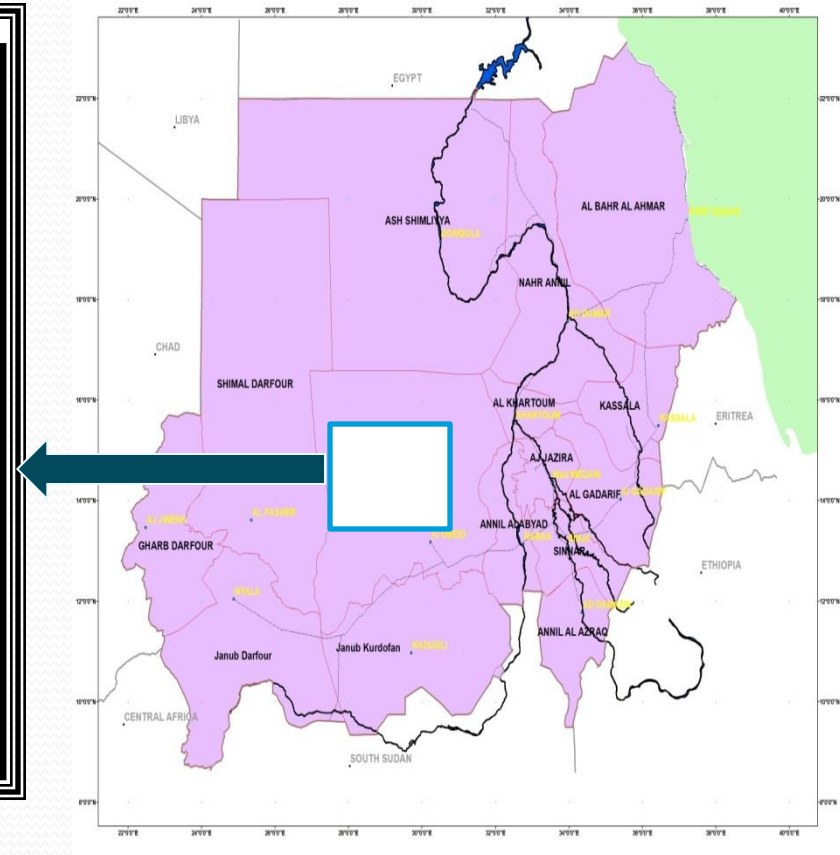
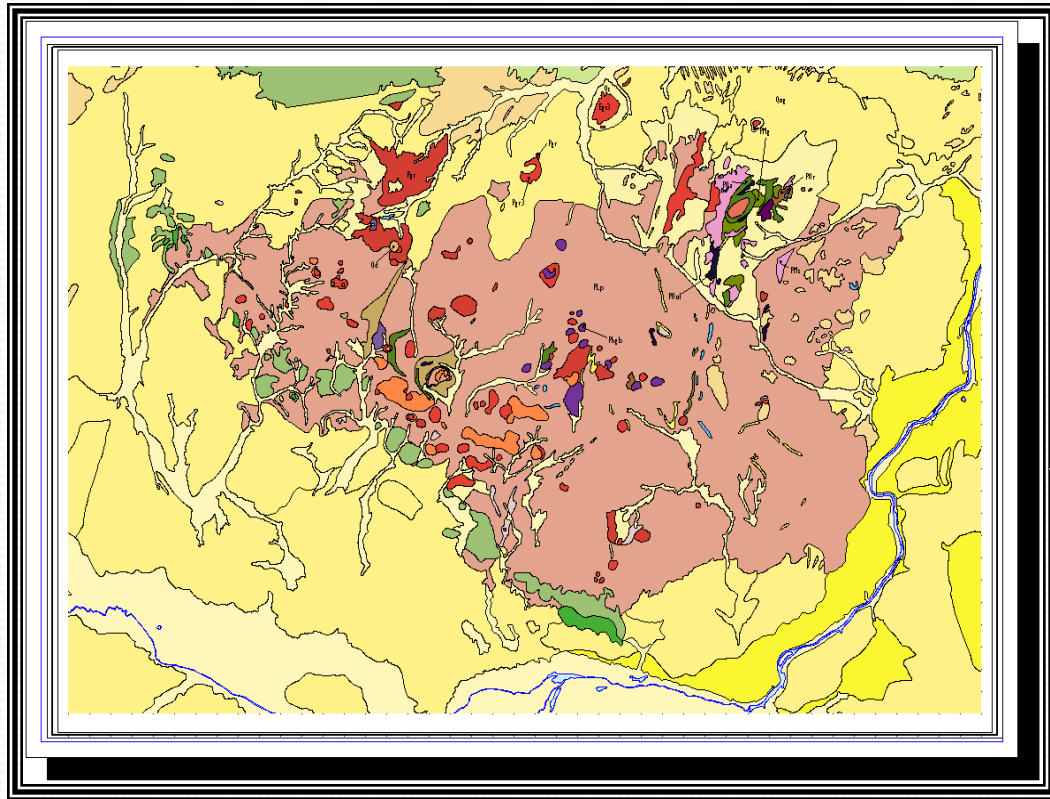
1. Gold
2. Chromite
3. PGM
4. Asbestos
5. Magnesite
6. Talc
7. Marble



5. THE NUBA MOUNTAINS (SOUTH KORDOFAN)

Minerals Potential:

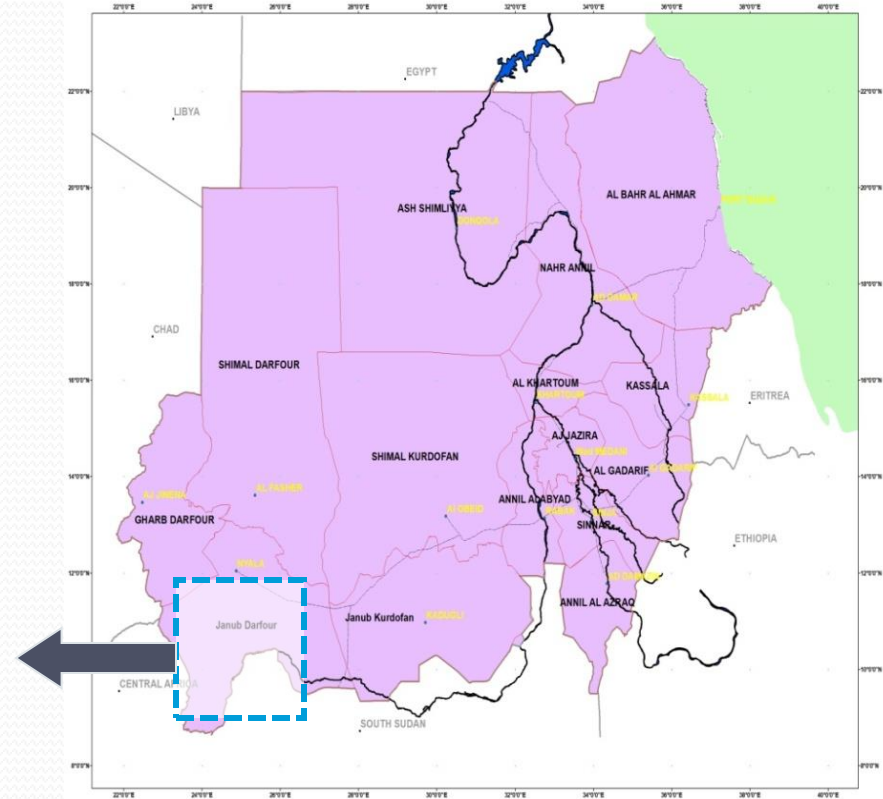
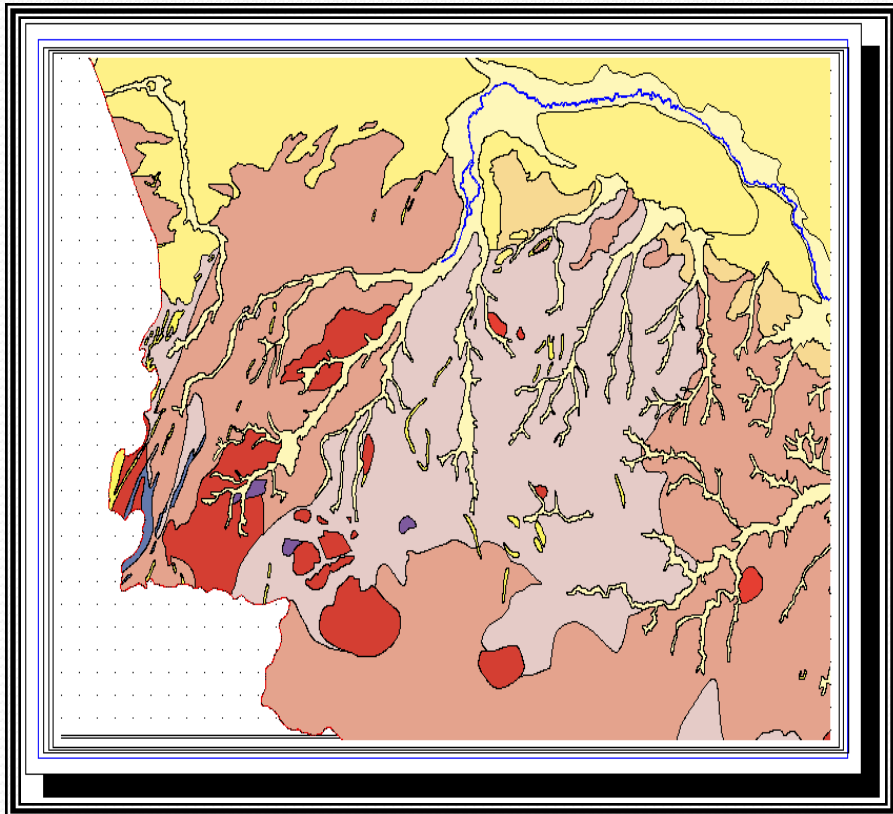
1. Gold
2. Copper
3. Zinc
4. Nickel
5. Iron
6. Manganese
7. Graphite
8. Chromite
9. Uranium
10. Talc
11. Marble
12. Phosphate



5. Copper Pit (Darfur)

Minerals Potential:

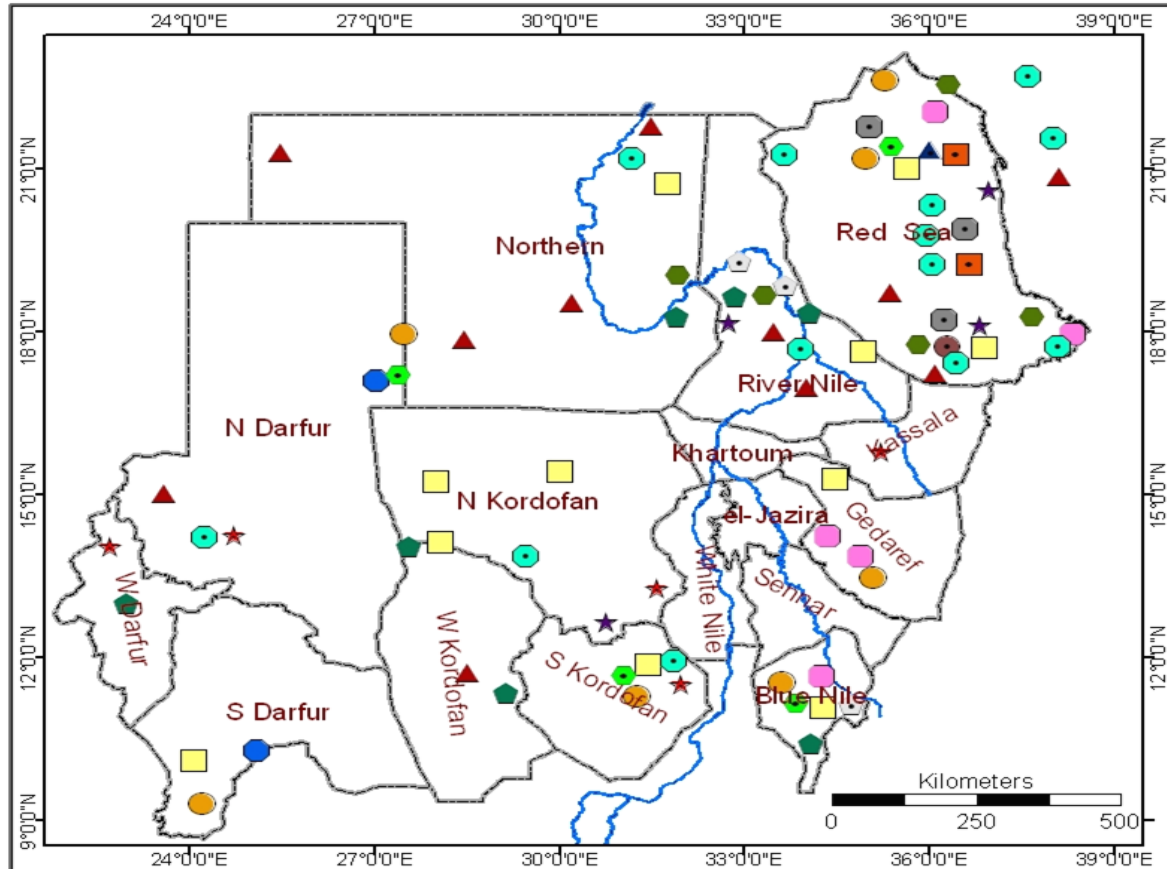
1. Gold
2. Copper
3. Uranium
4. Precious Stones



Metals and Minerals in Sudan

Sudan Strategic Minerals

- Gold - Au
- Iron Ore - Fe
- Copper - Cu
- Silver - Ag
- Chrome - Cr
- Maganese - Mn
- Polymetallic Salphide
Cu, Zn,Pb
- Aluminum (Bauxite)
- Cobalt - Co
- Nickel- Ni
- Lead - Pb
- Uranium - U
- Rare Earth Elements - REE
- Asbestos - A
- Graphite - G
- Mica - Mi
- River Nile
- States Bounaries



Data sources: Shape files (Minerals in the Sudan, Sudan Sates, River Nile)
 Geographic Coordinate System: GCS_WGS_1984 , Datum: D_WGS_1984, Adindan
 Regional Geology Administration, Geological Research Authority of the Sudan,
 Minstery of Minerals , September, 2011



