

# THE GEOLOGICAL RESEARCH AUTHORITY OF THE SUDAN (GRAS)



IEP KHT 12-14 SEP 2006

# **INTERNATIONAL EVENT PARTNERS**

## **12-14 SEP 2006**

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**Dr. E. M. Abdel Rahman**

# INTRODUCTION

- **GRAS is the Governmental Geological Survey, thus the guardian of all metals and minerals within the Sudan.**
- **It comes under the umbrella of the Ministry of Energy and Mining.**
- **It engages in cooperation with investors to assist in and enhance the development of identified mineral prospects.**

# **A BRIEF OVERVIEW OF THE GEOLOGY OF SUDAN**

- **Surface area of Sudan is almost 1 Million square miles. Geologically ; the area is sub-divided between the following main rock categories:**

**49% Basement Complex rocks**

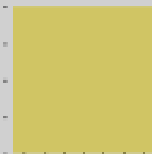
**48% Sedimentary Rocks**

**03% Recent Deposits**

- **The distribution and a simplified classification of the rock groups and their relative ages are shown on the next two slides depicting the structural map of Sudan**

# THE GEOLOGICAL UNITS OF THE SUDAN:

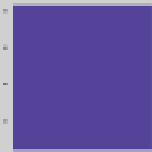
## The Geological Units Of The Sudan:



Sedimentary



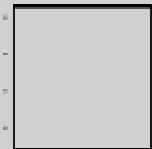
Basement Complexes



Extrusive

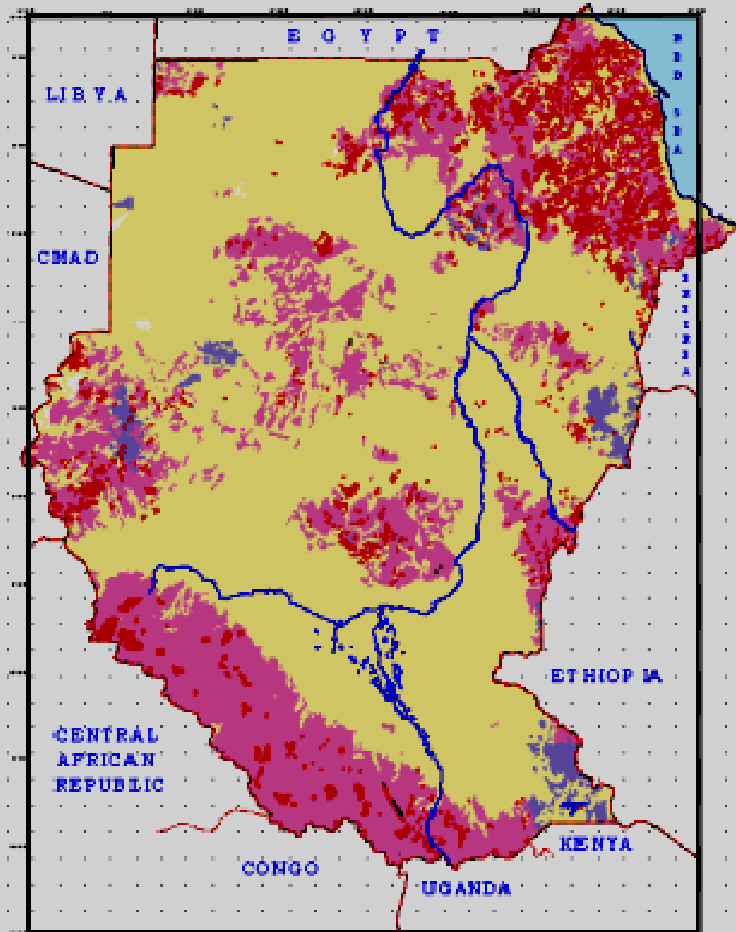


Intrusive



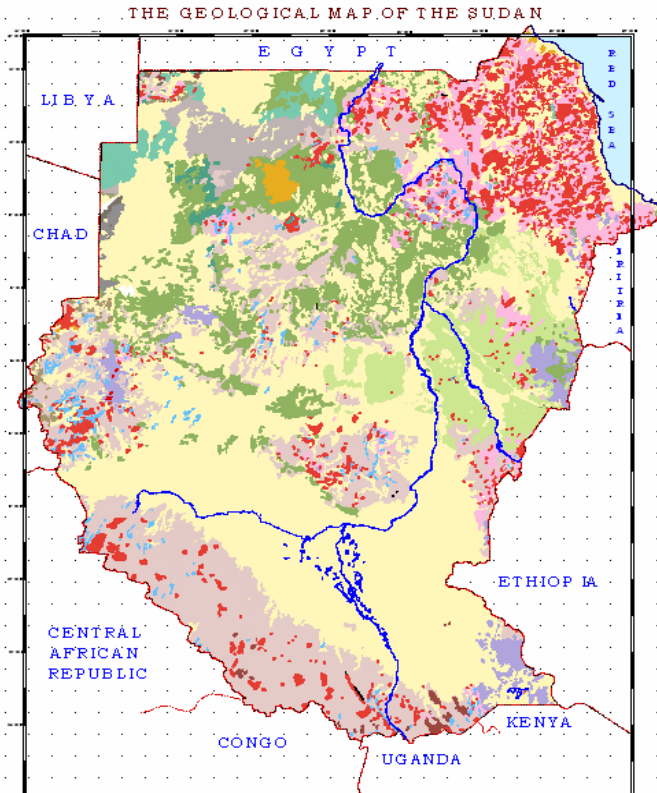
Miscellaneous

THE GEOLOGICAL MAP OF THE SUDAN



# AGES OF THE SUDANESE GEOLOGICAL UNITS

The Geological Ages Of The Sudan:



