



Mineral Potential of Balochistan

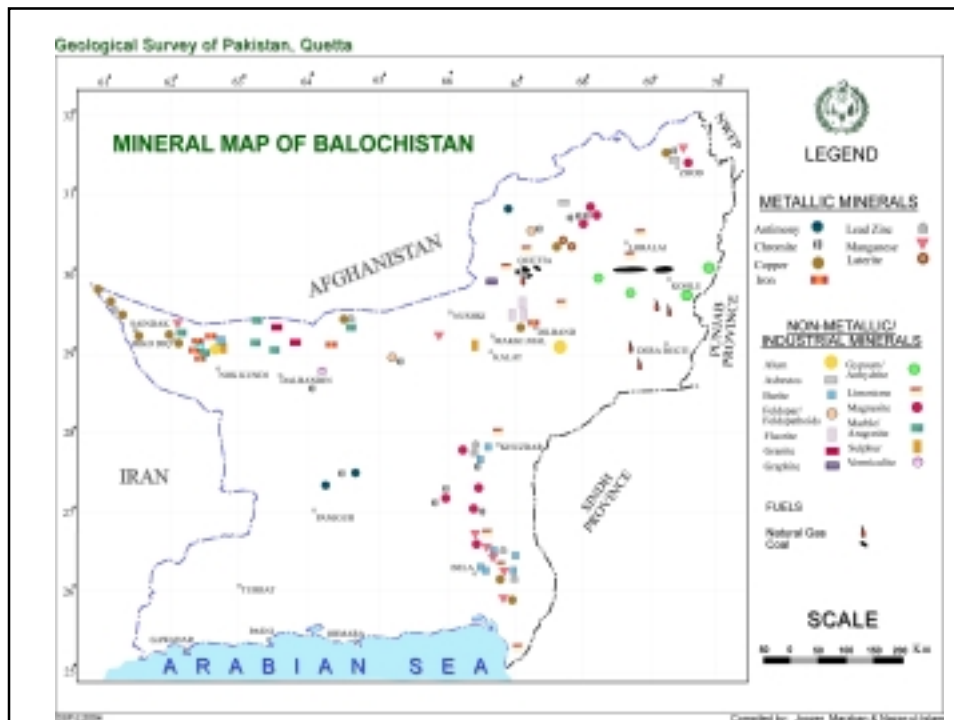
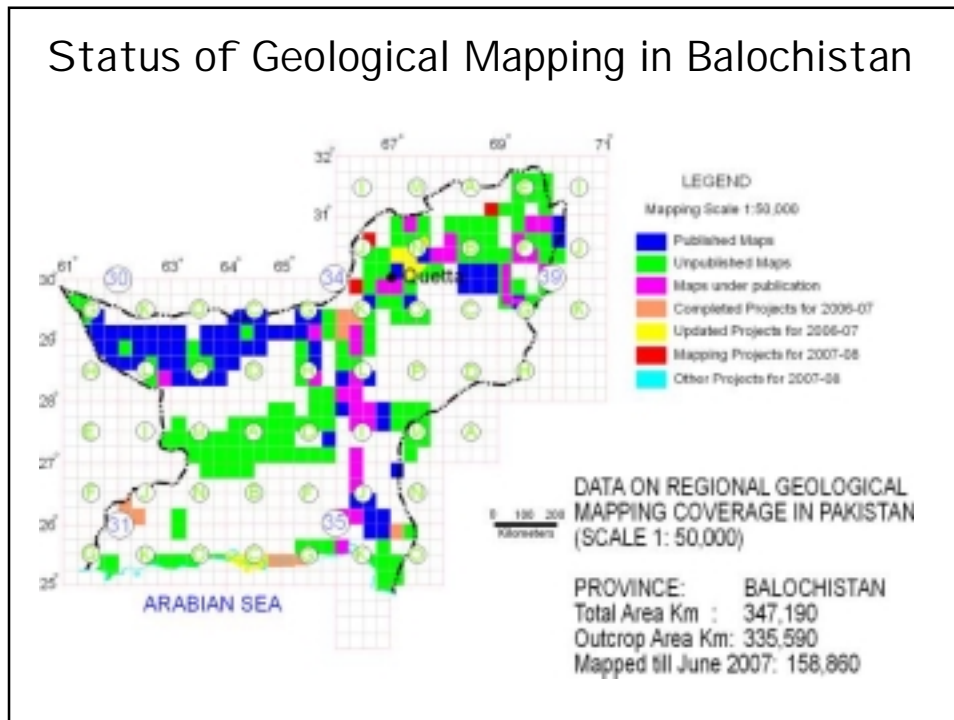
Geological Survey of Pakistan



