CERTIFICATE

This is to certify that the record of work done by Miss. Roshni Pujari of class MSc Applied Geology Part-1, Year 2022-2023, contained in this report has been examined and signed and that the course of fieldwork in Geology prescribed by Department of Earth Science of Goa University has been satisfactorily carried out.

Head of the Department

Examiner's Signature

Date:

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GEOLOGICAL REPORT ON FIELD EXERCISE DONE IN AND AROUND BAGALKOT

DECEMBER 2022

BY:- ROSHNI PUJARI | MSC APPLIED GEOLOGY PART-I

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Abstract

The field exercise was done in and around Bagalkot in karnataka, for this taking readings of strike and dip on field and identifying rock and features was done. Field mapping was also done.

The objective of this was to get an idea about the outcrops and their ages. All these studies were made to know the stratigraphic sequence of the area,

And after the study the relative ages of the outcrops with respect to one another were know and also a conclusion on the geological history of the area was deduced.

The formations were then checked with lithostratigraphy of Kaladgi basin, as the areas were a part of the kaladgi basin.

CONTENTS

Acknowledgement

. The field work is an important part of geology as we get field experience from that and this field work was made possible for us for which I am thankful and would like to acknowledge the efforts that were put in and thank all the faculty members of earth science department of Goa University.

I am grateful to Dr. Anthony Viegas, Dr. Niyati Kalangutkar, Dr. Poornima Dhawaskar, Dr. Nicole Sequeira, Prof. Mahesh Mayenkar and Prof. Pooja Ghadi for the knowledge and guidance and knowledge that they provided us. This field trip would not have been a success without the Teachers who accompanied with us in Bagalkot, Karnataka, they were Dr. Anthony Viegas, Dr. Niyati Kalangutkar, Dr. Poornima Dhawaskar, Dr. Nicole Sequeira. Their friendly and interactive nature, humble attitude and caring throughout the field trip. I would also like to appreciate the help received from the Laboratory Assistant Ms. Heena for providing material required to carry for the field trip

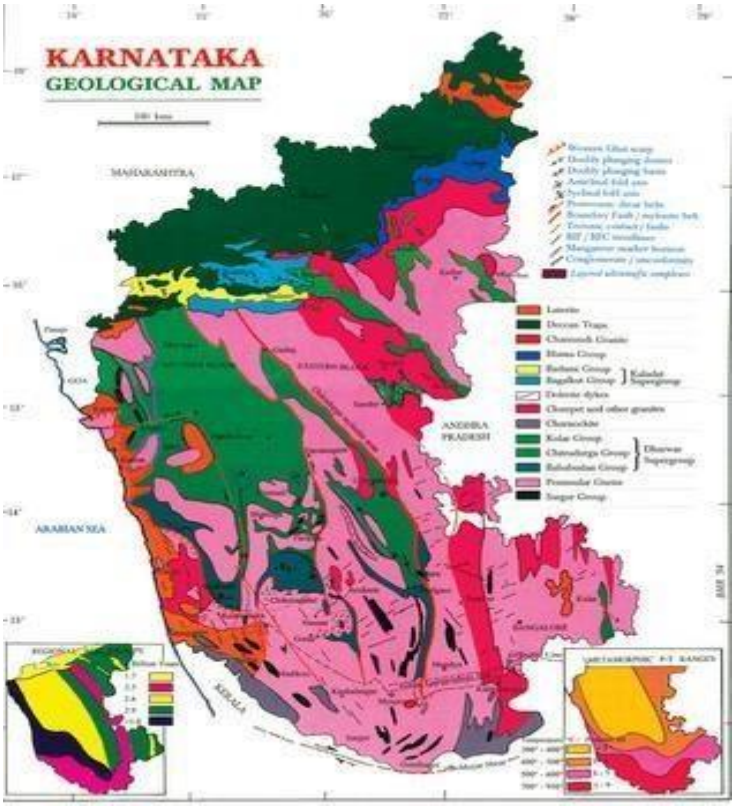
I would like to express my gratitude towards my fellow classmates for helping me wherever and whenever their help was needed during the field trip.

Lastly, I would like to thank my parents for allowing me to go for the field trip and motivating me to gather knowledge

INTRODUCTION

The geology of India is diverse and it contains rocks belonging to different geologic periods, dating as far back as the Eoarchean Era. Some of the rocks are very deformed and altered. Other deposits include recently deposited alluvium that has yet to undergo diagenesis. Mineral deposits of great variety are found in the Indian subcontinent in huge quantity. Even India's fossil record is impressive in which stromatolites, invertebrates, vertebrates and plant fossils are included. India's geographical land area can be classified into the DeccanTraps ,Gondwana and Vindhyan.

Karnataka forms a part of the Indian Shield that is constituted of rock formations ranging in age from 3300 m.y. to 5 m.y. Barring a narrow coastal strip of about 5000 sq.km of Tertiary and Quaternary sediments and another 31,250 sq.km of Craton comprises of greenstone-granite belts, gneisses and granulites. Greenstones essentially consist of meta-volcano-sedimentary sequences, surrounded and dissected by Peninsular Gneiss. At the southern end of the craton these give way to granulite suite of rocks. The craton preserves a billion years orogenic history from 3400 m.a to 2400 m.a. Epicratonic or intracratonic sedimentary basins called Purana Basins occupy the northern segment of the craton whose northern part in turn is concealed by Deccan basalt.