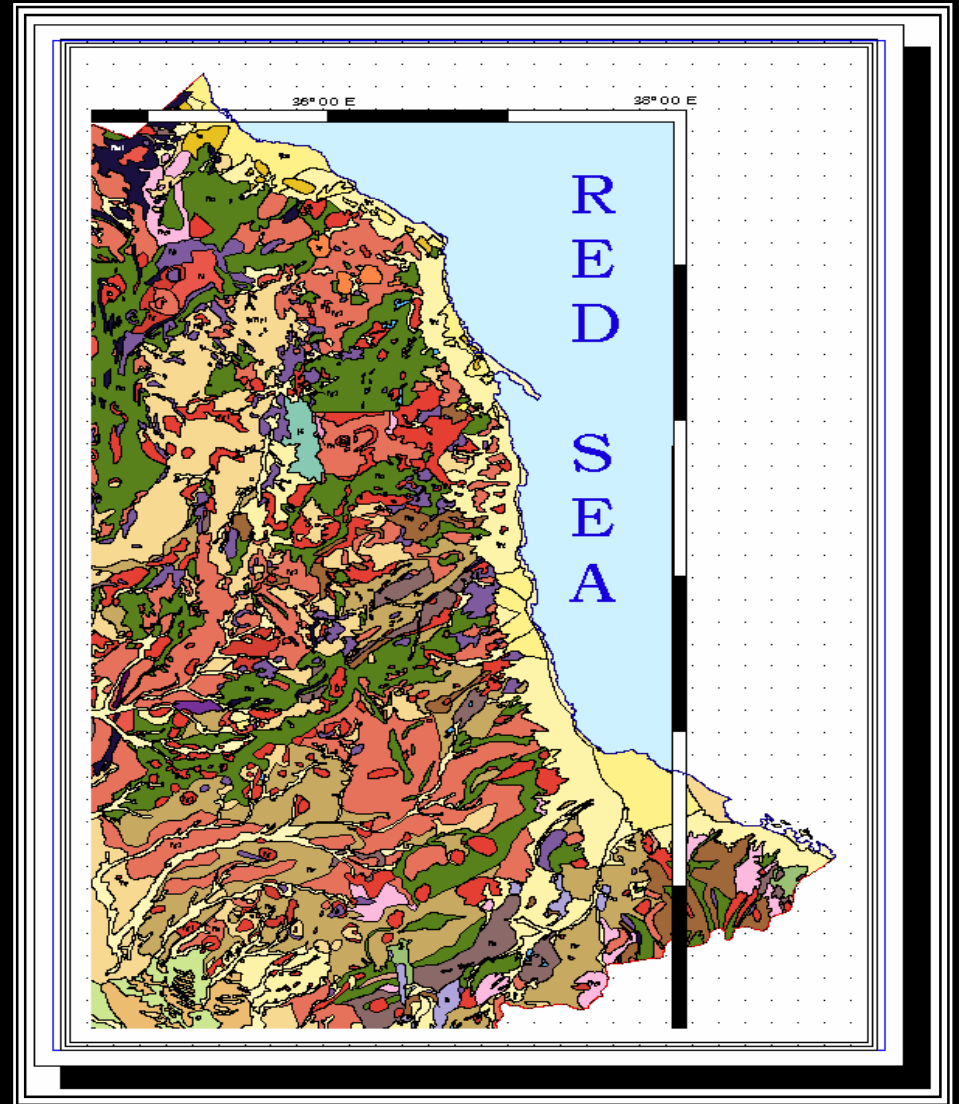
# **GEOLOGY AND MINERAL RESOURCES OF SOME SELECTED AREAS**

- **The following slides display the geology of well known areas in eastern, northern, central, western, southwestern and southeastern Sudan.**
- **For each area major minerals of potential are indicated.**