Mineral Resources

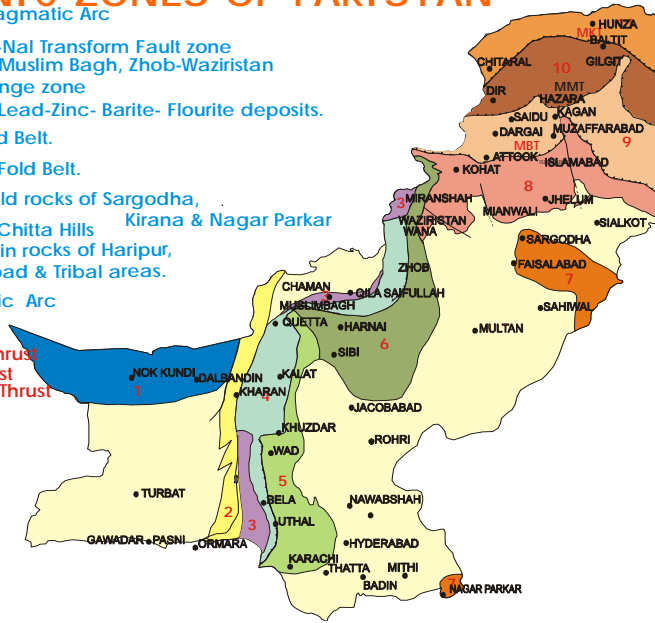
- At present Pakistan is producing 50 minerals; of these about 40 are being exploited in Balochistan
- Almost all the minerals now being mined in the province had been explored/ discovered by the Geological Survey of Pakistan

