Geological Fieldtrip in and around Bagalkot.

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MSC Part 1. Sem 1

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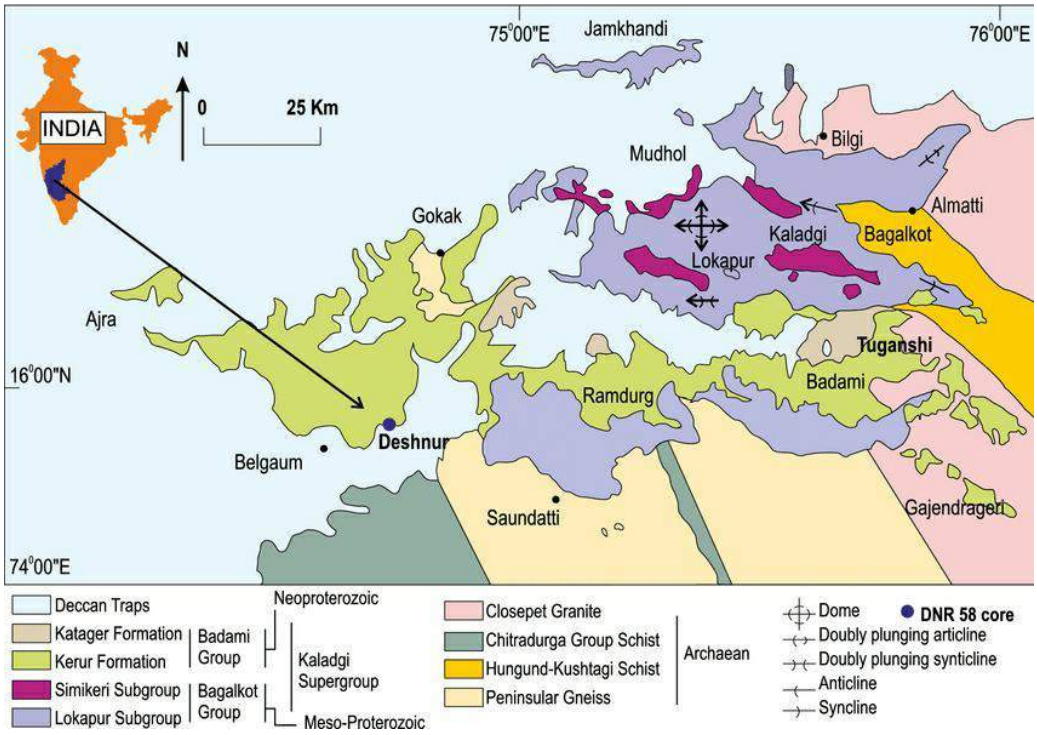
Kalagdi Basin

Kaladgi basin is an E-W trending irregular basin underlain by the basement granitoids (Penninsular Gneiss and Dharwar Batholith) of the Dharwar craton in the south and east and overlain by the Deccan Trap in the north. The basin covers an area of 8300 sq. km is made of an older Kaladgi sequence and younger Badami sequence occurring is separate sub-basinal areas, like the older Cuddapah and younger Kurnool sequences in Cuddapah basin. Unlike the other Purana basins, Kaladgi basin is not marginally deformed, as it is not spatially associated either with mobile belt or with terrane boundaries.

Instead, the deformation is concentrated in the centre of the basin with the periphery remaining unaffected. The basin consists of three quartzite-shale-limestone cycles with an aggregate thickness of 4500 m. Kaladgi basin hosts vast resources of limestone and dolomite, as well as building and ornamental stones, besides minor iron ore. Bruce Foote (1876) systematically mapped the basin and divided the sediments into Lower and Upper Kaladgi 'series'. M.N. Vishawanathiah in 1968 found that the 'sandstone and shale' unit of the Lower Kaladgi 'series' was a flat-lying unit laid with a marked angular unconformity on the underlying, folded Kaladgi sediments. He therefore proposed (Vishwanathiah, 1979) that the lower sequence be called the Kaladgi and upper the Badami, which was followed by Chandrasekhara Gowda (1981).