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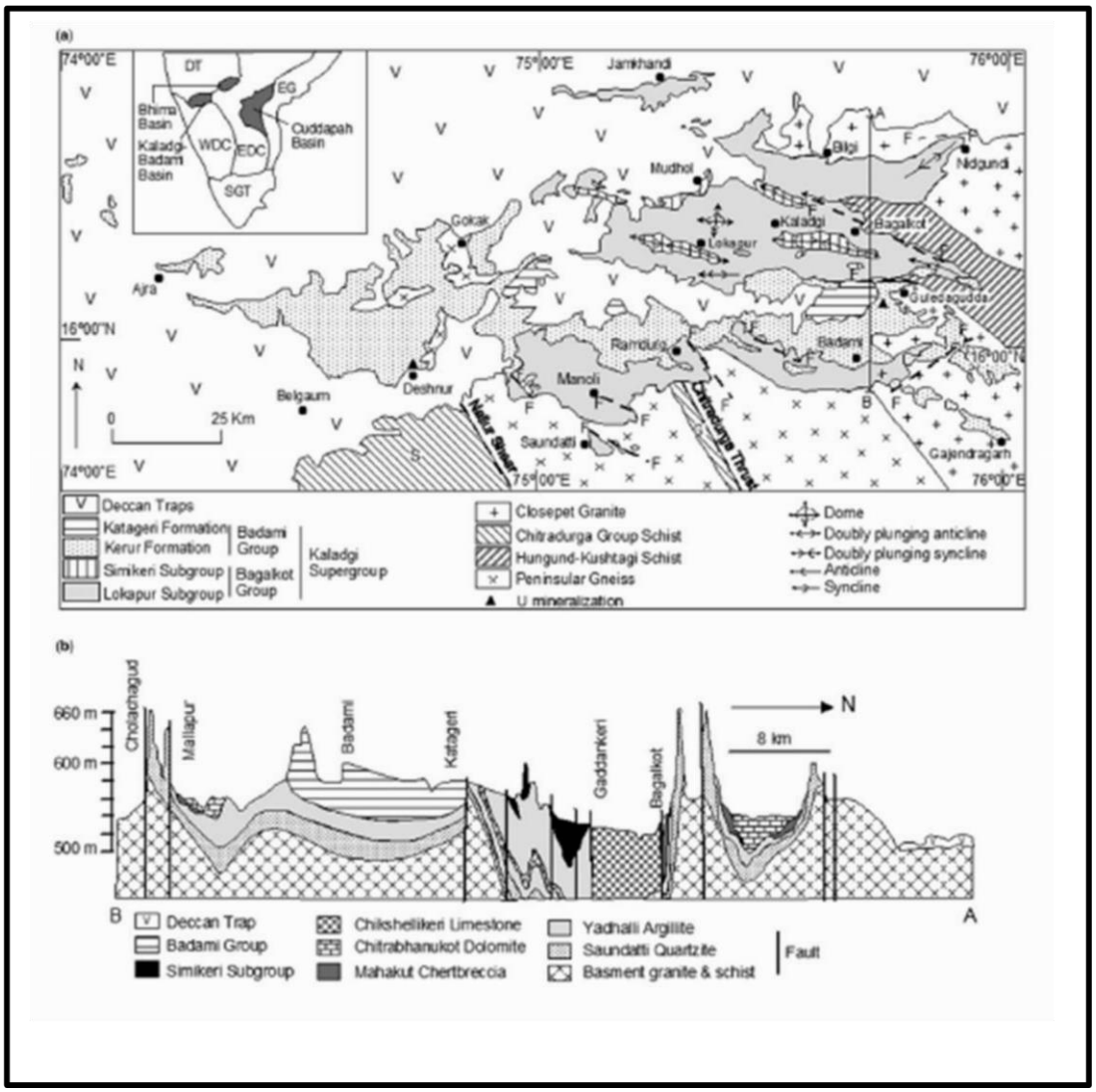
Geology kaladgi

The kaladgi-badami basin is a Proterozoic and intracratonic basin. The Kaladgi basin is an E-W trending irregular basin underlain by the basement granitoids of the Dharwar craton in the south and east and overlain by the deccan trap in the north.



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The basin contains arenites, shale, carbonate, and conglomerate.

The depositional environment is continental, transitional and shallow marine.