# THE GEOLOGY OF RED SEA HILLS

## ECONOMIC VALUES:

1. Gold.
2. Manganese.
3. Copper.
4. Black Sands.
5. Garnet.
6. Talc.
7. Zinc.
8. Salt.
9. Gypsum.





# ARIAB MINING (OPEN PIT)

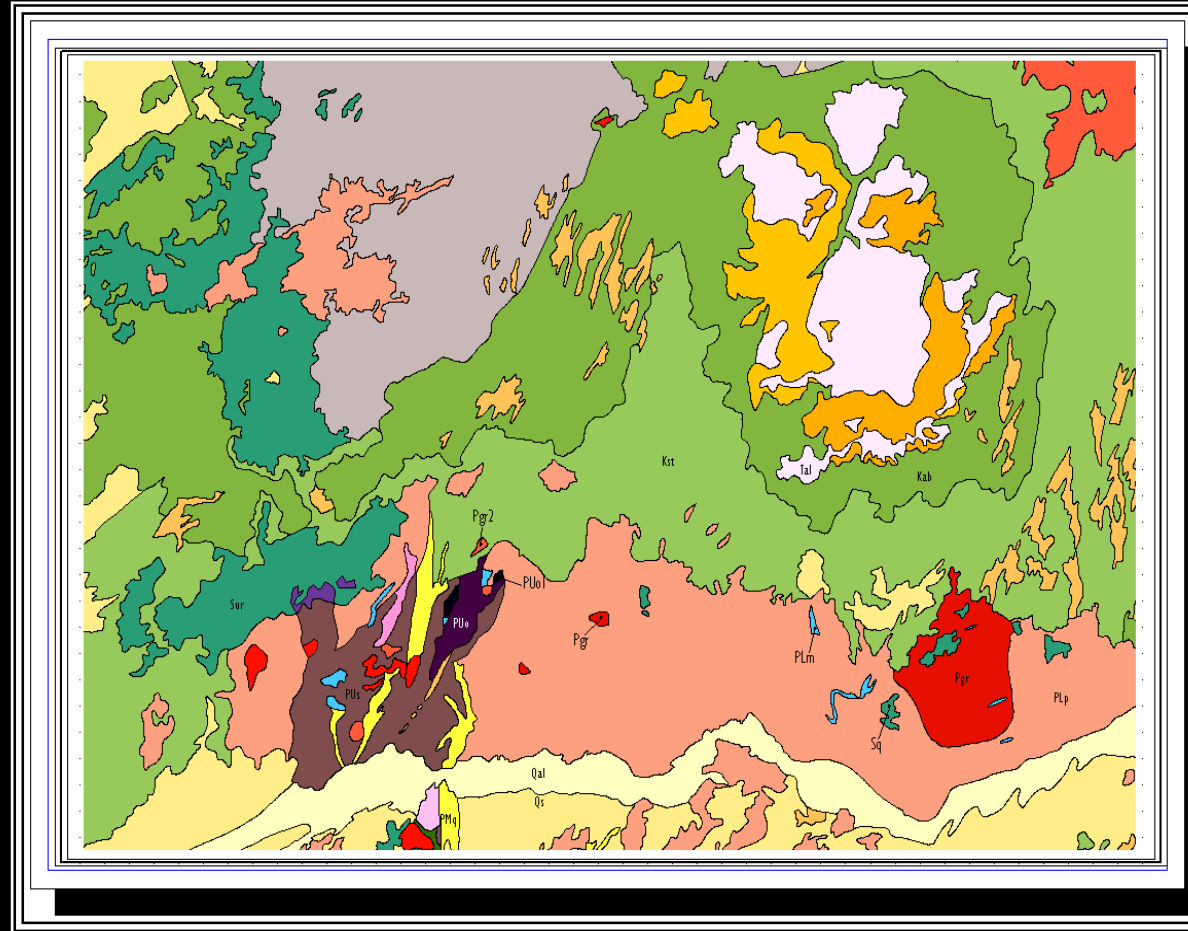




# THE GEOLOGY OF J. RAHIB & J. ABYAD AREAS ( NORTHERN WADI HAWAR)

## ECONOMIC VALUES

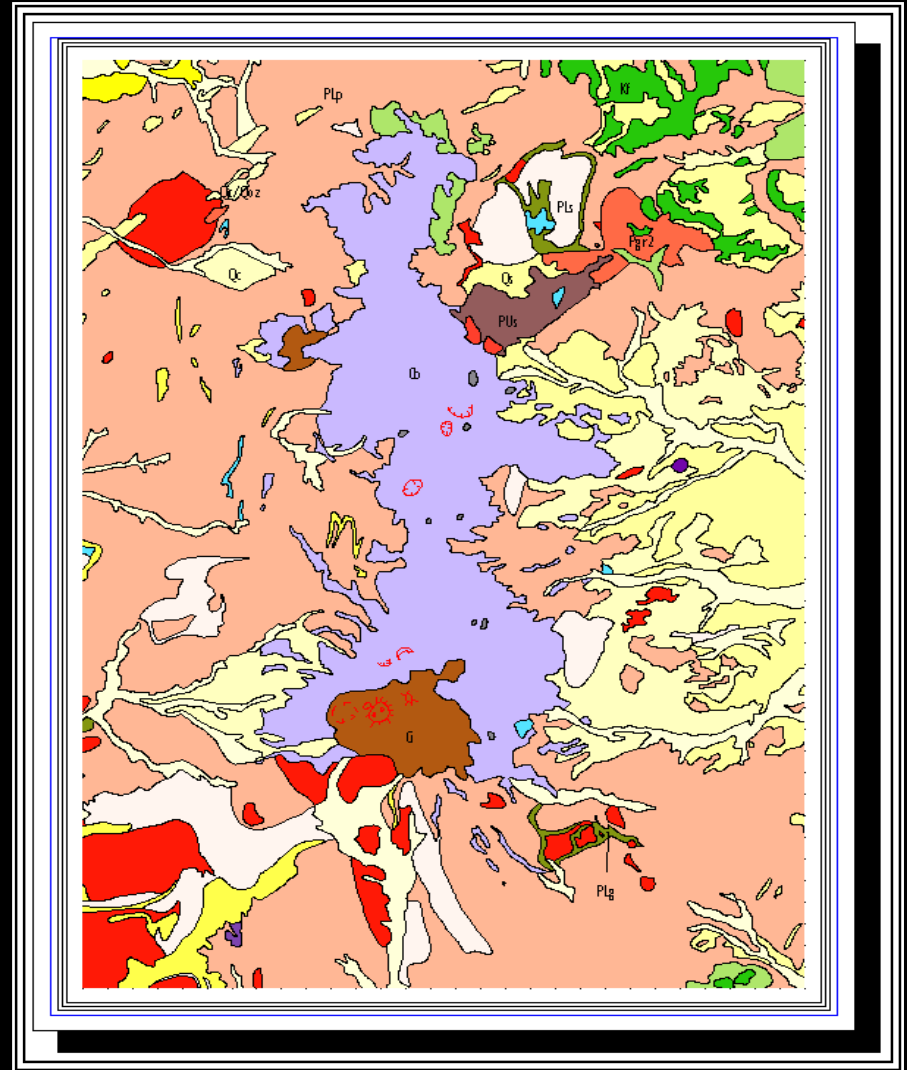
1. Bauxite.
2. Chromite.
3. PGM
4. Archeological Sites.