Prepared by:
Hind Siddig Adam Hamed

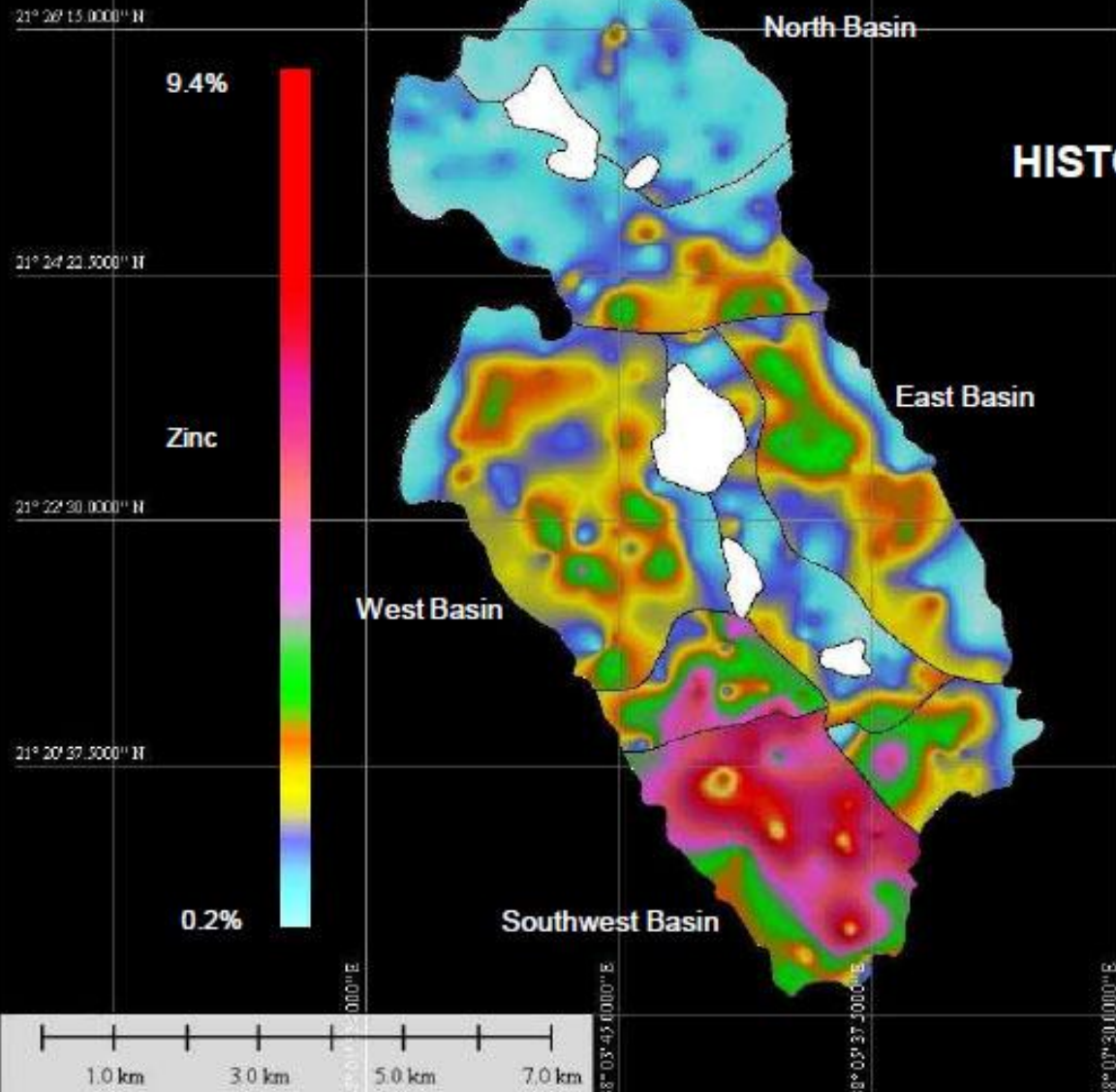
The Red Sea Potential

- Its worth noting that the reserve available at Atlantis II is worth over USD 20 Billion

Metal	Gold	Silver	Copper	Zinc
/ton	150	4500	500,000	1,890,000

Atlantis II

Resource Definition



HISTORIC RESOURCE ESTIMATE

**Bulk Resources Based
on top 8.5 metres
Average**

- 91 700 000 tonnes DSF
- 1 890 000 tonnes Zn
- 425 000 tonnes Cu
- 3 750 tonnes Ag
- 47 tonnes Au*
- 5 368 tonnes Co*

Minimum Resource

***Inferred from floatation
analyses**

Minerals in Sudan

1. Phosphate

- There are two types of phosphate; sedimentary phosphate and Khermaúyi type which consist of sedimentary phosphates in the form of horizontal layers associated with limestone layers in marine environments in different geological ages
- In Sudan (Khermaúyi) zones of the second type have been discovered .

Mount Kuoun and Mount Lauro East of the Nuba Mountains and in the form of lenses and veins slash cracks and joints reserves of 400 thousand tons a concentration of 1'2 05 % 20 and about 130 ppm uranium U 2 0 3 as an average . It can not be used as raw directly. Phosphate rocks need to be treated first.

PHOSPHATE



2. Kaolin:

Kaolin, one of the most important clay minerals (potassium - Aluminium silicate) in sedimentary rocks is found all over Sudan

A detailed study of some sites in Khartoum and South of the River Nile State near the depositions of infrastructure.

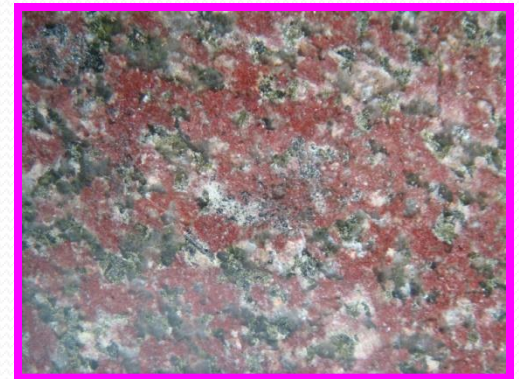
Detailed estimated quantities of approximately 30 million tons in South River Nile State show depositions with excellent specifications enabling the establishment of the ceramic industry in Sudan where kaolin in sediments and igneous rocks are found in all parts of Sudan.



Kaolin - j.abiyid

3. GRANITE:

Underground rock characterized by different shapes and colors used for Polishing and buffing Found in south Wadi Halfa.



Granite after cutting and polishing



**Tumluk Jabal Kel alteration zone
(Py-Au-Sericite schist + Cu staining)**



Chromite



4. Gold:

Gold mineralizes in Sudan in three types of rocks

Parenteses Gossan

Is evidence of mass oxidizing sulphides

For Base Metals (Cu, Zn, Pb Volcanogenic Massive Sulphide may be accompanied by Gold as in Eriab and sequin area in the eastern Nuba Mountains

Quartz veins:

Acompanion to the gold quartz veins in green schist rocks and affected by the Shear Zone Called Volcano Sedimentary Sequence There is this kind of gold in North Kordofan Obaidiya eggs lining and the Blue Nile

Alluvial gold

Erosion of quartz veins washed with water deposits gold in the creeks and valleys nearby The so-called alluvial gold of this kind is exploited by the locals along the Nile River and its tributaries especially in the Blue Nile and northern Sudan