	Group	Subgroup	Formation	Member
Deccan traps				
Angular and erosional unconformity				
KALADGI SUPERGROUP	**Neo-Proterozoic** BADAMI		⇒ Konkankoppa Limestone ⇒ Halkurki Shale ⇒ Cave Temple Arenite	• Gokak Sandstone • Kendur Sandstone • Torgal Conglomerate
	Angular unconformity			
	Meso-Proterozoic BAGALKOT	SIMIKERI	⇒ Lakshanhatti Dolomite ⇒ Niralkeri Chertbreccia ⇒ Arlikatti Argillite ⇒ Muchkundi Quartzite	• Tulasigeri Quartzite • Bevinmatti Conglomerate
		Disconformity		
		LOKAPUR	⇒ Petlur Carbonates ⇒ Mahakut Chertbreccia ⇒ Yadhalli Argillite ⇒ Saundatti Quartzite	• Chikshellikeri Limestone • Chitrabhanukot Dolomite • Yargatti Calc. Shale • Jalikatti Phyllite • Manoli Ferrug. Shale • Timmapur Quartzite • Almatti Quartzite • Salgundi Conglomerate
Angular and erosional unconformity				
PRECAMBRIAN BASEMENT COMPLEX (PBC) Granitoids, Gneisses & Metasediments				

Day 1

Location 1- karadigudda

Geocode- - N15°52'55"

E74°41'42"

Rock exposure seen on the left side of the road while traveling from belgaum to bagalkot at karadigudda village.

The rock exposure seen is of Bevinmatti conglomerate which is a part of the simikeri subgroup and it Mark's the unconformity between simikeri and lokapur subgroups. It is trending in N275°. Clast size keeps decreasing from the bottom of the hill as we move up the hill. The clasts are rounded to sub-rounded. Layers of siliceous and iron matrix were observed. Layer thickness was varying throughout the outcrop.

Images of bevinmatti conglomerate.(coin and pen for scale)

Spot 2-

Geocode- 15°52’37” N

74°41’48” E

Highly weathered Deccan trap Basalt is exposed on the right side of the road. It shows speroidal weathering. The rock is Amygdaloidal and pyroxene and plagioclase along with weathered material was observed.

Exfoliation in deccan basalt

Day 2

Location- Ramthal via Kambhat

Geocode- N16°6'36"

E75°92'45"

Rocks exposed are BIF's of Archean age. Banded iron quartzite , banded iron jasper and banded iron quartz were observed. These bands are a part of the hundgund schist belt of the Darwaar craton and are highly deformed.

Strike direction- N143°

Dip: 76°-NE

Data on upright fold (Folded BHQ):-

Strike direction- N161°

Dip: 38°- SW

Strike direction- N133°

Dip: 76°- SW

Close to the hinge:-

Strike direction- N155°

Dip: 40°-SW

Strike direction- N148°

Dip: 20°-NE

Data on phyllite:-

Strike direction- N334°

Dip: 76°- NE

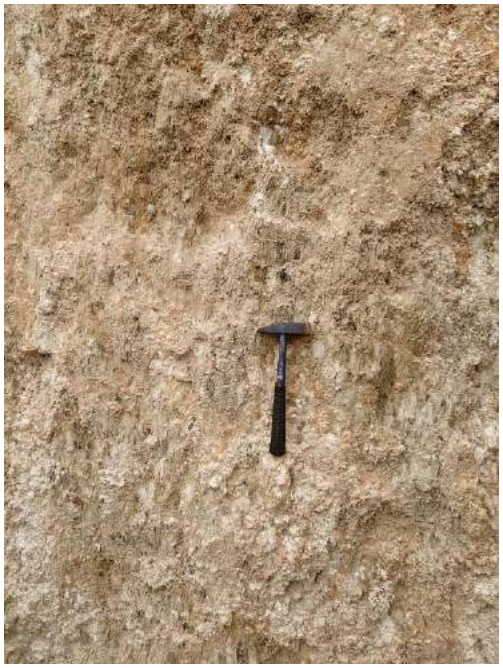
Strike direction- N325°

Dip: 65°- NE


Pictures of Banded iron formations

Spot 2- 1km away from spot 1

Caliche deposits were observed on the left side of the road. minerals observed were amorphous calcite and smoky quartz . These deposits are formed in dry conditions.