Status of Geological Mapping in Balochistan

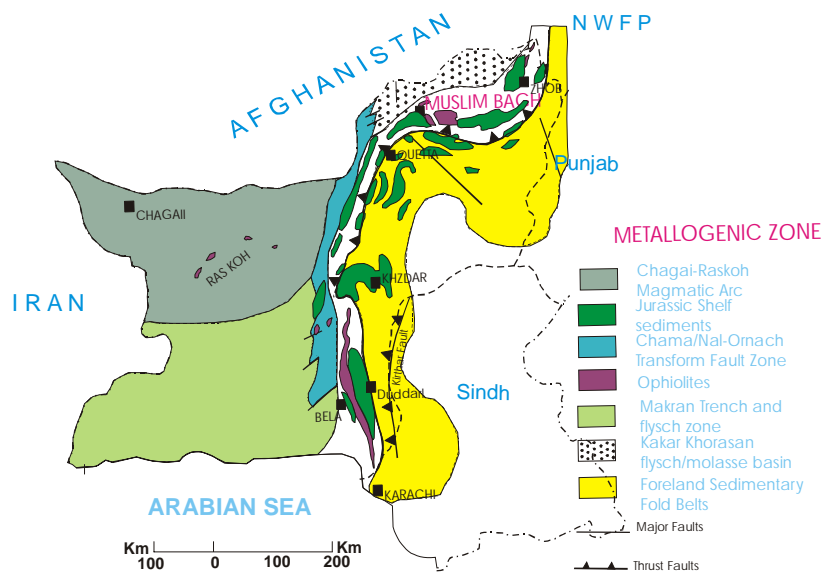


METALLOGENIC ZONES OF PAKISTAN

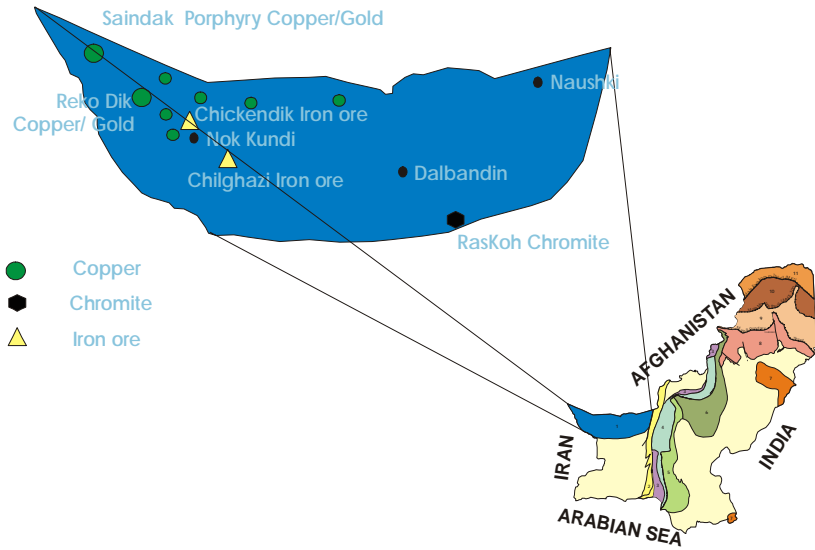
- 1 Chagai Raskoh Magmatic Arc
 - 2 Chaman- Ornach-Nal Transform Fault zone
 - 3 Lasbela- Khuzdar, Muslim Bagh, Zhob-Waziristan
 - 4 Ophiolites & Melange zone
 - 4 Sediment hosted Lead-Zinc- Barite- Fluorite deposits.
 - 5 Kirthar Thrust & Fold Belt.
 - 6 Sulaiman Thrust & Fold Belt.
 - 7 Indo Pakistan Shield rocks of Sargodha, Kirana & Nagar Parkar
 - 8 Salt range & Kala-Chitta Hills
 - 9 Gondwanic domain rocks of Haripur, Sherwan, Abbotabad & Tribal areas.
 - 10 Kohistan Magmatic Arc
 - 11 Karakoram Block
- MBT Main Boundary Thrust
 MMT Main Mantle Thrust
 MKT Main Karakoram Thrust