Lithostratigraphy of kaladgi basin

Group	Subgroup	Formation	Member	Thickness in metres
Badami Group (286 m)		Katageri Formation	Konkankappa Limestone	85
			Halkurki Shale	67
			Belikhindi Arenite	39
		Keru Formation	Halgeri Shale	3
			Cave Temple Arenites	89
			Kendur Conglomerate	3
----------ANGULAR UNCONFORMITY----------				
Hoskatti Simikeri Subgroup	Formation		Molapur Intrusive	7
			Dadanhatti Argillite	695
Arlikatti Bagalkot Group (3451m)	Formation		Lakshnhatti Dolomite	87
			Keralmatti Hematite Schist	42
			Niralkeri Chert-Breccia	39
Kundargi		Formation	Govindkoppa Argillite	80
			Muchkundi Quartzite	182
			Bevinmatti Conglomerate	15
----------DISCONFORMITY----------				
	Lokapur Formation	Muddapur Formation	Bamanbudnal Dolomite	402
			Petlur Limestone	121
			Jalikatti Formation	43
		Yendigeri Formation	Naganur Dolomite	93
			Chiksellikere Limestone	93
			Hebbal Limestone	166
		Yargatti Formation	Chitrabhanukot Dolomite	218
			Muttalgeri Argillite	502
			Mahakut Chert-Breccia	133
		Ramdurg Formation	Manoli Argillite	61
			Saundatti Quartzite	383
			Salgundi Conglomerate	31
----------NONCONFORMITY----------				
Granitoids, Gneisses and Metasediments				

Day 1:

Spot 1-karradi Gudda

Lat;

Long;

The outcrop exposed was conglomerate (Devimati conglomerate) that is Simikeri formation - Badami group of formation. The rock found had composition of cryptocrystalline type of silica and milky quartz. The clast size is 1.5 CM. The grains are surrounded (0.5-1.0 Cm) . It is siliceous matrix that is polymetalic conglomerate. The trend of the ridge is NW-SE(N 120°).

*Size of the clast decreases as we move on top.

On top rock exposed is breccia and conglomerate, which contains layering of light and dark bands(Reddish/ Brownish) -0. 3-0.5 CM known as ferrugenous bands.Which indicates less periodicity.

Reading of the bedding planes are:

Strike =140°

Strike direction=NE

Amount of dip=26°

Spot 2:1km forward from spot 1

Lat:15°52'37.5"N

Long:74°41'49"E

The rock exposed in conglomerate with Boulder size clasts, which are of basaltic composition, which shows spheroidal weathering that is Exfoliation of the rocks and the clast contains vesicles, which is a part of Deccan traps.

Day 2:

Spot 1:Ramthal

The rocks exposed is hundgun schist belt, kaladgi basement. made up of meta volcanics with ultramafics, which has been metamorphosed, Metasediments with some acid volcanoes and greywackes with BIF's

Location 01: lat:

Long:

Hundgun schist belt, has competent layer forming-class 1B.Quartzite layer along with class 3 folds of ferrugenous mineral layer. There are crenulations present. Crenulations hinge lineation, microfolds are seen. BIF's on top CaCo3 is deposited.

Loc 02:

Lat:

Long:

The rock exposed is phyllites, which are dipping very steep.

Structural data:

1) S=N163°

DD=NE

Amount=76°

2) S=N166° DD=NE

Amount=67°

3) S=N168°

DD=NE

Amount=4°

4) S=N143°

DD=NE

Amount=40°

Loc 03:

Rock exposed is folded BBQ. Upright folds were found. Sn and Sn+1, taking a plunge reading was difficult.

Loc 4:

Intrafolial folds were present in BBQ, there are 2 events of folding. Sn=-Sn+1 1)

S=N112°

Amount=55°NE 2)

S=N220°

Amount=60° NE

Loc 5:

The rock seen was conglomerate, consists of clasts which varies in size from 10cm to 17cm length and approximately 9cm in width. Clasts are of BBQ.

Spot 2:location 1:Saundati Lat:

Long:

Ferrugenous Quartzite are present with moderate steeping and has cross bedding . 1)

S=N301°

Amount=36°NE

2) S=N285°

Amount=36°NE

Location 2 :200 m away from location 1.

The outcrop exposed was caliche deposit. Mineral composition is smoky quartz and chlorite and carbonate rocks.

Loc 3:500m away from loc 2.The rock exposed is BBQ. Slumping present because of removal of overburdened (phyllites)

1) S=N334°

Amount=78°NE

2) S=N326°

Amount=80°NE

3) S=N332°

Amount=86°NE 4)

S=338°

Amount=80°SW 5)

S=325°

Amount=65°NE

6) S=N315°

Amount=85°NE

Hinge data:

1) S=306°

Amount=40°NE 2)

S=320°

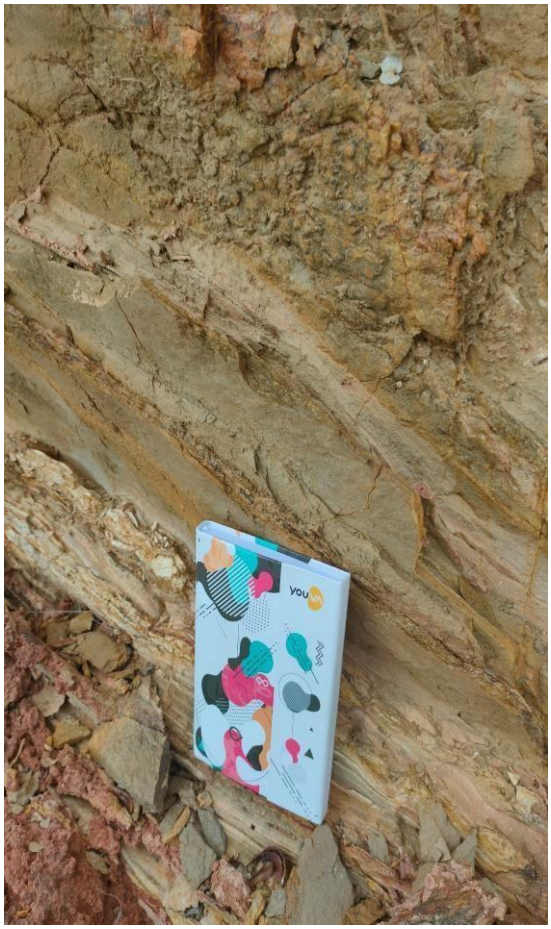
Amount=74° NE

Day 3:

Spot 1:

Lat:15°44'23"N

Long:75°22'28"E



The rock exposed is metamorphic rock. Phyllites intercalated with BBQ. There was development of foliation(minerals are alligned). Foliations has the same trend as on location 3 of spot 2(It has large warping). Presence of Quartz vein which is parallel to foliations (which is formed later because of weak planes) . Phyllite is low grade rock. While deformation;(synchronous deformation) , there can be intrusions of Quartz vein. Horizontal shear zone which has horizontal allignment of minerals in the rock. There are carbonate minerals present. Sn, Sn+1 and Sn-1 is present but Sn - 1 is mostly obliterated. Sn is more spaced and Penetrative.

Strutural data are:

1) S=N346°

Amount=70°SW

2) S=N168°

Amount=85°SW

3) S=N174°

Amount=82°SW

4) S=N148°

Amount=79°SW

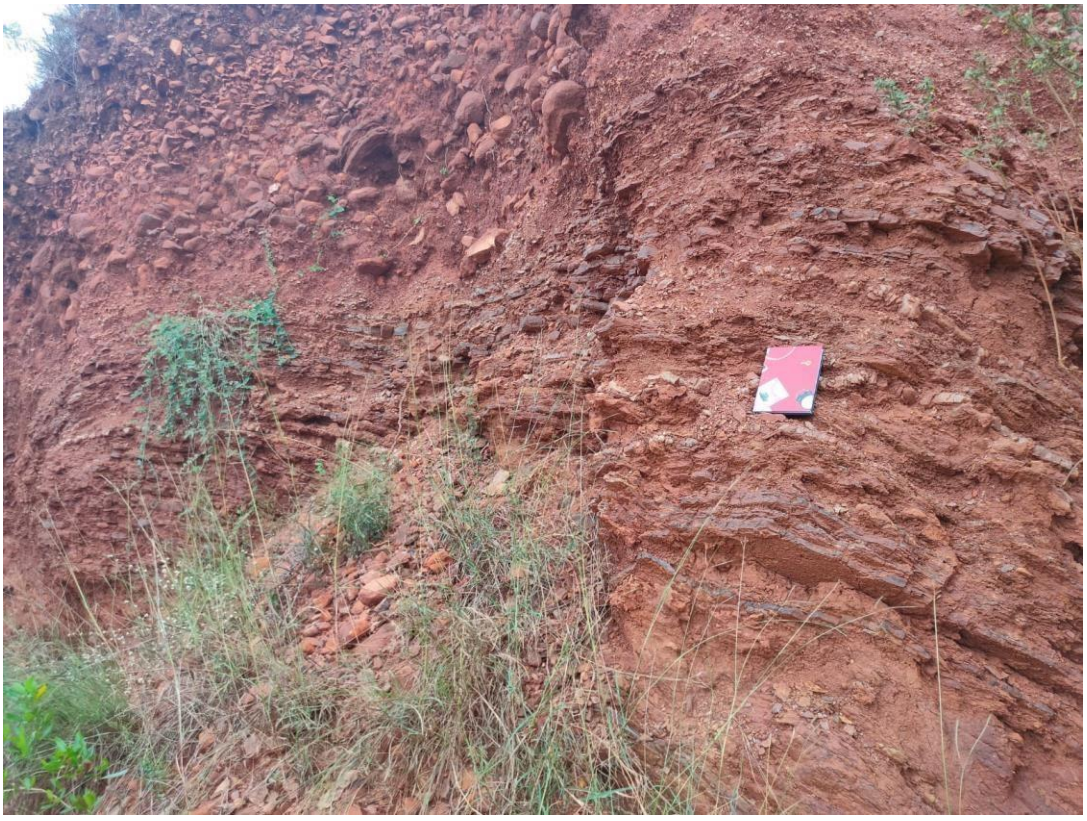
5) S=N160°

Amount=76°SW

6) S=153°

Amount=73°SW

Spot 2:100 m away from spot 1(left side)



Exposure was uncomformity(Angular unconformity). It is not a graded bedding. There is deposition of Boulder's on the surface, horizontal shear zones is present. 1) S=N150°

Amount=65°SW

2) S=N145°

Amount=65°SW

3) S=160°

Amount=46°SW

4) S=N153°

Amount=85°SW

Spot 3:Boroka power plant

Lat:15°44'23"N

Long:75°22'25"E

The rock exposed is sandston rock. Sandstone is deformed to Quartzite. (Iron content is more). Contain joint set(orthogonal joint set)