Caliche deposits

Spot 3-

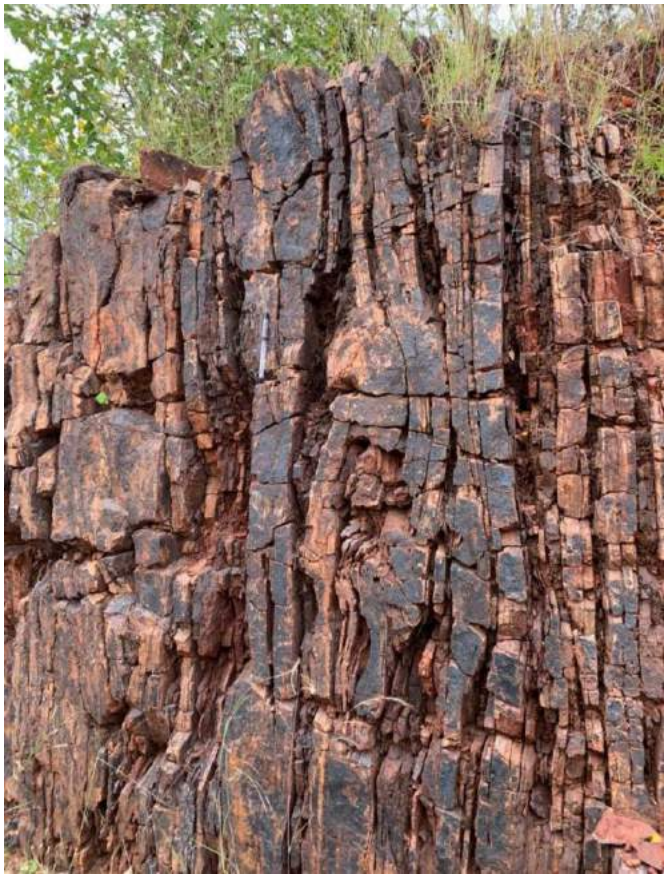
Geocode- N16°4’53”

E75°52’29”

Trend- N140°

Bands of BHQ and Phyllite were observed. BHQ band thickness varies from 1.4m to 1.6m. Phyllite thickness varies from 2m to 2.1m. Warping and Interfolial layers were observed in the BHQ layer.

1) SD- N40°,DD- 34°-NW
2) SD- N306°, DD- 40°-NE
3) SD- N320°, DD- 74°- NE




Intrafolial fold in BHQ

Day 3

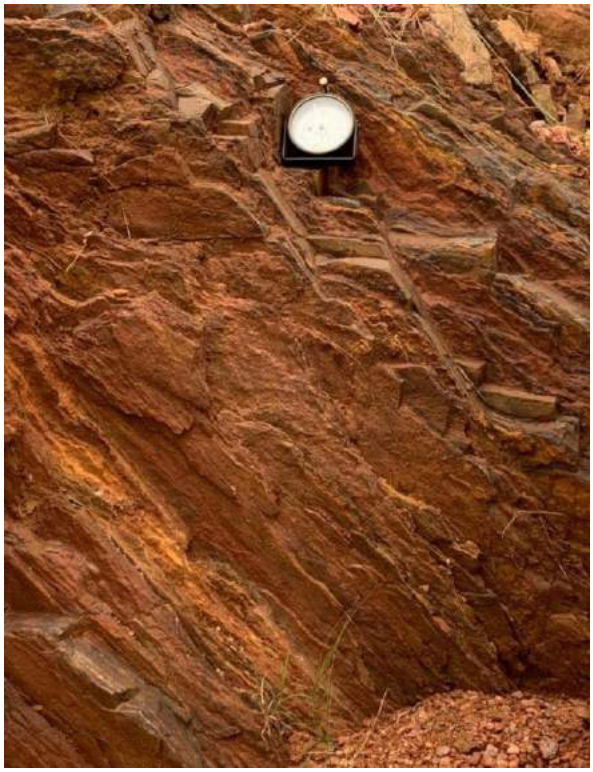
Location- Nardur

Geocode- N15°44’23”

E75°22’28”

Rock exposed is a Phyllite with quartz veins. Quartz veins are parallel to exfoliation indicating that they formed either during or before the deformation event that took place that deformed the rock. Since the outcrop is small we could not find evidences to determine if the veins were older or formed during deformation. Angular unconformity between upper recent deposits and lower proterozoic kaladgi rocks was observed.