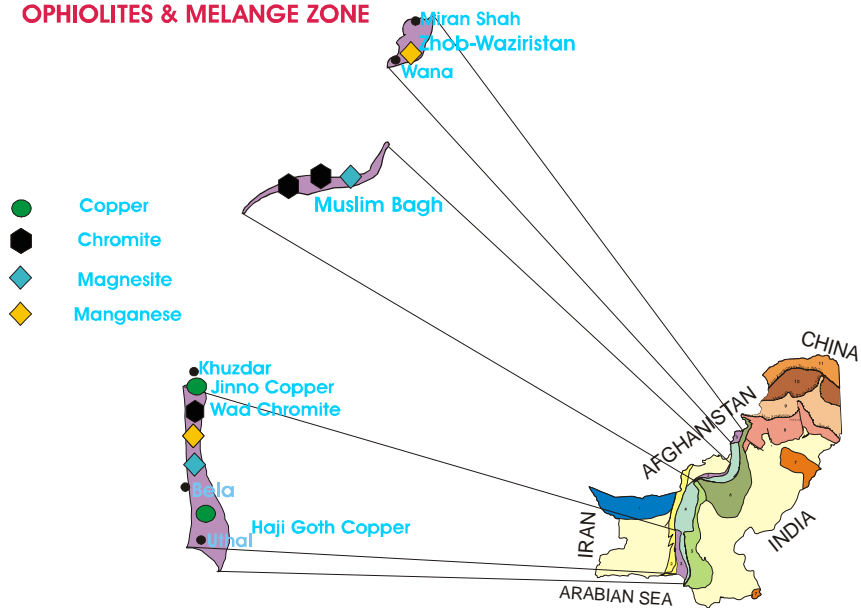
Metallogenic Zone of Balochistan



CHAGAI- RASKOH MAGMATIC ARC

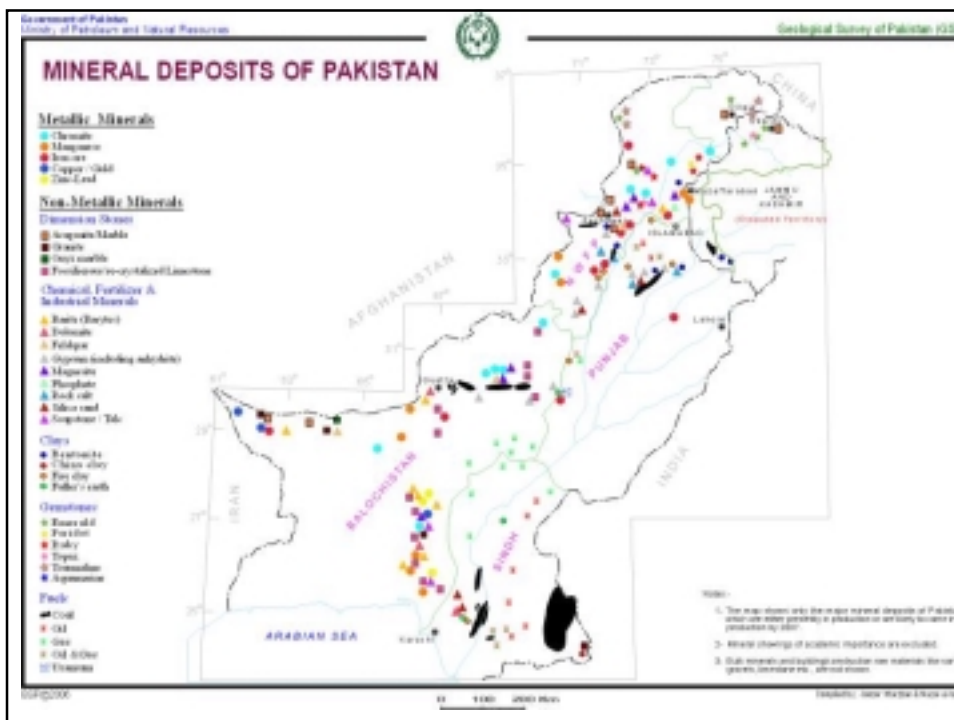
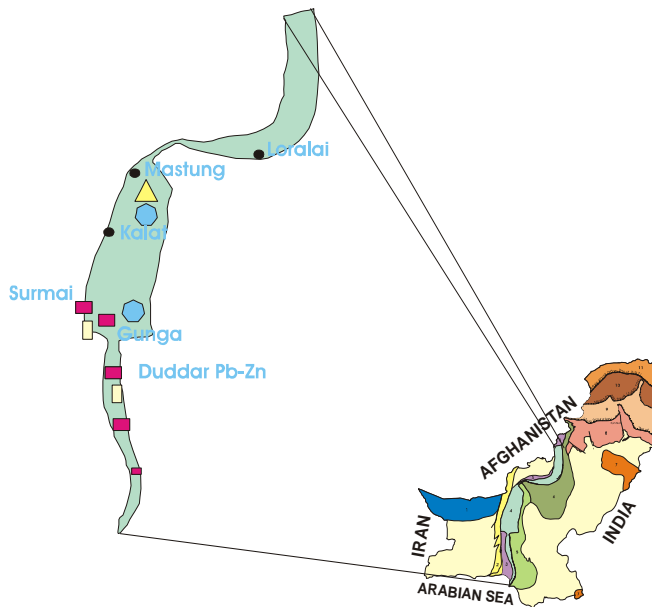


LASBELA- KHUZDAR, MUSLIM BAGH, ZHOB-WAZIRISTAN OPHIOLITES & MELANGE ZONE



SEDIMENT HOSTED LEAD-ZINC- BARITE- FLUORITE DEPOSITS

- Copper
- Lead- Zinc
- ▲ Iron Ore
- ⬢ Fluorite
- ▭ Barite



Major Mineral Deposits in Balochistan

- GSP discovered major mineral deposits which are being developed/exploited now; such as Saindak Copper-Gold Deposit; Reko Diq Copper-Gold Deposit; Duddar Lead-Zinc Deposit; Dilband Iron Ore Deposit