1) N225°

2) N252°

Conjugate joint set

1) N 250°

2) N161°

Reading of bed

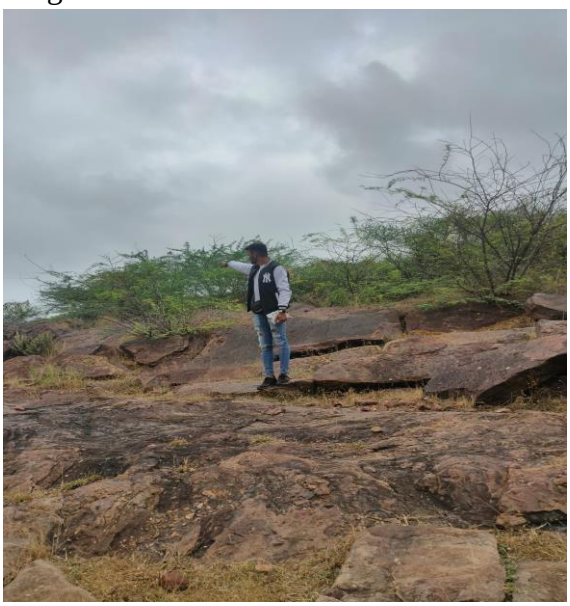
1) S=N133° Amount=11°SW

Day 4 :

Spot 1:Aihole

Lat:16°0'49"N

Long:75°53'5"E



Location 1:1km from famous heritage temple.

The rocks exposed are Ferrugenous Quartzite that is horizontal Badami rocks. Presence of lamination. Mineral composition of the rock is smoky quartz, Quartz nad jasper. There is a fault present where quartz vein is been faulted. There is rhythmic alterations of coarser and finer grains. Bands of breccia seen. Intraformational breccia(width is 5-10cm)/ conglomerate are there, where fine grains are mire rounded and coarser grains are angular. Presence if

BIF's; Angular grains are banded, clasts are elongated and parallel to foliations. There are 7 Quartz vein present. Quartzite also show cross bedding found with Quartz veins.

Structural data:

1) S=N117°

Amount=41°SW

2) S=N120°

Amount=42°SW

3) S=N125°

Amount=36°SW

4) S=112°

Amount=34°SW

5) S=115°

Amount=44°SW

Loc 2:On other side of the road.

An extensive outcrop on the North side of Aihole. The rocks exposed were inclined bagalkot rocks.The rock seen is reddish pink sandstone, which had horizontal beds. This is the upper part of the unconformity.

1) S=N142°

Amount=6°SW

Spot 2:Sirur

Lat:14°5'34"N

Long:75°46'59"E

The rock exposed shows faulting.presence of striations {Slickenside}, smooth downwards and upwards rough. Fault plane was identified based on striations. It is a shallow dipping fault that is reverse fault. There is also presence of intraformational conglomerate because there is no faulting seen around it.

Fault plane reading:

1) S=N111°

Amount=60°NE

Lineation=88°

Day 05: Spot

1:Amingad

Lat: long:

The outcrop observed is a granitic outcrop which is pinkish in colour having coarser grained size and has mineral such as feldspar and Quartz. Feldspar are pink in colour. Feldspar form the clasts. The rock has not deformed. There is no foliations in rock.

Undeformed granite, closepet granite (age 2.5 Ba) . Xenoliths are present. Cognate xenolith- when magma is rising, pieces of unmelted part can be restitic xenoliths. Xenoliths has foliations, Accidental xenoliths form country rock. The size of the xenoliths varies from 712cm and they are subrounded patches formed. As we go on top feldspar increase and Quartz decrease.

Spot 2:

Jointing is observed in granitic rock

Spot 3:

Conglomerate rocks are intercalative with Quartzite which are rich in BIF's.

Spot 4:




Loc 1:The rock exposed was sandstone.

1) S=N120°

Amount=21°NNE

2) S=N116°

Amount=21°NNE 3) S=N125°

Amount=25°NNE

Loc 2:

Lat:16°4'9"N

Long:76°3'8"E

The rock exposed is phyllite, Hungund schist belt. BIF's iron is much more than that. It is an expensive outcrop exposed at the Hungund of BIF's.

1) S=N125°

Amount=71°NE

2) S=N127°

Amount=83°NE

Data on fold hinge 1)

S=N143°

Amount=85°NNE

BBQ folding is preserved

2) S=N125°

Amount=55°NNE

Intrafolial domain-Overprinting **Day**

6:

Spot 1:

Lat:N16°20'43"

Long:75°37'2"E

The location show's exposure of basement granite overlained by the badami rocks (Saundati Quartzite/conglomerate). This is the clospet granite (It is a 2 feldspar granite). The essential mineral are quartz and feldspar with accessory mineral such as biotite. Grey granite is fine grained mineral. The granite exposed is greyish in colour hence called as the grey granite. It is intruded by 6 pegmatic veins. The pegmatic vein is 15 CM(approx) . Pegmatite composition are quartz, orthoclase, biotite. Trend of the rock is N30°.At some places there is displacement of pegmatic vein. Presence of xenoliths. Length is 34cm to 36cm and width is 15cm to 18cm, contains plagioclase and biotite. It is dark in colour, magic components (pyroxene, mica, less of hornblende, Amphibole). It is Na rich content (Alkali feldspar are present). Some part of the rocks are weathered away. The rock is not ductily deformed (Because there is no proper allignment of mineral) . There is recrystallisation in granite rock but not in pegmatite. The granite rock is older and there is later intrusion of pegmatite.