1) SD- N152°, DD 79°-SW
2) SD- N150°, DD 76°- SW
3) SD- N160°, DD 76°- SW
4) SD- N160°, DD 76°-SW



Spot 2-

Highly jointed quartzite was observed at the powerplant. The powerplant consists of 9 windmills which produces 8 Mw of power. The data of the joints is as follows-

N60° N95° N51° N41° N86° N155° N152° N157° N23° N133°

N103° N150° N80° N121° N91° N114° N65° N90° N149° N84°

N63° N121° N60° N75° N94° N103° N114° N163° N93° N154°

N82° N100° N81° N80° N103° N133° N83° N71° N245° N87°

N87° N86° N93° N100° N91° N160° N105°

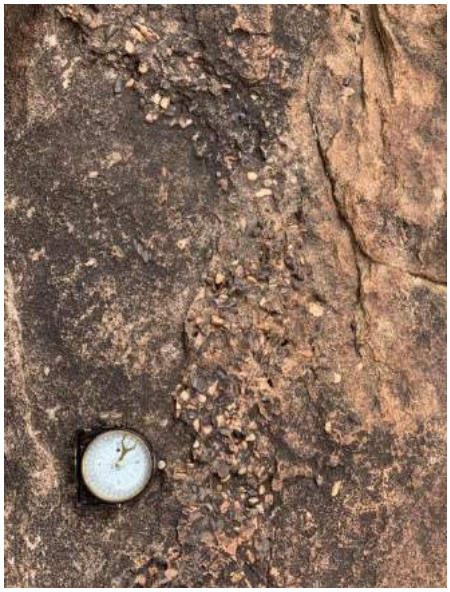
Day 4

Location- Aihole (½km from heritage temples)

Geocode-N16°0’48”

E75°53’5”

An extensive outcrop of quartzite on the south of Aihole road was observed. This outcrop has intercalations of interformational conglomerate having asta of BIF, Chert, Agate, Smoky Quartz and Jasper. The outcrop shows wide variation In grain size. The quartzite has alternate layering of white and red bands.



Spot 2- The northern side of the road.

Rock exposed is a reddish pink Sandstone which has horizontal beds. These beds form the upper part of the angular unconformity.

Spot 3-

Geocode- N16°05’34”

E75°46’57”

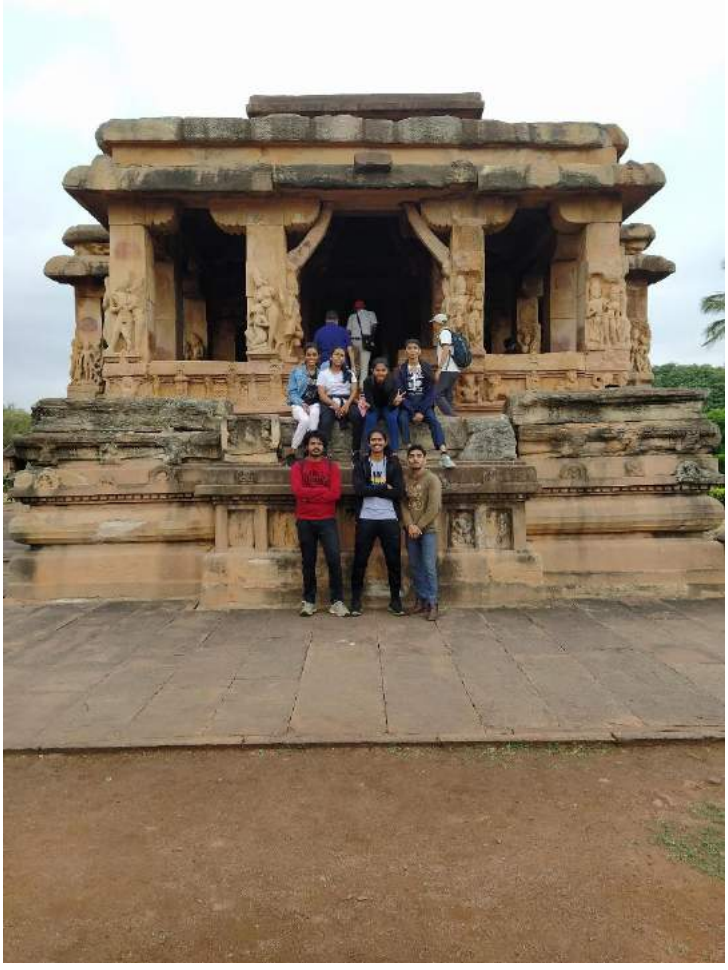
Extensive outcrop of reddish pink quartzite with conjugate joint set was observed.