# THE GEOLOGY OF J. MARRA (Volcanic Rocks, Craters)

## ECONOMIC VALUES

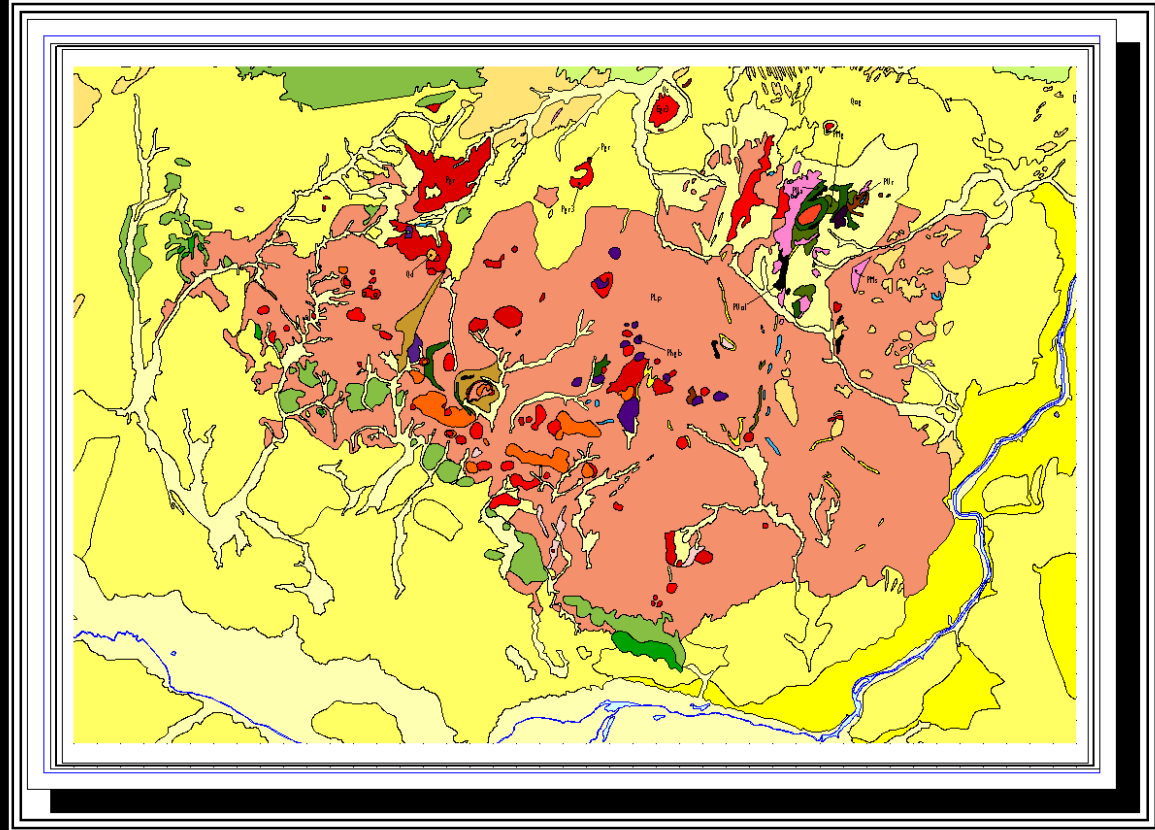
1. Base metals.
2. Garnet.
3. Kyanite.
4. Thermal Springs.
5. Sulphur.
6. Salt.