Spot 2:600m elevation

Lat:16°20'14"N

Long:75°36'43"E

200 mts away from 1st spot. A huge expensive outcrop of quartzite is observed having mineral, Quartz and feldspar. 2 sets if joints. Leaching is seen in the rock. 1) S=88°N

Amount=11°NS

2) S=114°N

Amount=6°NS

3) S=110°N

Amount=3°NS

Spot 3:

Lat:

Long:

There is presence of intraformational conglomerate, not a basal conglomerate. 3cm to 5cm thick cyclic deposition. Graded bedding-1°-syndepositional sedimentary structure current bedding structure. The clast of conglomerate varies from 1cm to 8cm

1) S=114°N

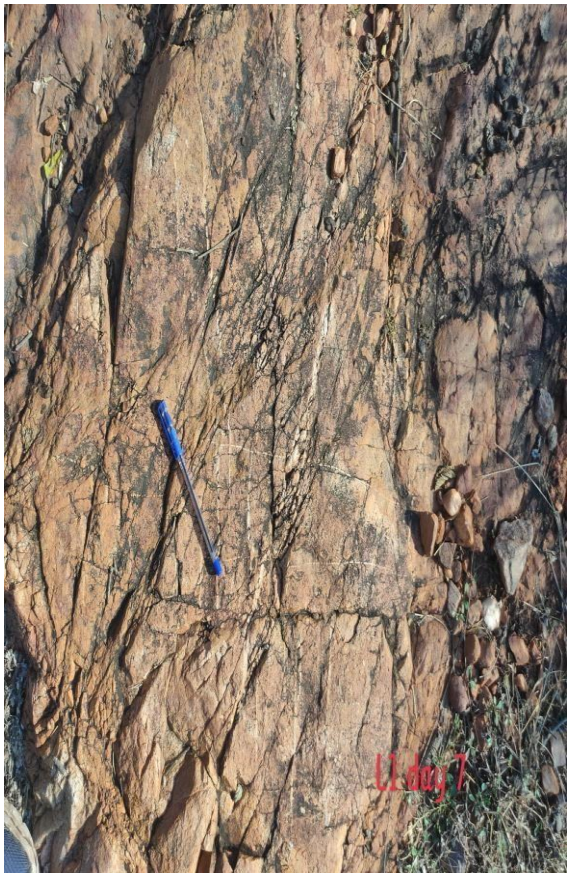
Amount=11°SW **Day**

7:

Spot 1:Fault zone

Lat:16°5'47"N

Long:75°48'07"E



The rock seen was sedimentary rock that is Quartzite. It is a highly fractured Quartzite rock. There are joint set present. Which has variations in amount of dip in the joint sets of rock. There is no presence of bedding planes or bedding junctions. There may be offset (but it is difficult to identify). There is no identical joint sets. There are some joint sets, which go across with same strike but different dip. There are veins present. There are minor faults in veins. All veins vary in thickness (some are branched, parallel, orthogonal (intersected)). There are Quartz vein present. In some veins the mineral assemblage is different, coarse grained, they are elongated in nature(They look like teeth). The growth of the mineral is perpendicular to the vein wall known as comb structure. This rocks are continuation of sherur fault(fault zone) . This type of comb structure is formed because of rock extension(increase in width). The veins formed are called as gash veins. Economic mineral are formed in veins because of fault zones.

Structural data; 1)