Faults were observed in this outcrop

Strike direction- N111°

Dip direction- 60°-N

Spot 4- visited heritage temples at Aihole



Day 5

Location- Amingad

Geocode- 16°03’22” N

75°56’43” E

An extensive outcrop of pink granite is observed at the base of the hill. It consists of Orthoclase Quartz Hornblende and Biotite. On the left side of the way, the rock is massive and on the right side it is highly fractured and weathered. The joints trend in N-S direction and dip 86°-E. At some places minerals are almost alligned in N-S direction. Xenoliths were also seen at this spot.

Spot 2- higher up the hill.

Conglomerate was observed with intercalations. The coasts are more of BIF. It shows sharp contact with the granite.

Strike direction- N305°

Dip direction- 19°-NNE

Tte hill has steep slope on the southern aise and gentle slope on the northern side as the beds dip due NNE direction.

Spot 3- Hundgun Schist Belt (Behind Adarsha Mahavidyalaya School)

Geocode- N16°04’8”

E76°03’33”

Hundgun Schist Belt contains higher iron concentration than the BIFs at previous locations. There is cross vein which is younger than rock.

Strike direction: N125° Dip: 55°-NNE

There is intrafolial fold present in the rock. Shear lenses were observed and they preserve the fabric without taking part in deformation.

Data on axial plane of intrafolial fold

strike direction: N143° Dip: 85°-NNE

Intrafolial fold in BHQ

Day 6

Location- Bilagi

Geocode- N16°20’26”

E75°36’41"

Closet granite is exposed on the surface. It is grey in colour and consists of feldspar, quartz and plagioclase. Accidental xenoliths are present in this outcrop. Quartz veins were observed in the outcrop.

Veins data-

1) N62° thickness- 23cm
2) N50° thickness-22-25cm
3) N55° thickness- 10-12cm

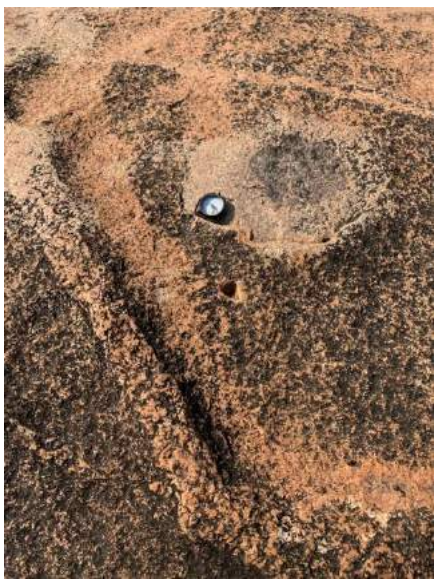
A fault was identified by observing the displacement of a vein.it is a dextral strike slip fault.

Trend- N129°

Displacement-10.5cm

Xenoliths were composed of Quartz, Plagioclase, Mica and Hornblende.

A xenolith within a xenolith was observed. It was alligned in N101° direction.



Clospet granite

xenolith within a xenolith

Spot2- 200m from previous location

Sandstone is exposed on the northern side of the road.