IMPORTANT MINERAL FINDS IN BALOCHISTAN

• Massive Sulphide Haji Goth, Lasbela (2002)	• Fluorite & Barite, Loralai (2000)
• Massive Sulphide Soap Dhoro and Anna Dhoro, Lasbela (2002)	• Fluorite & Barite, Kalat (2000)
• Duddar Zinc-Lead, Lasbela & Khuzdar (1975-86)	• Saindak Copper-Gold, Chagai (1969-78) (Saindak)
• Dilband Iron Ore, (1998)	• Reko Diq Copper - Gold, Chagai (1978-79)
• Barite, Khuzdar (1956)	• Coal Deposits in Chamlang Area (1960)
• Dolomite, Mastung (1976)	• Iron Ore, Chilghazi, Chigendik, Pachin Koh, Chagai district (1960)
• Fluorite, Kalat (1958)	• Onyx marble, Chagai (1952)

Deposit already attracted investment

SAI NDAK & REKO DIQ COPPER - GOLD DEPOSIT

Saindak

GSP initiated the work and in collaboration with RDC completed the prefeasibility study

Reserves > 400 million tonnes
Copper = 0.4 % with 1.7 million tonnes
Gold = 0.30 - 0.48 g/ton

Presently MCC of China has started production with 20,000 tonnes of copper, > 1.5 tonnes of gold and >2.8 tonnes of silver per annum

- * In-Situ value of contained Metal US\$ over 5.5 billion at present price

Reko Diq

One of the very promising deposit discovered by GSP. Presently M/S TCC is working to develop the deposit which is expected to start production within 2-4 years.

Reserves > 1.27 Billions tonnes @ 0.54% Copper and 0.24 g/t Gold

- * In-Situ value of contained Metal US\$18 billion at present prices.

Dilband - Iron Ore Deposit

Discovered by GSP

Haemetitic Iron ore with above 40% Fe₂O₃

Reserves > 200 million tonnes. 10% of Dilband ore blended with imported ore will save millions of rupees in foreign exchange for the country. GSP has helped BME to drill evaluate the deposit for beneficiation, and exploitation. Mining has already been started and supply to Pakistan Steel is in progress

In-Situ value of contained Metal Pak. Rs 240 billion or US\$ 40 billion at present prices

Duddar - Lead Zinc Deposit

Discovered and initial investigation done by GSP

Combined Lead-Zinc Ore with 7% Zn & 3.2% Pb

Reserves = 15.5 million tonnes

MRDL of China has been given the lease to develop Duddar Deposit as join project with PMDC

In-Situ value of contained Metal US\$1.33 billion at present prices.

Gunga and Surmai - Lead Zinc Deposits

Deposits	Reserves (M.T)	Grade
Gunga	10.00	8.0% Pb-Zn
Surmai	3.00	6.5% Pb-Zn



Important investigated Copper prospects by GSP

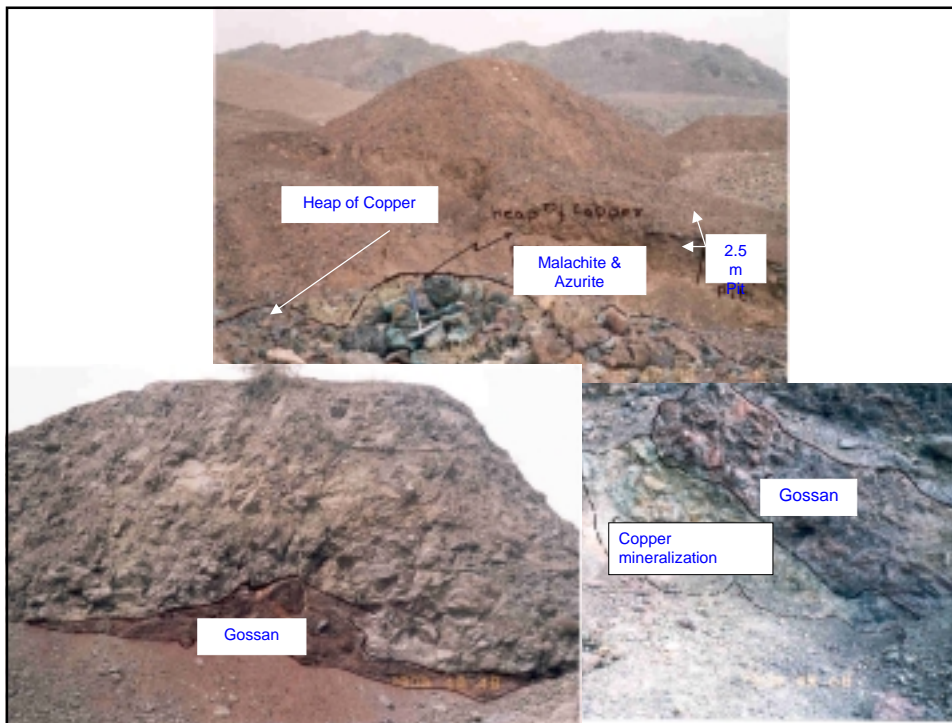
Prospect	Location	Reserves m/tonnes
Dasht-e-Kain	Dalbandin	400
Durban Chah	Nok Kundi	< 100
Talaruk	Near Rabat	0.657
Ziarat Pir Sultan	Dalbandin	200
Kabul Koh	Dalbandin	50