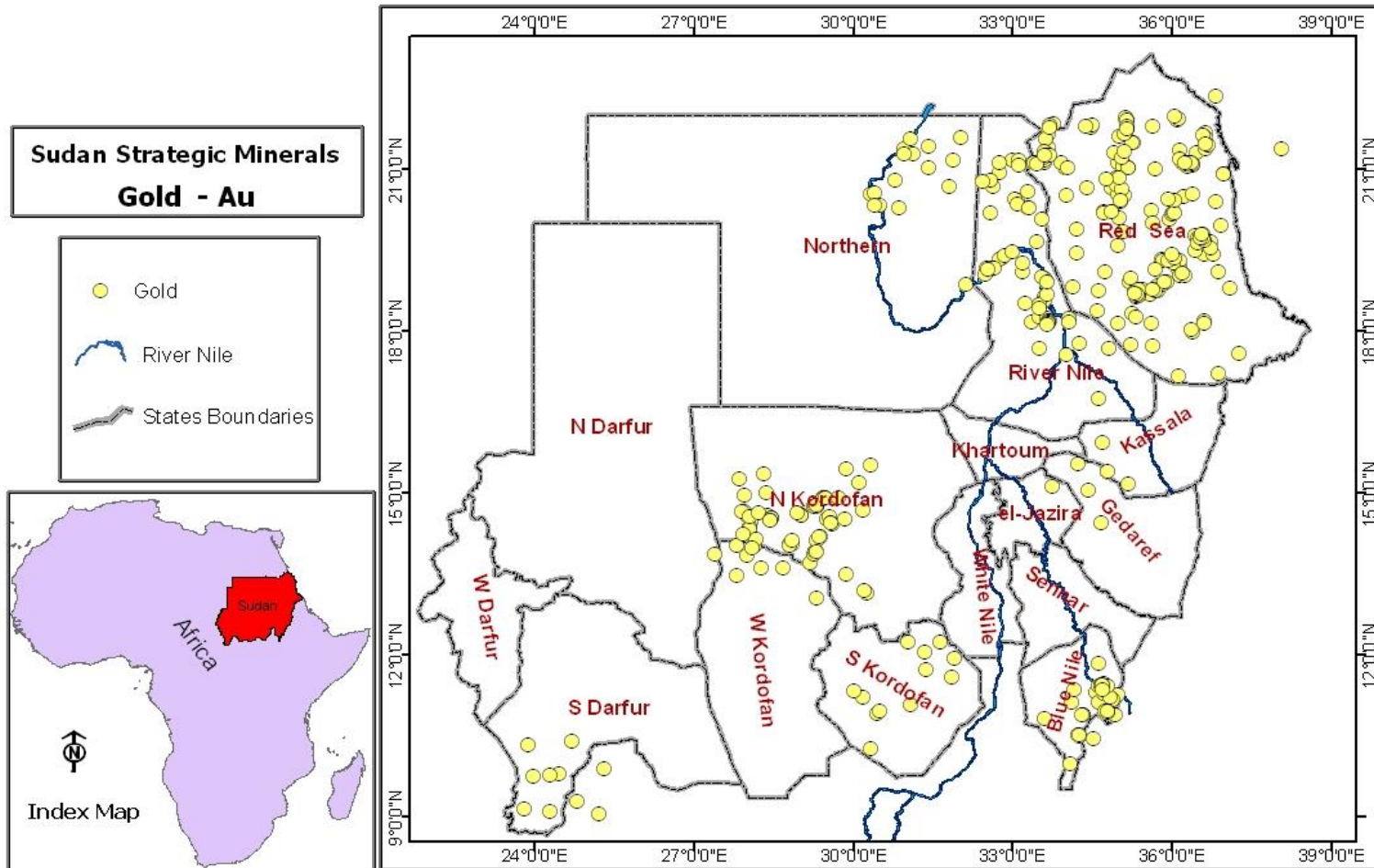


Quartz rocks, found in Duwaishat



Image shows veins of (Quartz) quartz rocks, which resides Gold Baldoecat-gold-bearing quartz in Abossarh area

LOCATIONS OF GOLD



Data sources: Shape files (Minerals in the Sudan, Sudan Sates, River Nile)
Geographic Coordinate System: GCS_WGS_1984 , Datum: D_WGS_1984, Adindan
Regional Geology Administration, Geological Research Authority of the Sudan,
Ministry of Minerals , September, 2011

Prepared by: Hind Siddig Adam Hamed



5. Iron:

Studies have shown the presence of iron in several locations in the Red Sea Mountains

Discoveries of iron ore in each of the Mount Abu Tolo in South Kordofan in the state of West Darfur near the old alliance and finally Baljrawih the River Nile State.

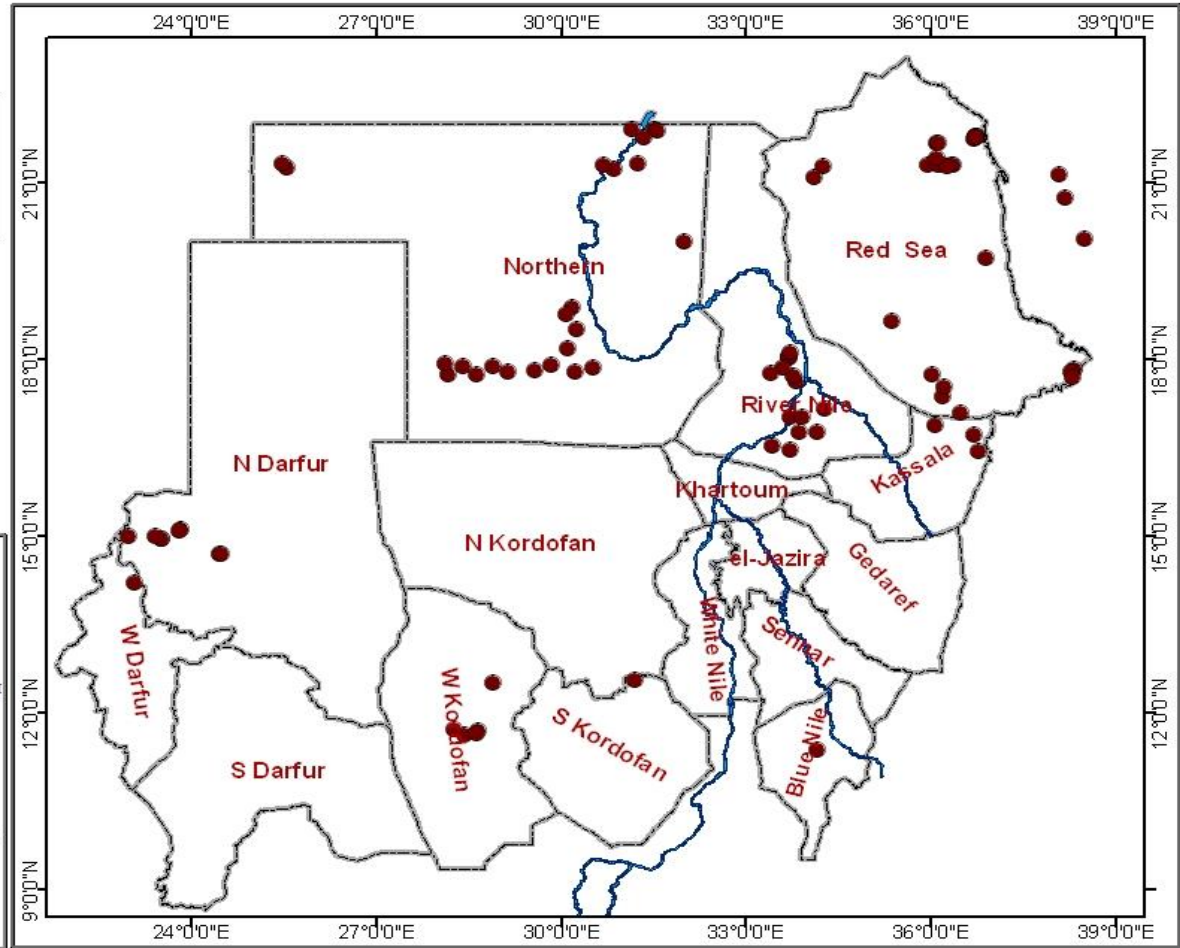
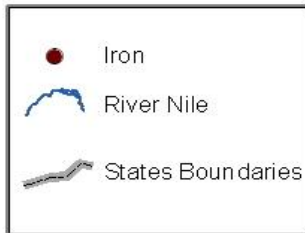
Iron ore discovered the Baljrawih area and Wadi Halfa are of Batrokhi type consisting of sedimentary reserves estimated for at least two billion tons in a concentration of 40% iron