Trend- N100°

Dip- 11°-SE

Spot 3-

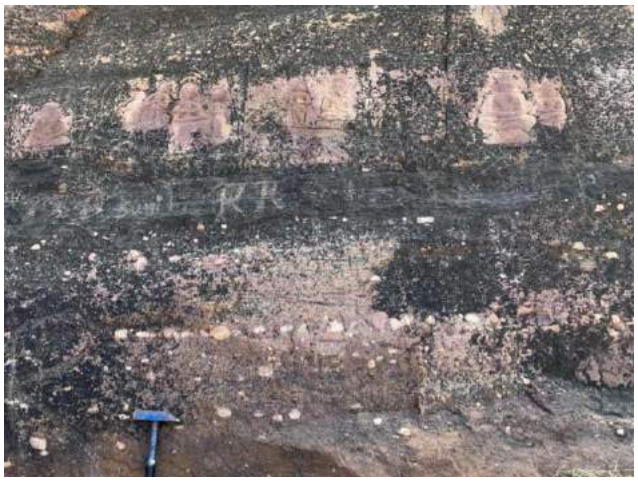
Geocode-16°20’29”N

75°36’59”E

Outcrop of intraformational conglomerate was observed. It shows cyclic deposition and graded bedding. Syndepositional structures like cross bedding/current bedding were observed. It is an oligomictic conglomerate with largest clast?size observed is 8cm.

Strike direction- N126°

Dip direction- 20°-SSW



Day 7

Location- Sirur

Geocode- N16°05’47”

E75°48’07”

A highly fractured pink quartzite is observed on the left side of the road. This is a part of the Sirur fault zone. Width of the shear zone is 27m.

Structural data-

Strike direction- N57°

Dip direction- 67°-SE

Quartz veins were observed which were trending in N57° and N104° and took advantage of the joint sets.comb structure was observed in some of the veins.

Spot 2-

Tors of pink granite is observed. It shows exfoliation but reading couldn't be taken because the rocks weren't insitu.

50m from previous spot-

Outcrop of a pink granite containing enclaves of the rock that it intruded in was observed. The enclave shows foliation trending in N305° and dipping 42°-NE. The rock type is Biotite schist.

Cross-cutting relation between two pegmatite veins

Spot 3-

Location- Murdi

Geocode- 16°20'29"N

75°36'59"E

Outcrop of siliceous sandstone with conglomerate bands was observed. Conglomerate consists of clasts of BHQ and quartz which were rounded to sub rounded.

Joint data- N95° N170°

Spot 4-

Location- keralmatti

Geocode-16°20’29”N

75°36’59”E

Folded phyllite were observed on the road cut section. The folds had vertical axial planes.

Fold data is as follows-

1)N70° 34°-NNW

2) N75° 25°-NNW

3) N78° 28°-SSE

4) N60° 7°-SSE

5) N75° 12°-NE

After plotting the poles of these planes on the stereo net we found that the axial plane is trending in N-S direction.

Day 8

Location- kagalcomb

Geocode- 16°06’52”N

75°38’24”E

A quartz body of around 35m is exposed on the surface and forms a ridge as the surrounding layers got weathered and eroded. The quartz body was trending in N100° direction.

Spot 2-

Dolomite layers were observed next to the road.

Structural data- N105° 40°-SSW

Spot 3- konkankappa

Geocode- N16°03’19”

E75°38’45”

Konkankappa Limestone is exposed along a stream.

Strike direction- N95° 4°-SW

Spot 3-

Geocode- N16°1’14”

E75°38’58”