MAJOR MINERAL RESOURCES OF BALOCHISTAN

MINERAL	RESERVES (in metric tonnes)	QUALITY
Barite	> 300,000	Medium to High
Building Stones	Large deposits	Good quality
Chromite	200,000	Low to medium grade
Coal	> 200,000,000	Low grade (lig-A to bit-C)
Copper Ore (Saindak and Reko Diq)	>1,230,000,000	Low to medium grade
Dolomite	Large deposits	Good quality
Fluorite	Small deposits	Low to medium grade
Gold (with Copper)	>300 (M. ounces)	Low grade
Gypsum	>200,000,000	Medium to High
Iron Ore (Dilband & Chagai)	>275,000,000	Low to medium grade

MAJOR MINERAL RESOURCES OF BALOCHISTAN

MINERAL	RESERVES (in metric tonnes)	QUALITY
Zinc/Lead (Duddar & Gunga)	> 16,000,000	Low to medium grade
Limestone	Large deposits	High quality
Marble (ordinary)	Large deposits	High quality
Pumice	Being estimated	Medium quality
Silica Sand (Glass Sand)	Being estimated	Medium quality
Silver (with Copper)	>50	Low grade
Sulphur	> 100,000	Low to medium grade



Important Copper prospects investigated by GSP

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Virgin Territory of Balochistan



- Vast Potential for untapped Gem material
- Occurrence of various precious and semi precious stones have been known from Balochistan as early as late sixties
- However geology, gemology and genesis of gem material from Balochistan and history of mining is not fully documented
- No reliable estimates of reserves and production available

Balochistan Gems

- Early discoveries of most of Gem materials in Balochistan by GSP in connection with investigations for other mineral commodities , during the course of geological mapping
- In **Chagai**: Chrysocola, Malachite, Azurite, Turquoise, Glossularite Garnet, Brown Garnet, Zircon, Obsidian, Jade, Jasper, Phrolusite, Lazurite, Lapis Lazuli and Spar

Balochistan Gems

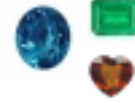
- In **Chagai**: Varicolored Agates, Chrysoprase, Chalcedony, Geodes, Citrine and Smoky Quartz
- In **Zhob**: Pistachio Green Vesuvianite, Serpentine & Idocrase
- In **Wad**: Green Quartz
- In **Lasbela & Kharan**: Citrine, smoky Quartz and Jasper
- In **Panjgur**: Auriferous Quartz

Balochistan Gems

- In **Kharan**: Blackish Green Jaberjet
- In **Kalat**: Brown Garnet, Fluorite
- In **Killa Abdullah**: Aragonite
- In **Khuzdar**: Agates
- In Loralai Amethyst

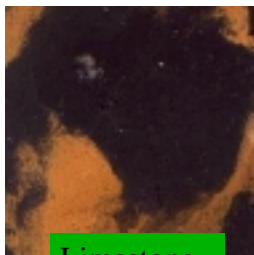


Museum of Earth Sciences

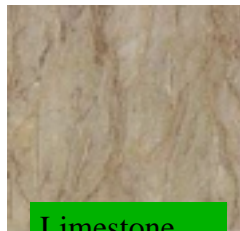


Gem Hall displays all the varieties of precious and semi precious stones found in the NWFP, Northern Areas, FATA and Balochistan. These collections constitute raw material for study, identification, reference and research, in a way not possible through any other media