LOCATIONS OF IRON

Sudan Strategic Minerals

Iron - Fe

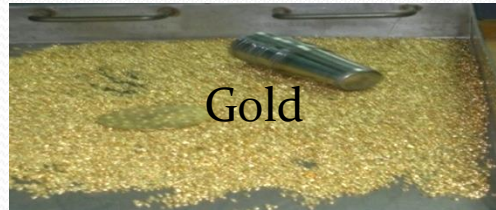


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 Regional Geology Administration, Geological Research Authority of the Sudan,
 Ministry of Minerals , September, 2011

Prepared by: Hind Siddig Adam Hamed



Sudan Gold Refinery Co. Ltd.



Gold



Silver



- It is Fully owned by the Central Bank of Sudan, the Ministry of Minerals and the Ministry of Finance and Natural Economy
- Sudan gold refinery maintains a high quality wet chemical refinery (aqua regia process) as well as a complete precious metals melting system for accurate and reliable results.
- The refinery capable of producing gold of different purities including: 995.0; 999.0; 999.9 in one kilo or large standard bars
- Refinery can produce silver of 999.0 fineness (400 kg/day).
- The refinery has an annual production capacity of 270 to 360 tons



The refinery produces gold with varying purity 995.999, 999.9 and the volumes per kilo and sizes per international standard (12.5 kg) or any other sizes required by clients in addition to granules

Gold also produces refinery silver alloy with purity of 99.9% and volumes per kilo and sizes per international standard (30 kg) or any other sizes required by the customers.

The refinery also produces silver granules in the same degrees of purity. The annual production capacity of the refinery (270 tons) of gold and 60 tons of silver, at the rate of 900 kg gold and 200 kg silver per day.



Iron at the the Erqan area.

6. Chrome:

Chrome ore is found in several locations, Sudan (Inqasna Mountains Nuba Mountains, the Red Sea mountains, gouge bees).

Chromium is used in several industries most significantly iron and steel industries, refractory and chemical industries.

Work began in chrome mining since the seventies and is produced currently in Inqasna area in Blue Nile State. The estimated reserve is about one million tons of crude and by the concentration of up to 48 - 60% in the case of high-quality vineyards. Chrome resides in the Red Sea areas, the Nuba Mountains and the northern state.

Detailed studies on stock Inqasna confirmed about one million tons of crude material, with great potential for the presence of additional quantities



7.Manganese:

Manganese was discovered so far in the mountains of the Red Sea and the desert Albeodh River Nile. There is huge potential for manganese ore in sedimentary cover around Khartoum State. The Northern State has not been evaluated so far. Proportion of mineralization in the Red Sea between 47 - 50 In North Sudan, the mineralization rate of up to 25-40%.

There manganese in the Berber region is estimated at 75 thousand tons to the content of more than 48%. Manganese is expected to increase this amount due to the possibility of the continuation of mineralization at depth

8. Base metals

(Zinc - lead - aluminum - cobalt - nickel)

Base metal mineralize in the form of blocks sulfides volcanic origin in Alariab belt and eastern Nuba Mountains. It also exists in the ranges and the mountains of North Kordofan state,

Concentrated zinc in the area of Abu Samar and Taquteb mountains of the Red Sea WAM Tkack Nuba Mountains Sharqiya.

Zinc is the most important metal after silver. Mineral deposits in the Red Sea , (Atlans 2), has reserves of about 60 million tons of zinc ore with concentration of 3.5% which is about 2 million tonnes of zinc.

Lead known in the area of Kutum in North Darfur has been mined in the previous eras and there have been recent discoveries in South Darfur and North Kordofan, the Nuba Mountains east.