# THE GEOLOGY OF NUBA MOUNTAINS

## ECONOMIC VALUES

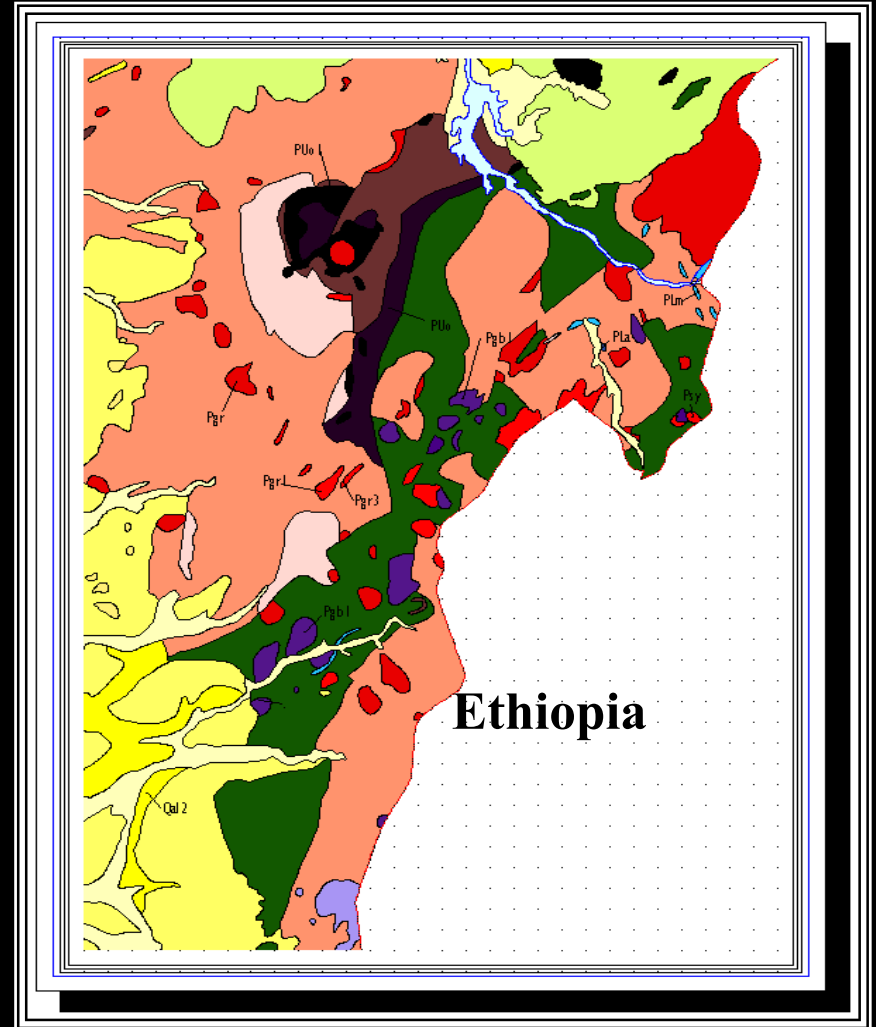
1. Gold.
2. Iron.
3. Copper.
4. Graphite.
5. Talc.
6. Zinc.
7. Manganese
8. Chromite
9. Uranium.
10. Marble



# INGASSANA COMPLEX

## ECONOMIC VALUES

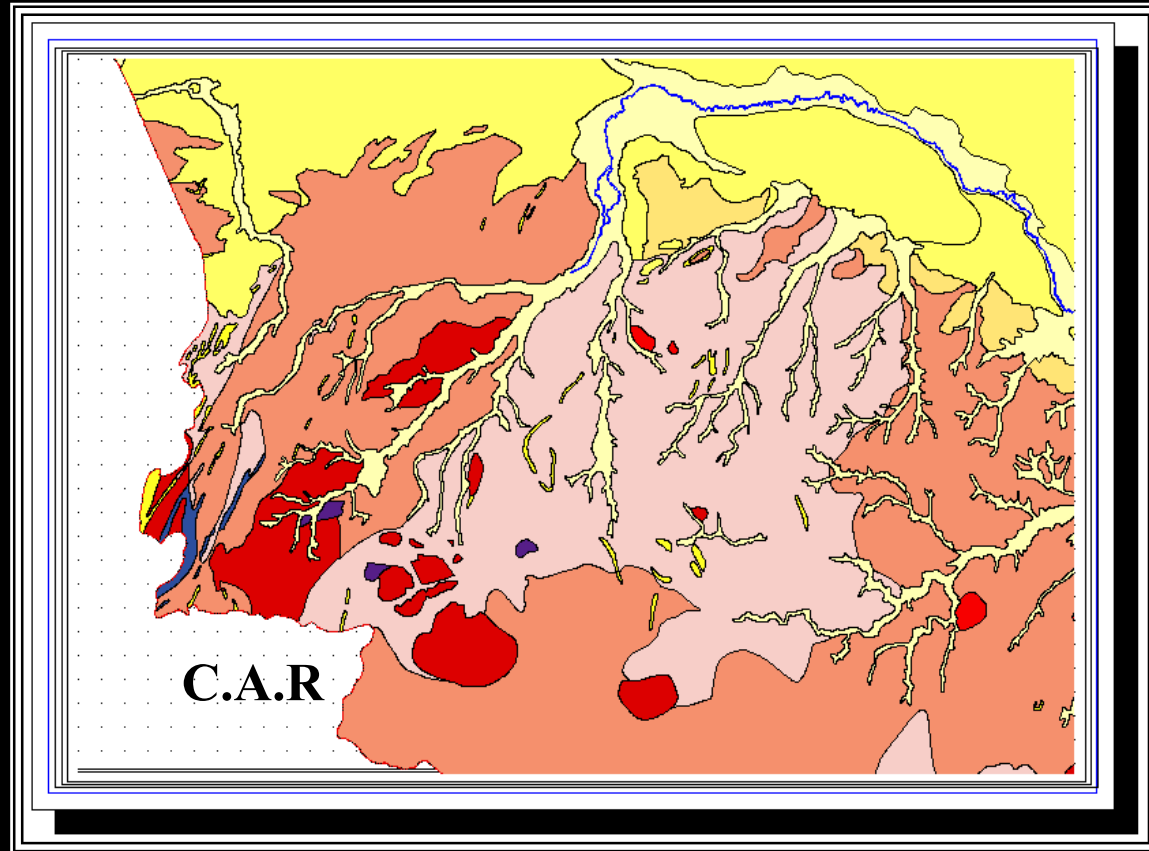
1. Gold.
2. Chromite
3. PGM
4. Asbestos
5. Magnesite
6. Talc
7. Marble