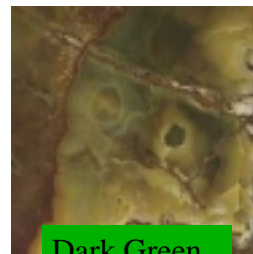
Decorative Stones Gallery...GSP



Limestone
King Gold



Limestone
Desert Storm

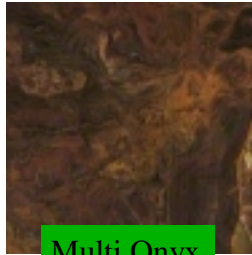


Dark Green
Onyx

Decorative Stones Gallery...GSP



Limestone
Grey Cloud



Multi Onyx

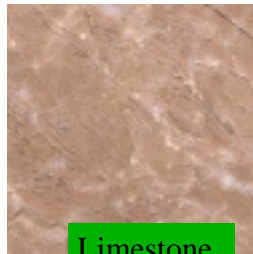


Red Onyx

Decorative Stones Gallery...GSP



Marble
Chocolate
Marble



Limestone
Verona

Marble: Chagai, Bela,
Kalat & Khuzdar



Basalt
Black Gold

Decorative Stones Gallery...GSP

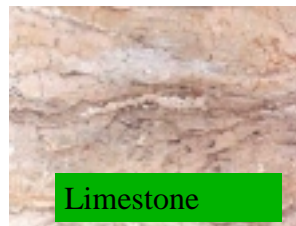


Sandstone



Granite

Granite:
Chagai, Balochistan

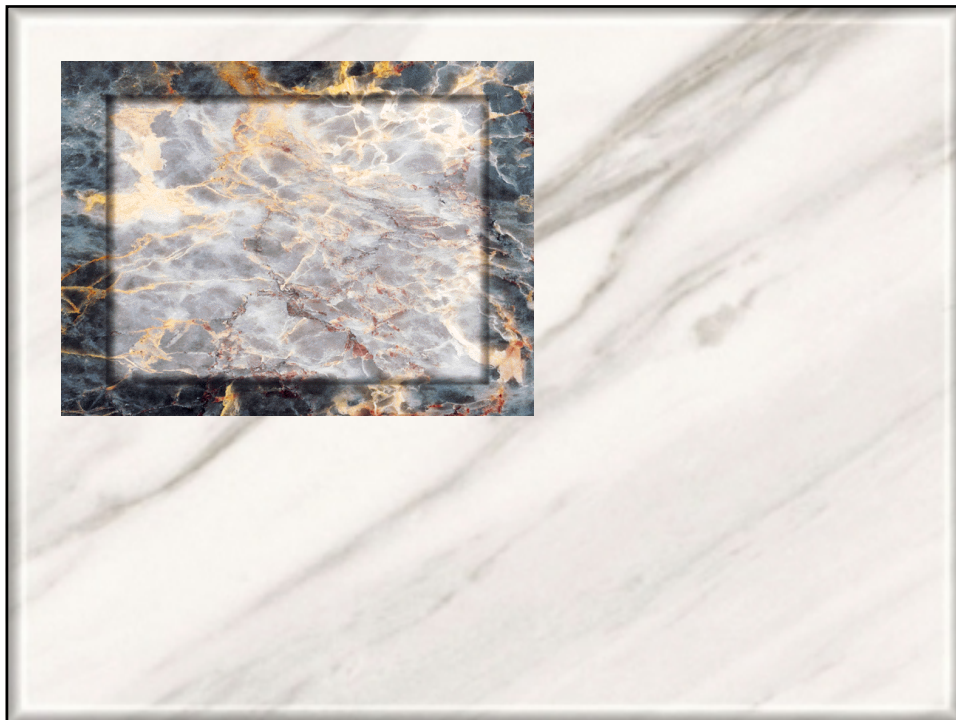


Limestone



Balochistan Stone

S.NO.	VARIETIES	AREAS
1	China Verona	Khuzdar, Loralai, Naal
2	Plane Verona	Khuzdar, Loralai, Naal, Wadh
3	Amber/Hamza Green	Khuzdar, Wadh
4	Botesina	Loralai, Khuzdar, Lasbela
5	Burma teak	Lasbela, Wadh, Naal
7	King Gold / Black & Gold	Lasbela, Wadh, Khuzdar
8	Ziarat/Super White	Loralai, Quetta, Ziarat, Khuzdar, Lasbela
9	Badal	Quetta, Loralai, Khuzdar, Lasbela
10	Brown	Naal, Khuzdar, Lasbela
11	Green	Khuzdar, Wadh
12	Pink	Bela, Lasbela, Wadh, Loralai
13	Travera	Lasbela
14	Sphadar White	Loralai
15	Onyx- Green & Banded	Chaghi, Nukundi, Dalbandin, Zeh, Julli, Botik.
16	Granite	Chaghi, Dalbandin