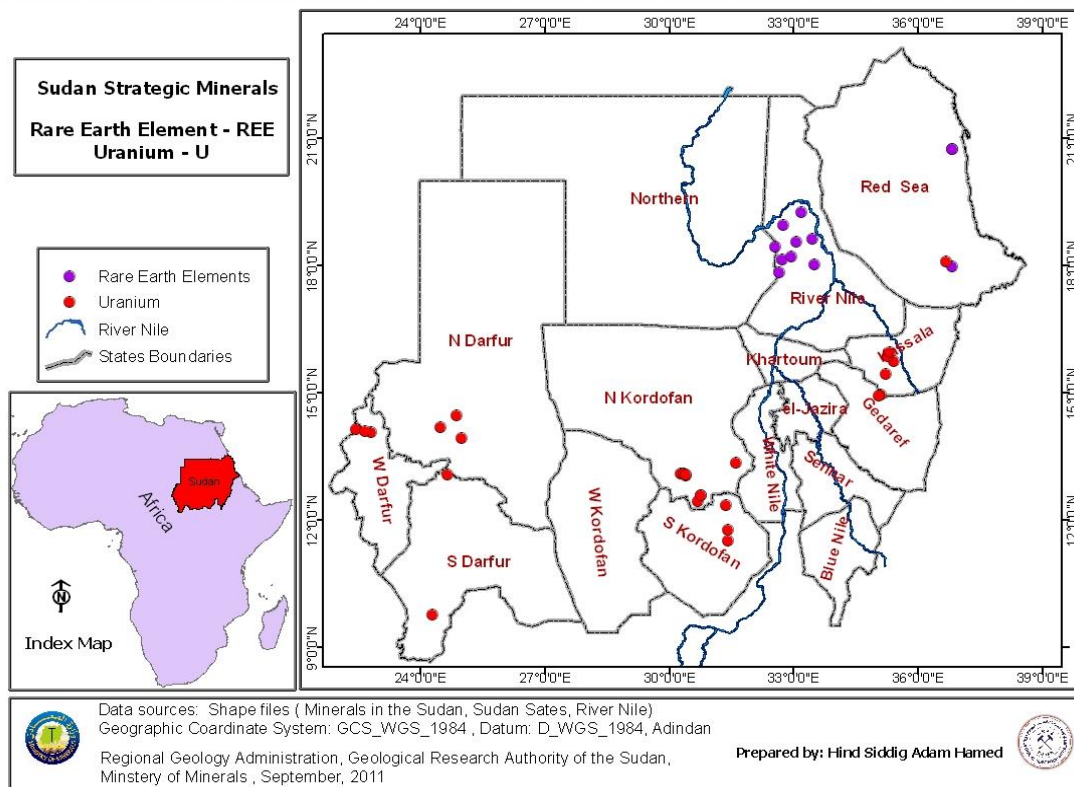
Aluminium can be found in Darfur

Cobalt can be found in the Red Sea

Nickel can be found in the Red Sea - Blue Nile - Southern Kordofan

9. Uranium and rare earth elements

These minerals are located in areas of Darfur pit copper - South and West Kordofan - Red Sea - and Butana



10. Graphite - Mica - Asbestos:

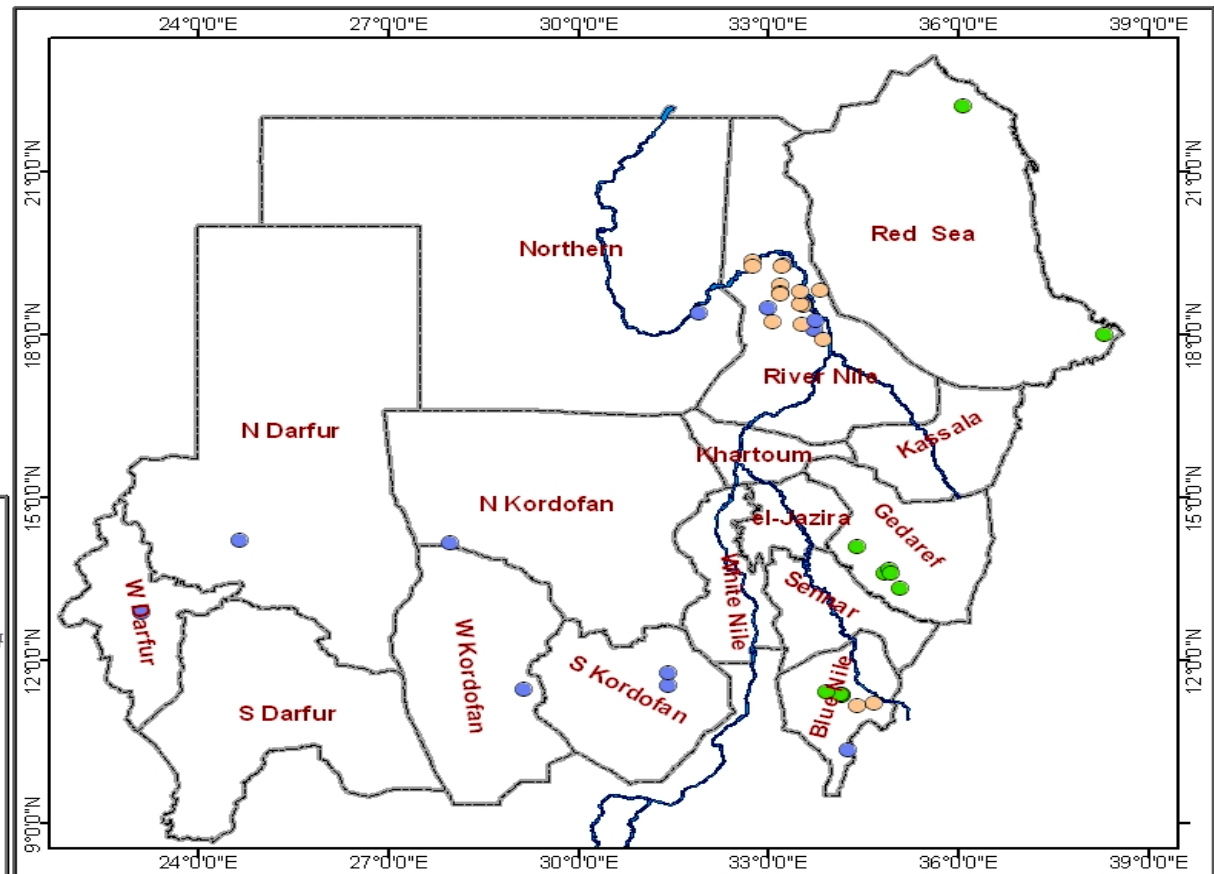
Graphite is found in Blue Nile

Mica: in the River Nile west of Shareek. Almscoaat is found here and reserve estimates in this region are at about 14.7 million tonnes. 36 tons have been exported thus far.