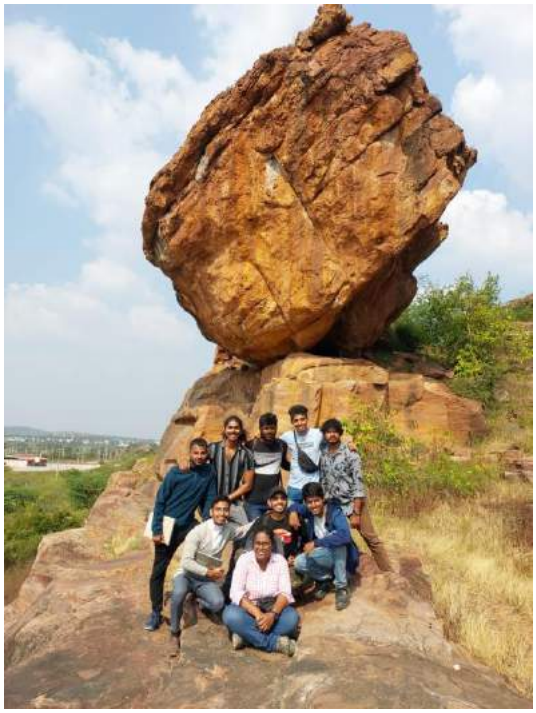
Halkurki shale is exposed along a stream and it shows alternate banding of pinkish-red and white layers.Minerals present could be kaolinite, montmorillonite and illite. The shale formation is horizontal.

Spot 4- Badami

Geocode- N15°56’18”

E75°40’35”

Horizontal layers of Aranaceous rock is exposed. The outcrop at this location is of sandstone with quartz, orthoclase, feldspar and white cementing material. There are ferroginous and silicious bands present. Cross bedding is observed. Joints are developed parallel to the bedding plane.



Day 9

Location- lokhapur

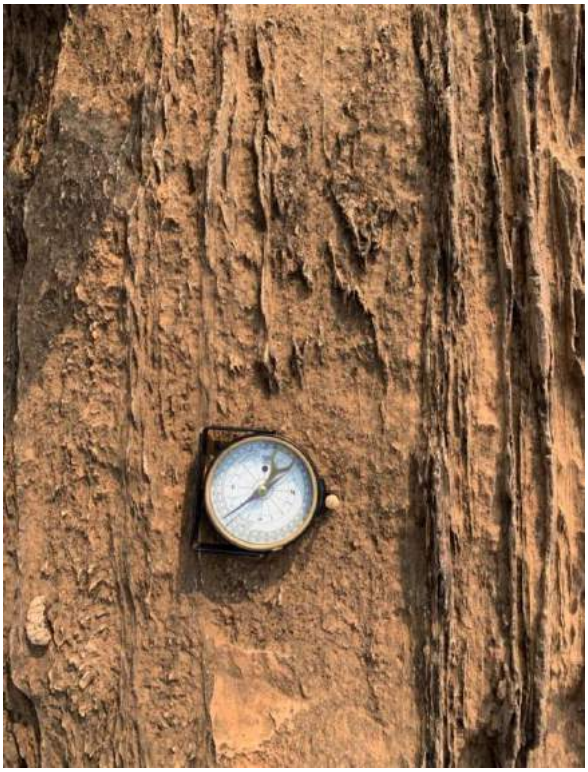
Geocode- N16°10’04”

E75°21’31”

Outcrop is exposed on the south of the road. Rock exposed is of a impure or marly limestone which contains stromatolites. The rock is highly deformed hence the structure is not proper. This formation has calcium carbonate rich n deficient layers.

Strike drieection- N120°

Dip direction- 66°-SSW



Deformed stromatolites

Day 10

Location- upper Krishna Dam project

This dam is built on river Krishna. It is a multipurpose dam built mainly for irrigation purpose. Reservoir capacity of the dam is 143 TMC. It contributes to about 60% of the irrigation area of karnataka. 6 turbines are present which produces 15MW electricity. 36 gates are built at the dam to release water after it reaches max capacity.

Max river height- 519.6m

Dam height- 528m

Depth of the river at the centre- 26m

Area of the reservoir- 487sq km

Spot 2-

Geocode- N16°20’28”

E75°55’34”

Rock exposed is a migmatite which is older than 3Ga. It is formed due to the partial melting of TTG gneiss. The outcrop has undergone several episodes of melting producing different granites. Pegmatite veins, Xenoliths and faults were observed. Dark coloured rock, banded granite, pink Granite , grey granite were present. Xenoliths are the oldest.

References

- Lithostrtigraphy of Kaladgi and Badami Groups, Karnataka by Vishwanathiah M.N (1979)