Potential of Baluchistan

- Reserves

Marble 2.5 Billion Tons

Granite 1.5 Billion Tons

Onyx 15-20 Million Tons

- Annual production

Million Tons 3.3

- Clusters Areas

Quetta, Chaghi, Khuzdar, Dalbandin

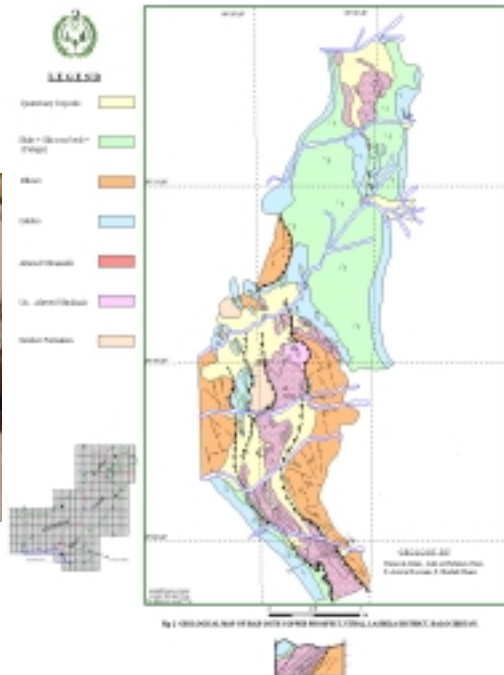
Nukundi, Loralai, Lasbela



New findings in Lasbela Khuzdar area

- Goth Essa (Konano Pir) copper prospect, north east of Uthal town. Copper content 20% to 25%
- Detho Dhorro copper prospect
- Ali Koh East copper prospect. Copper content 2.5-4.5%
- Jinno East copper prospect. Copper content 20%

Lasbela- Khuzdar



EXPLORATION/DEVELOPMENT TARGETS FOR INVESTMENT

- Chagai-Raskoh : The Chromite deposits in Chagai - Raskoh magmatic arc of Balochistan occur in Nag Bunap and Rayo valley and are located at 290. 50/ E : 650.13/ N & 280.50/ E: 640.43/ N. The deposits occur respectively as small isolated lenticular bodies in the ultramafic rocks in Raskoh range, District Chagai, Balochistan. The Raskoh Chromite deposits contain 47-57% Cr₂ O₃ having 2.6-3:1 Cr : Fe. ratio. The estimated reserves are about 30,000 tons (Ahmad-1975).
- The chromite reserves in commercial quantity are available in Lasbela, Chagai, Pishin, Sonaro and Muslim Bagh.

Deposits awaiting investment

- GSP will be carrying out exploration & evaluation work under " Accelerated Mineral Exploration of GSP to identify New Economics Minerals Deposits of the Country"
- 20 porphyry type of poly metallic deposits containing copper and gold in other parts of Chagai district.

COAL RESOURCES OF BALOCHISTAN

PROVINCE	Million tonnes
BALOCHISTAN	217

Advance Geoscience Research Lab. – GSP - Islamabad

- Prepared 1000 Standard Gemstone Samples for verification and comparative studies
- Testing Lab on basis of crystallography, chemical signatures & refractive Index
- Gemological Microscope to check Inclusion or Ghost Structure



Advance Geoscience Research Lab. – GSP - Islamabad

Gemstone Testing Equipment

- Refractometer
- Polarizing microscope
- Ultra violet lamp
- X-Ray diffractometer
- Diamond Tester (to check the condensity)

Recently signed MOU

- GSP & Pakistan Gems & Jewelry Development Company
- GSP & Pakistan Stone Development Company (PASDEC)
- Establishment of Gemstone identification Lab at Quetta