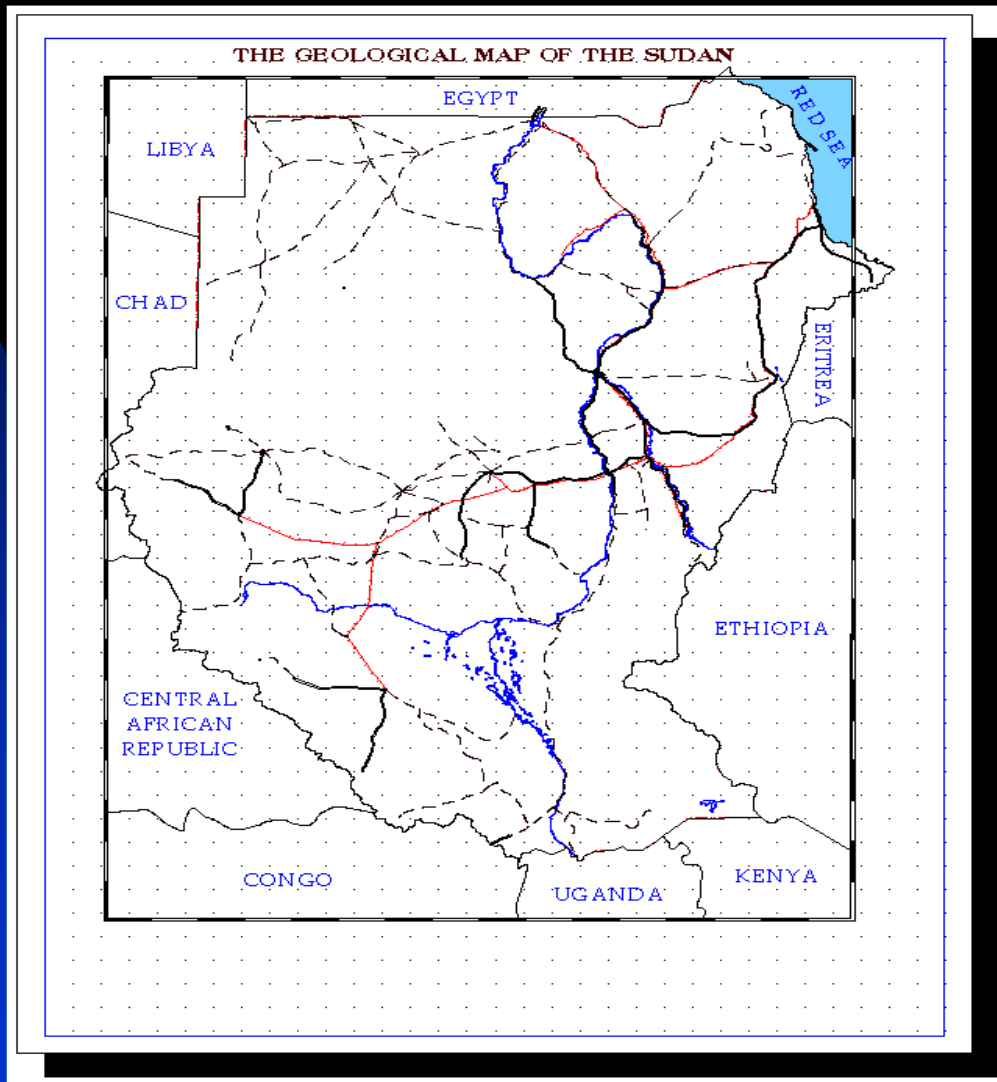
# THE GEOLOGY OF HOFRAT EN-NAHAS

## ECONOMIC VALUES

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



# SUDAN TRANSPORTATION)



# SUDAN MINERAL RESOURCES

- **Geological studies indicated the variability of the mineral resources of Sudan and though what so far being discovered are not world class deposits but their geology and structure correlates well with that of deposits in adjacent countries renowned for their huge mineral wealth.**
- **The following slide is a tabulation of the rock types, their mineral potential and mining activity.**
- **Mining is a meager fraction in Sudan's economy and tabbing such a source need not be missed.**



