

GEOLOGY IN AND AROUND THE GWALIOR CITY

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1. INTRODUCTION

- The historical Gwalior city is not only world famous in the field of Archaeology, Culture, Art and Music. But also it is world representative in the field of Geology, because “Gwalior Group” of rocks are well exposed in and around the city, lies in between the Cartesian Coordinates $26^{\circ}00'$ to $26^{\circ}15'$ N and $78^{\circ}00'$ to $78^{\circ}15'$ E, on the Survey of India toposheet No. 54 J/4.

- Various rocks from the age of 'Achaean' to 'Recent' are found in the region.
- The name “Gwalior Series” was first given by English Geologist name C. A. Hackett in 1870. Now days, by the new nomenclature it is known as “Gwalior Group”.

2. CLASSIFICATION

- Two fold classification is given by the Hacket for Gwalior group of rocks i.e.
 - 1. Par Formation
 - 2. Morar Formation
- Par** is the 'older' and **Morar** is the 'youngest' formation of the Group.

3. NOMENCLATURE

- The name 'Par' is given after the locality name i.e. "Par Village", which is 40 Km. far from Gwalior city in the S-W direction, situated on Gwalior- Nayagaon- Chinor road.
- The name 'Morar' is given after "Morar locality" of Gwalior city, where the said formation is well exposed in the N-E direction of the city.

4. LITHOLOGY

1. The “Par formation” consists with ‘Arenaceous’ material

2. Chief rocks are as

- (i) Sandstone
- (ii) Shale and
- (iii) Quartzite

1. The “Morar formation” consists with ‘Argillaceous’ material

2. Chief rocks are as

- (i) BHC
- (ii) BHJ
- (iii) Limestone and
- (iv) Ochers

5. REGIONAL GEOLOGICAL SETUP

Group/Super Group	Formation	Lithology
	Recent Age	Soil & Laterite
Vindhyan Super Group (upper)	Kaimur Formation	Sandstone
-----Unconformity -----		
GWALIOR GROUP	Morar Formation	Dolerite dykes & Sills, Slate, Limestone, Siliceous Shale, Clay (ochre), BHJ & BHC, Black Chert, Banded Ferruginous Shale, Banded Chert Shale.
	-----Unconformity -----	
	Par formation	Sand Stone, Shale and Quartzite.
-----Unconformity -----		
Bundelkhand Granite Gneissic complex (BGC)	Achaean Age	Granite, Gneiss with Quartz Veins and Reefs.