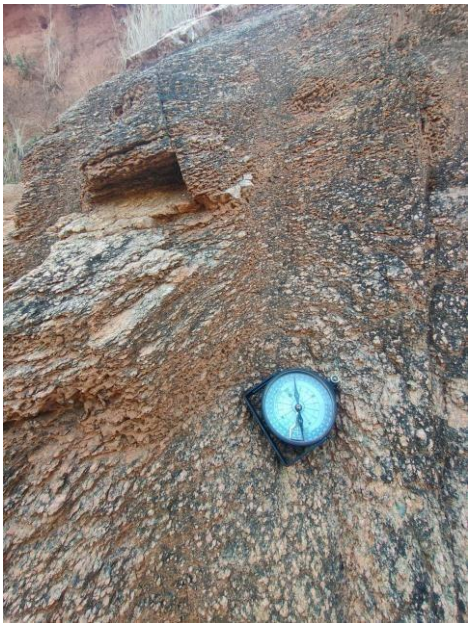
S=N54°

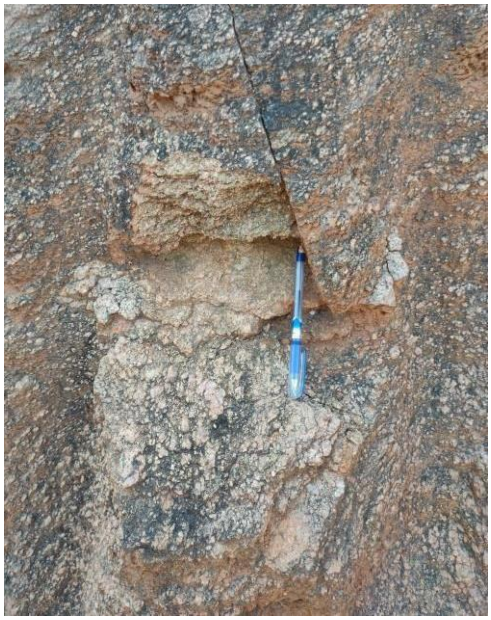
Amount=50°SE

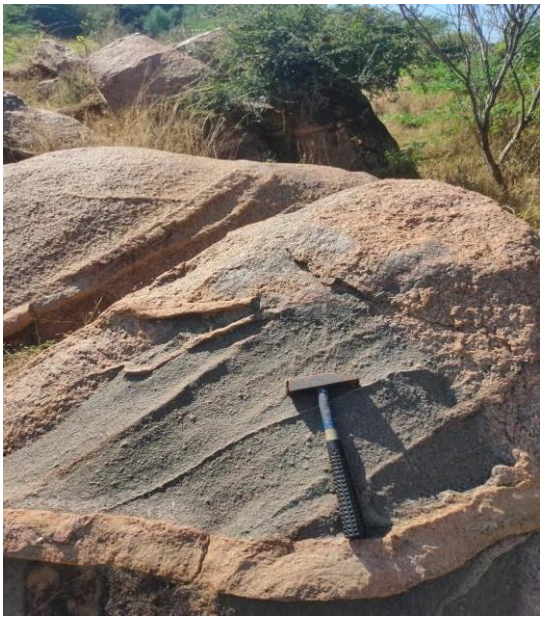
2) S=N64°

Amount=45°SE

Spot 2:







Location 1:

Lat : 16°05'10"N

Long:75°48'47"E

The rock exposed is pink granite. The rock is deformed.

Location 2:100 m forward

Lat:16°05'08"N

Long:75°48'46"E

The rock exposed is pink granite(which is weathered) . There are veins, the thickness of veins vary. There are foliations present. The foliation plane value is N40°. 1) S=N270°

Amount=90°NNE

2) S=N100°

Amount=43°NNE

Parallel veins, cutting the foliation plane. Vein reading Is N117°.There is 1 generation of vein.

Loc 3:Upwards from left side.Further after few steps, again there is an exposure of pink granite rock, presence of Quartzatic vein in the rock. Country rock us schistose rock. There is intrusion of granite in the country rock. Trend of foliation is N150°>This schistose rock is preserved as basement rock(It can be a biotite schist).

Loc 4: 200m above

Lat:16°05'05"N

Long=75°48'50"E

The rock observed was pink granite, with less mafic content, veins are observed.

Spot 3:Hanapur

Lat:16°2'7"N

Long;75°45'27"E

It is an expensive outcrop of Quartzite. The rock consists of intraformational conglomerate. Also consists of joint sets and fracture. Chemical weathering of the rock is observed. Clasts of jasper (purest sandstone) exsitu, cross bedding is observed. Badami formation-Saundati Quartzite.

Spot 4:Kerkalmatti

The rock exposed was Phyllites.

Structural data:

1) S=N95°

Amount=35°S

2) S=N81°

Amount=26°NNW

3) S=N105°

Amount=10°NW

4) S=N145°

Amount=23°S

5) S=N103°

Amount=19°S 6)

S=N91°

Amount=23°N

Day 8;

Spot 1: kagalcomb Loc

1:

lat:16°7'29"N

Long:75°35'46"E

The rock exposed is dolomite. The beds are inclined in nature.

Structural data:

1) S=N106°

Amount=44°SSW

2) S=N105°

Amount=53°SSW

3) S=N106°

Amount=44°SSW 4)

S=N107°

Amount:45°SSW

Loc 2: 500m above loc 1

Lat:16°06'52"N

Long:75°38'24"E

The outcrop exposed is Quartz body. The rock is weathered. There are veins present in it. The rock is radial because of blasting. The vein thickness varies from 3cm-4cm.The cross cutting each other. Trend is N100°.Mineralization of secondary minerals in joint sets. Trend of joint:N32° and N40°(Tensional joint reading).

N120° and N132°(Extensional joint reading).

Spot 2:Quarry

The rock exposed is dolomite. Trend is same as earlier on spot 1 that is location 1.

Spot 3:konkankappa Lat:16°03'19"N

Long:75°38'45"E

The rock exposed is limestone.