**Table(1): Rock groups, economic importance and ongoing mining activities**

Economic and mining activity	Mineral Potential	ROCK GROUPS
<p>1 Exploration and economic evaluation of gold and copper is in progress at Hofrat EnNohas.</p> <p>2 Limited artisanal gold mining by local people.</p>	<p>Gold, Tin, Diamonds, Radioactive elements, Asbestos, Mica, Graphite &amp; Marble</p>	<p>Archaean-Lower Proterozoic Basement</p>
<p>1 Mining of gold in Ariab</p> <p>2 Mining of chromite, magnesite &amp; asbestos in Ingessana and Qalaa EnNahal areas.</p> <p>3 Marble quarries for cement and decorative stones in Atbara and Rabak.</p> <p>4 Limited artisanal placer gold mining .</p>	<p>Gold, Chrome, PGM, Cupper, Zinc, Tin, Iron, Asbestos, Marble, &amp; Granite.</p>	<p>Upper Proterozoic Basement (Pan-African)</p> <p>Ophiolites &amp; low grade volcano-sedimentary units</p>
<p>Groundwater&amp; Building Materials Quarries</p>	<p>Groundwater, Marble, Precious Stones, Heavy Metals, Radioactive Materials &amp; Industrial Materials</p>	<p>Palaeozoic Cover</p>
<p>Hydrocarbons, Groundwater &amp; Natural Building Materials</p>	<p>Hydrocarbons, Groundwater, Kaolin, Bentonite, Boxite, Building Materials, &amp; Carbonatites</p>	<p>Mesozoic Cover</p>
<p>Torona, Gypsum, Salt, Placer Gold, Groundwater,&amp; Building Materials.</p>	<p>Groundwater, Building Materials, Precious Stones, Placer Gold, &amp; Natural Gas</p>	<p>Cenozoic Cover</p>

■ **GRAS has also 6 mineral locality maps showing the known ore locations and mineralization indications in Sudan, grouped as follows:**

**1- Map 1 Precious Metals (gold, silver & PGM)**

**2- Map 2 Base Metals (copper, lead & zinc)**

**3- Map 3 Rare Metals (Tin, Tungsten, Tantal, Niobium, Beryllium, Uranium & REE)**

**4-Map 4 Iron, Iron Alloys & Light Metals (iron, manganese, chrome, nickel, cobalt, titanium, vanadium & aluminum.**

**5- Map 5 Industrial Rocks & Minerals (Graphite, Kaolin, Asbestos, Silica sand, Salt, Barite, Magnesite, Fluorite, Feldspar, Kyanite, Rock Phosphate, Bentonite, Wollastonite, Mica & Vermiculite.**

# **THE INFRASTRUCTURE AND IT'S EFFECT ON MINERALS EXPLORATION.**

- **The large area of the Sudan requires huge resources to develop and improve the infrastructure in order to encourage and attract investment in minerals exploration.**
- **The Ministry of Energy and Mining in it's plans to develop the huge mineral potential of Sudan encourages investment in precious metals (gold and others) mining, especially in the north, north east and Blue Nile areas of the Sudan, to avoid the negative effect of the weak infrastructures on mining projects with huge volume production. In addition, there are particular studies on building and raw materials like decorative stones, natural construction materials, and raw materials for cement in different parts of Sudan.**