6. TYPE AREA

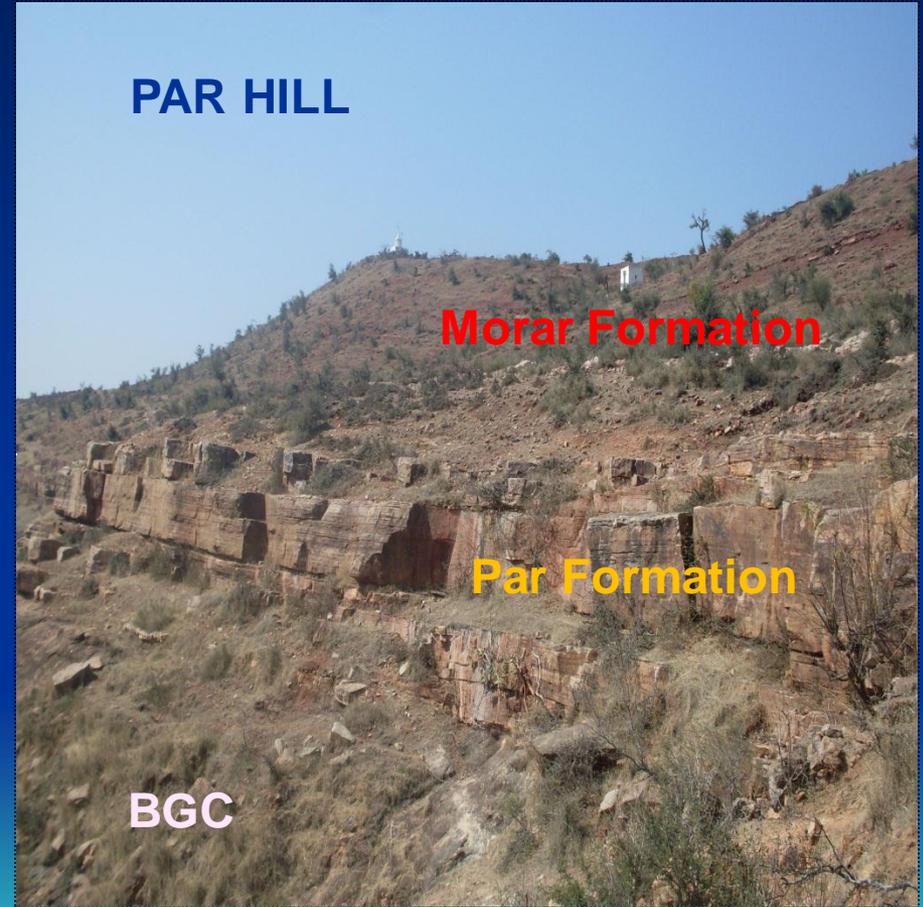
- All the lithological units as mentioned under “Gwalior Group” are well developed at a place i.e. **Par Village Hill**, where they can be seen chronologically, It is the unique place in the world, that’s why, the said area is called as the type area.
- Field photographs of the area are as follows-

7. Field Photographs

PAR VILLAGE



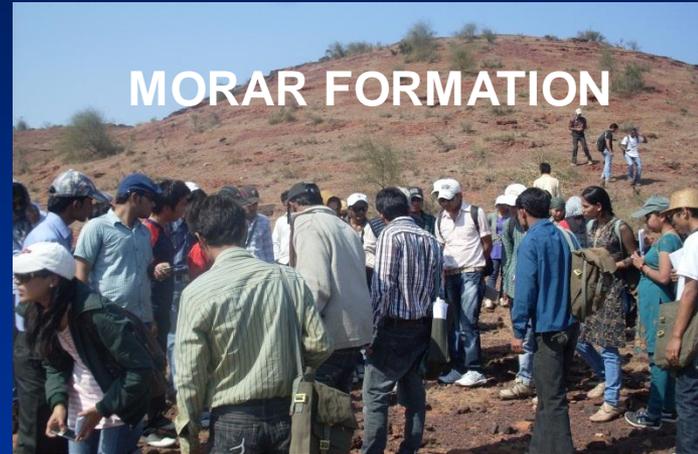
PAR HILL



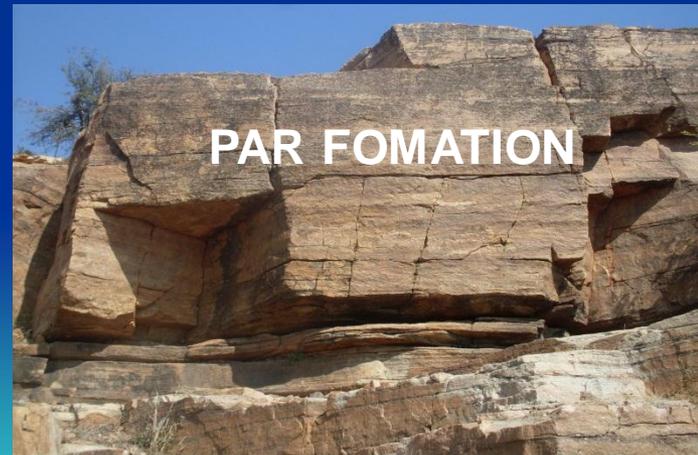
PAR HILL



MORAR FORMATION



PAR FOMATION





BUNDELKHAND GRANITE
(AT BOTTOM OF THE HILL)



TOP OF HILL

8. Mineralization

- “Mineralized zone” is present within the Morar formation. The chief mineralized zone is BIF (Banded Iron Formation).
- 1. BIF consists by BHC (Banded Hematite Chert) and BHJ (Banded Hematite Jasper).
- Both BHC & BHJ are the chief Minerals/ ore of Iron, having < 50% ‘Fe’.