Asbestos: There is asbestos ore in the area of Inqasna where the reserve is estimated at 6650 million tons, increased by 1.2%, while the fibers in the gouge zone bees reserve estimates at 53500 million tons and fibers Of which 1.77% were extracted

Graphite - Mica - Asbestos

Sudan Strategic Minerals
Asbestos- A Graphite-G
Mica- Mi



Data sources: Shape files (Minerals in the Sudan, Sudan Sates, River Nile)
 Geographic Coordinate System: GCS_WGS_1984 , Datum: D_WGS_1984, Adindan
 Regional Geology Administration, Geological Research Authority of the Sudan,
 Ministry of Minerals , September, 2011

Prepared by: Hind Siddig Adam Hamed



11.Tungsten deposits

Confined to the most important sites, raw tungsten is found in the region of Mount Ayub Ali after 225 km southwest of Port Sudan, close to the railway Alhdidokd constitute Altmjn in Mount Ayoub

The granite contains veins of tangled Hosa-Stock work of quartz content within sites such as(Greisen)

French Foundation (BRGM) carried out a study of the reservoir in 1981 and proved the presence of 531000 tons of crude oil, divided as follows:

Possible ore	175000 ton	0.6% WO3
Probable ore	120000 ton	0.1% WO3
Crude	236000 ton	0.89% WO3

12. Gypsum

Gypsum found at the Beraat area, which lies about 75 km north of Port Sudan on the Red Sea coast. Confirmed studies indicate the presence of crude oil reserves estimated at about 220 million tons).

Sagom Mountain and Mount Tuban site can be accessed by road from Port Sudan and is located just 8 kilometers from Morsi Arkiyaa

The reserve in Mount Sagom has been estimated : 34 million tons of sea and 124 Million tonnes to a depth of 50 meters

Gypsum ore enters in several industries such as the cement industry, chemical industry, using gypsum then burned as an adhesive in the construction industries and panels.

Estimated Mineral Production 2012

Mineral Commodity	Quantity/ Tonnes
Gold	60
Silver	7
Chromite	75,000
Iron Ore	200,000
Manganese Ore	50,000
Feldspar	30,000
Clinker	3,000,000
Mica	100
Marble stone	3 ²⁰
Gypsum	40,000
Salt	200,000
Fluorite	10,000
Talc	5,000

Investment Info

The participation of the minerals sector in the gross domestic product (GDP) is by no more than 8%

However there has been many Agreements for the exploration and exploitation of many minerals has been concluded between the Government of Sudan and national and foreign companies which is expected to increase the participation of the mining sector.

It was the conclusion of these agreements according to the Minerals Development Act of 2007 and its regulations. Investors are entitled to benefit from the privileges provided by the Investment Promotion Law of 1999 and its subsequent amendments.

The agreements include all phases of exploration and exploitation in return for the government privileges, bonus shares and profit tax

Investment In The Mining Services

The signed agreement between the Government of Sudan represented by the Department of Minerals and investors in mining

Granted under this Agreement, the permit for the search of minerals (Exploration Prospecting License)) of the agreed upon metal and minerals associated with it. And exploratory activity starts during the first six months of signing. The ministry provides all available geological information in the franchise box

The Agreement sets out mineral exploration period for a period of 3 years, subject to extension after the submission of adequate justification for it

•At the end of the exploration period (3 years) the investor will have to relinquish 50% of the area granted
subsequent abandonment of the last 50% of the remaining area will depend on each extension period
The Ministry has the right to act in areas that have been abandoned

The investor can voluntarily give up all or part of the box in any time they want. In this case, the ministry needs to be notified before 6 months
In addition the investor will assume all the obligations under the agreement and program submitted

The end of the exploration period the ministry grants a mining license to the investor after the submission of a feasibility study as well as a technical and financial report



- The investor is to spend 400,000 euros on exploration during the first year.

Remaining period is to agreed upon to the amount spent in accordance with the work program.

- In the absence of an economic quantity of metal and when the investor's desire to stop the activity, it bears all the cost incurred

- When commercial discovery is made with the acceptance of the feasibility study Both parties need to register the production company, in accordance with the Sudanese Companies Act 1925. The company will then continue operating in the extraction and sale of metal. The company granted a mining license, shall be operational for a period of 21 years which can be extended



- The company has the right to export its share of metal or hard currency

It also has the right to bring in foreign specialists

- The provisions relating to the environment and health and safety. The company is expected to contribute in support of local communities. And further requests from the investor in the prospecting and exploration of an annual monitoring fee (throughout the period of exploration) for training and technical aid for the Ministry

TAHI





RIYDA



Hawakan Mining Company



Hagagia (Poly) Gold Mining Co., Ltd.



Conclusions

- **Sudan covers a big surface area and has diversified geology which merges with neighboring African countries.**
- **Sudan has a huge mineral potential waiting to be explored , evaluated and developed.**
- **Infrastructure is developing, and the environment of investment is encouraging.**
- **Invitation is extended to investors to visit and explore Sudan, and to invest in the mineral sector.**

The image features a stylized Indian national flag with a pixelated, dithered texture. The flag is divided into three horizontal bands: saffron at the top, white in the middle, and green at the bottom. A navy blue Ashoka Chakra is visible in the center of the white band. The text "Thank You" is written across the white band in a bold, italicized, black sans-serif font. The background behind the flag is white with light blue curved lines at the top, suggesting a sky or a decorative border.

Thank You