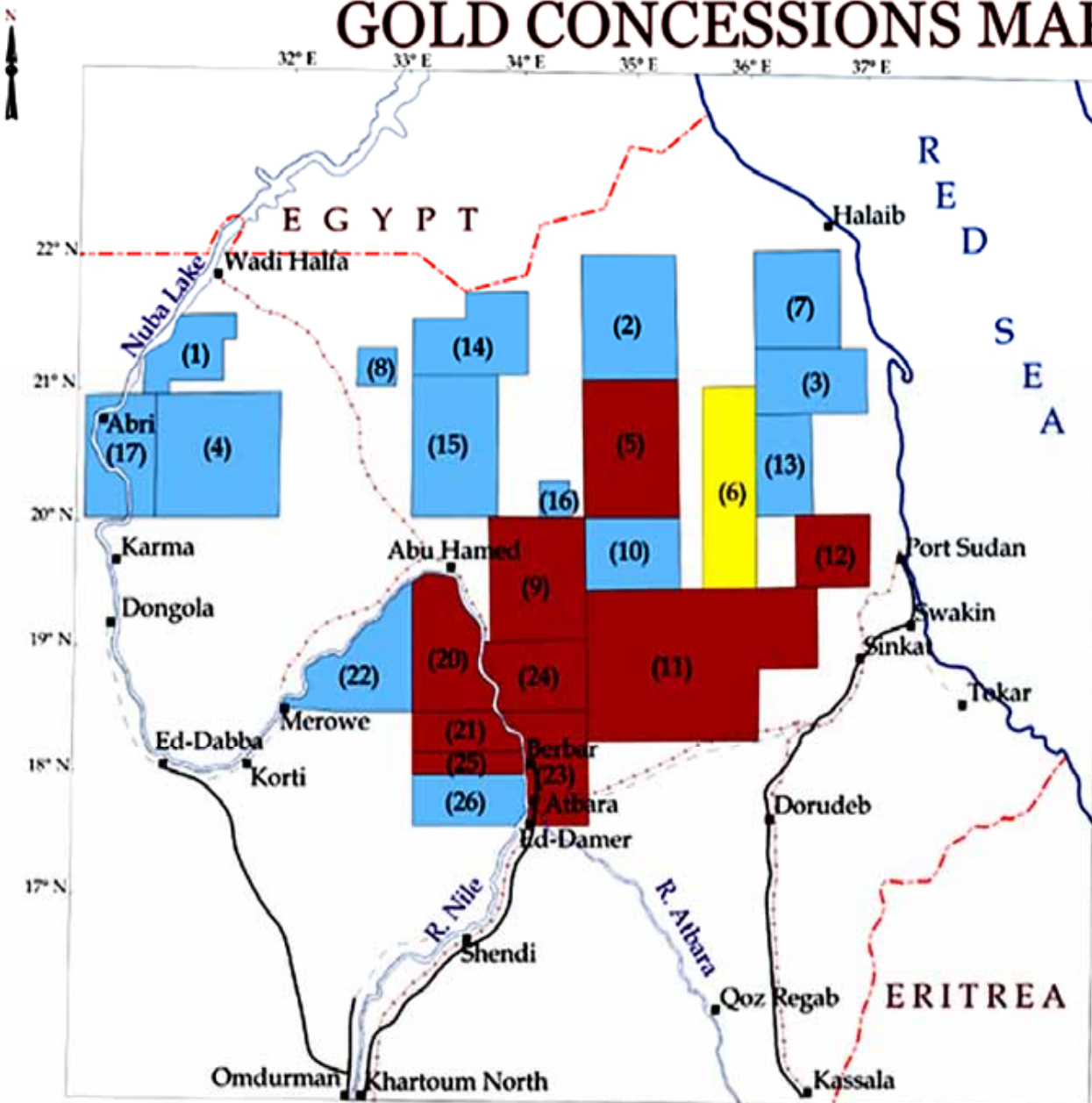
- **Available information enabled GRAS to subdivide some regions into concession blocks for exploration and exploitation of gold, as shown in the next slide for north and north eastern Sudan. There is also a similar map for the southern part of Blue Nile region.**
- **Currently the researches are concentrated on eastern areas of Nuba Mountains and north Kordofan as promising areas for gold and precious metals. Projects to upgrade information in promising areas in southern Sudan have been included in the 2007 plan of GRAS.**

# GOLD CONCESSIONS BLOCKS

## GOLD CONCESSIONS MAP



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### Gold Concessions Blocks:

- Granted
- Under Negotiation
- Still Free (Available)

- Towns
- International Boundaries
- Asphalt Roads
- Roads Under Construction
- Railway

Prepared by: Information Centre, (GRAS).  
 Projection: UTM, Clarke 1880 Spheroid.  
 Scale: 1 : 5,000,000  
 February, 2003

# **EXAMPLES OF SUCCESSFUL INVESTMENT IN MINING**

- **The Sudanese French Ariab Mining Company in Ariab block is producing gold and silver in commercial quantities since 1991. The currently production of gold and silver is approximately 12 tons annually. 50% of the production is gold.**
- **There are other projects in different stages. Some have already completed bankable feasibility studies (e.g. Rida Mining Company). Some have completed the preliminary investigations. Also there are concession agreements waiting for the signal and other under the negotiation.**

# REGULATIONS AND LEASES

- Mining leases are issued according to Mines and Quarries Act (1972) and are classified as:
  - 1- A general prospecting license for one year covering part or a state as whole, as requested by investors.
  - 2- An Exclusive prospecting license for one year with possible extensions.
  - 3- A mining lease (for 21 years, with possible extensions) covering an area of 2 Km<sup>2</sup> in every case.

- **All types of leases can be easily obtained from GRAS with minimal costs. Both foreign and notational investors are treated equally.**
- **The Minster of Energy and Mining has authority to issue especial agreements for exploration and exploitation of certain minerals as long as the investors are technically and financially capable.**
- **The concession agreements for mineral exploration and exploitation offer the investors all the privileges and grantees by the Investment Encouragement Act of 1999.**



# THE IMPORTANT FEATURES OF CONCESSION AGREEMENTS

- 1- The period of exploration must not be less than 3 years and could reach 5 years.
- 2-The agreement allows exploitation of an economically feasible mineral resource at any stage in the given period.
- 3-The investors enjoy the privileges by Investment Encouragement Act (1999) both during the exploration period and at the beginning of production.
- 4- Mining leases grant exploitation of commercial resources to a period of 21 years in minimum.
- 5- The Government of Sudan doesn't insist to have the major part of shares of profits.
- 6- Mining projects are exempted from profit taxes for ten years from the beginning of commercial production. The projects are also exempted from customs and other taxes during exploration.



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For more information please visit our  
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Thank you

**GRAS**