2. Laterite deposits are also seen frequently within the BIF. It is the iron rich soil, having 22.38% “Fe”, derived from the BIF.

3. Thin ocher bands are also found in three distinct colours namely- **white**, **red** and **yellow** within BIF.

9. MINING ACTIVITIES

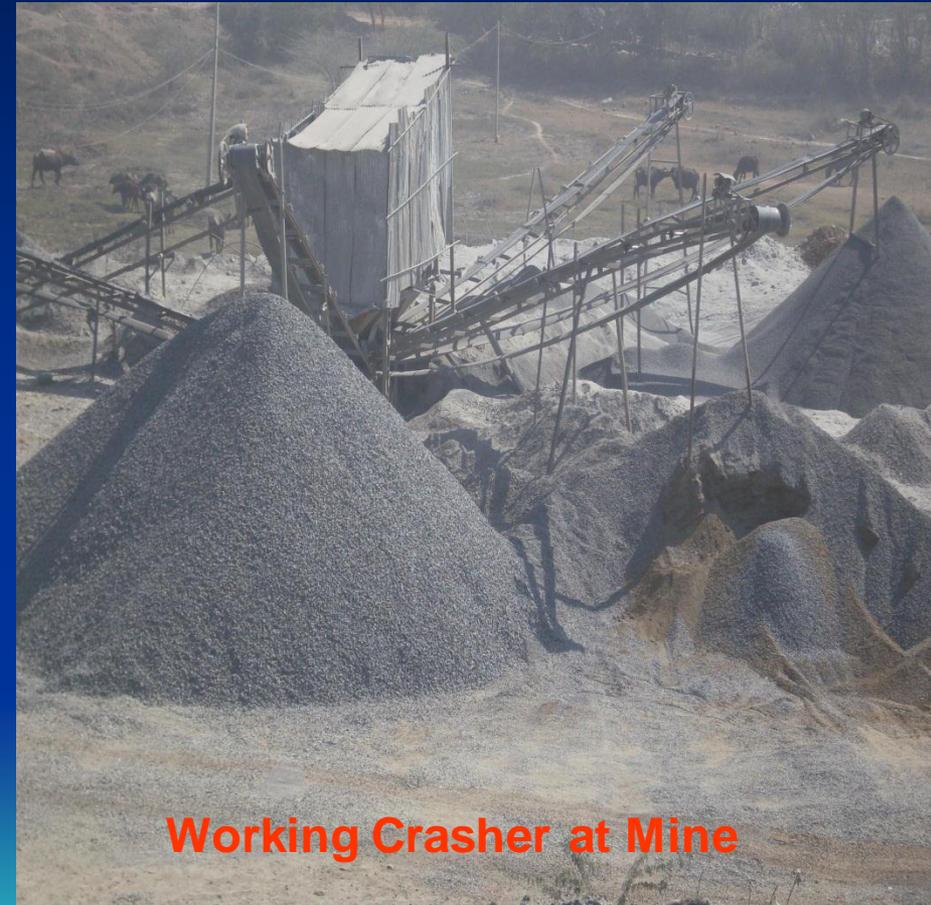
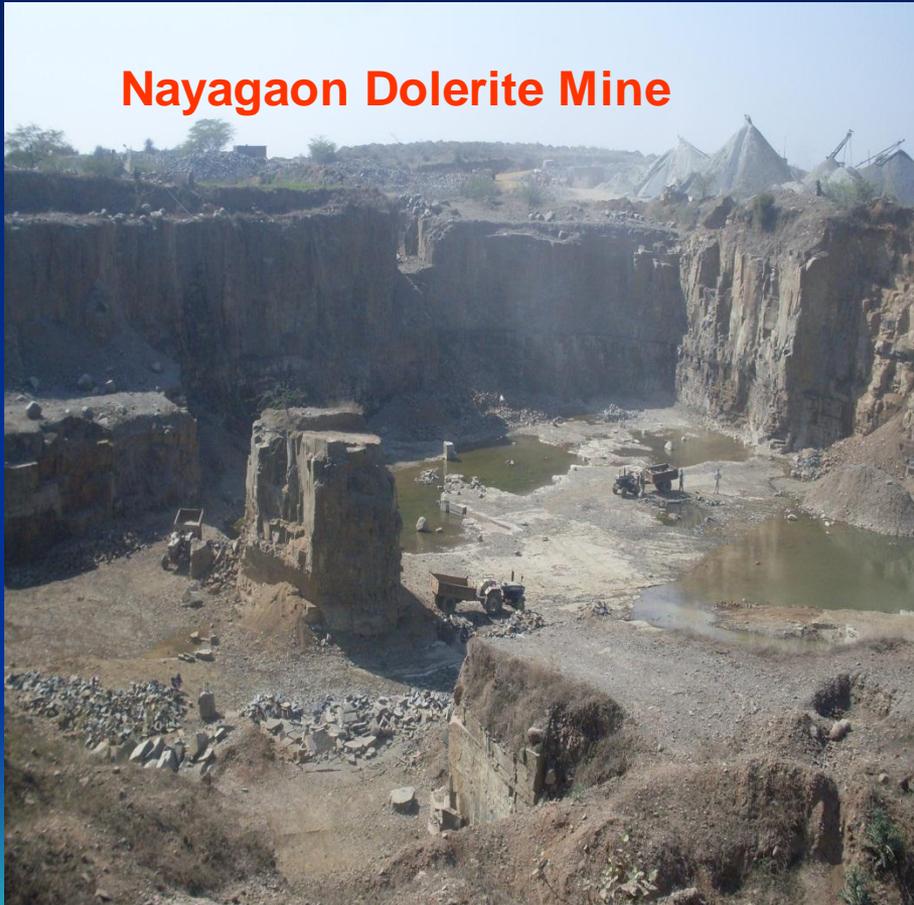
- Open cast mining activity is going on in and around the Gwalior city for exploitation of the said minerals/ores and road metals from the Morar formation.
- 1. Open cast mining activity within the dolerite dyke is going on at Nayagaon on Gwalior- Shivpuri (NH-3) road for the making of road metal etc.

- 2. Open cast mining activity within the BIF is going on at Panihar Iron Ore Mine , Panihar on Gwalior- Shivpuri (NH-3) road for the exploitation of BHC & BHJ.

Mining Activity Field Photographs are as follows-

OPEN CAST DOLERITE MINE

Nayagaon Dolerite Mine



Working Crasher at Mine

OPEN CAST IRON ORE MINE



Mining Activity is Going on at Panihar



Panihar Iron Ore Deposit

10. ECONOMIC MINERALS / ORES



11. USES OF MINERALS / ORES

1. BHC & BHJ

- Iron and sponge Iron
- Cement Industry
- Iron Oxide

2. OCHERS / CLAY MINERALS

(a) Red

(b) Yellow

(c) White

- . Paint Industry
- . White Washing & polishing
- . Paper Industry & Paint Industry

3. LATERITE

- Cement Industry As a Flux
- Road Making
- Fillers
- Iron Oxide

4. DOLERITE

- Building Materials
- Road Metal
- Decorative Stone

5. LIMESTONE

- Low grade L.St some time using in cement Industry
- White Washing
- Purifier

12. Geological Map In and Around Gwalior City

(Map ID 54 J/4)