1) S=104°N

Amount=4°SW

2) S=86°N

Amount=8°SW

3) S=N96°

Amount=4°SW

4) S=N148°

Amount=4°SW

Spot 4;Alkutti

Lat:16°1'13"N

Long:75°38'57"E

The rock exposed here us shale that is harkurki shale(Also known as Argillite). Shale is laminated . There is no metamorphism. There is a gentle warp in the rock. 1) S=120°N

Amount=6°SSE

2) S=125°N

Amount=3°N

Spot 5:

Lat : 15°56'18"N

Long:75°40'35"E

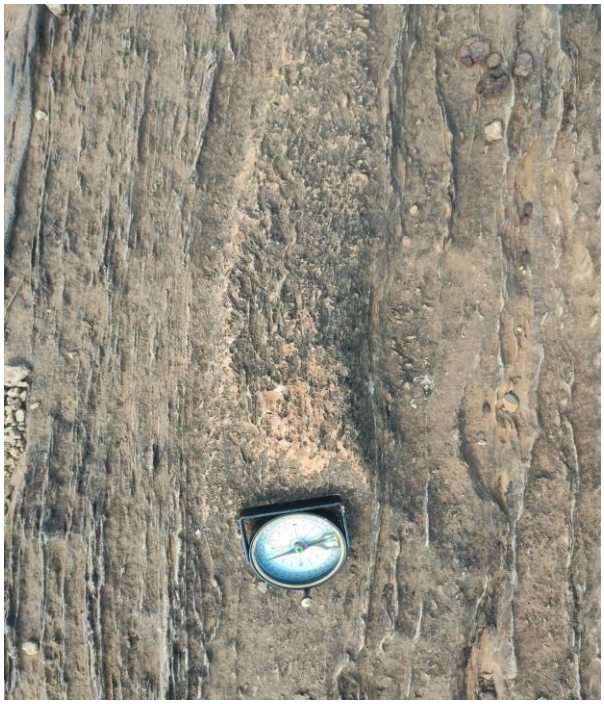
The rock exposed was very fine grained known as Arkosic Sandstone.

Day 09;

Spot 1:Naganapur(lokapur)

Lat:16°10'4"N

Long:75°21'32"E



The rock exposed is lmpure limestone(marl) . The rock is intercalated, there is presence of feldspar mineral, also presence of carbonate mineral(effervescence present). There is intrusion of vein in the rock, the vein intruded in the rock is Quartzite vein. The rock is steeply dipping with the amount of 71° to 72°.Trend is 116°.It is high grade limestone (Top layer is mgo). Presence of stromatolite structure. Seen as layers, but mostly cannot be seen in this outcrop because of high deformation of the rock. Structural data are: 1) Strike= 118° N

Strike direction= SW

Amount of dip=72°

2) Strike=120°

Strike direction=SW

Amount of dip=71°

Spot 02:jallikatti

Lat:16°09'33"N

Long:75°22'58"E

Lokapur limestone mine(1 km away from lokapur town) . The rock exposed were limestone. Presence of carbonate (effervescence present) CaCO3(calcite present) **Day 10:**

Spot 1:visit to Almatti dam.

Lat:

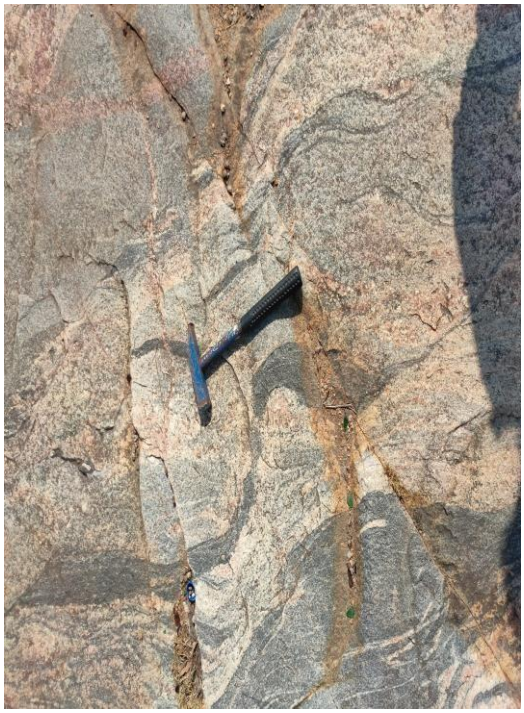
Long:

Almatti dam is a Multipurpose project(upper krishna project). Started in 1964 and completed in 2000.Abdul kalam inaugrated in 2006.Built along River krishna(Originates in Mahabaleshwar). Capacity of the dam is 123 TMC(In future : 225 TMC). Contributes 60% for irrigation of karnataka. 290 mega bytes power is generated. It is a mixed dam. There are 6 turbines, 15000 motors, 26 gates. It mostly attracts wildlife.

Spot 2: Vijayapur(Almatti)

Lat:16°20'28"N

Long:75°55'34"E



The rock exposed is migmatite rock. The melting of TTG Gneiss seen as the Dharwar basement. Age is 3.2 to 3.5mya.Several generations of rocks are seen here like granite and pegmatite. There are intrusion of many veins. The composition of the rock is feldspar, orthoclase, Quartz, Microcline etc. The pegmatic vein thickness varies from 4cm to 6cm.there are joints present. Melting of rock in some areas of rocks showing mafic and felsic mineral patches differentiation. There is displacement of vein in some places. At some places the rock is banded with dark and light mineral that is banded gneiss. Granite is the older rock, xenoliths are the oldest. There is faulting in rock, it displaces the TTG bands.

References

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