GOA UNIVERSITY

2022-'23

AGTC-408
GEOLOGICAL FIELD MAPPING

GEOLOGY FIELD REPORT

BAGALKOT, KARNATAKA

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MSc PART 1

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Acknowledgement

I would like to express my sincere thanks to our vice dean Mr.Anthony Viegas, I would also like to express my gratitude towards our professors Dr. Poornima Sawant and Dr. Nicole Sequeira for their valuable guidance, knowledge and support throughout the field work. I would like to thank our non teaching staff. Finally I will always be thankful to my parents for constant love and support.

INTRODUCTION

The Indian State of Karnataka is located between 11°30' North and 18°30' North latitudes and between 74° East and 78°30' East longitude.It is situated on a tableland where the Western Ghats and Eastern Ghats converge into the complex, in the western part of the Deccan Peninsular region of India. The State is bounded by Maharashtra and Goa States in the north and northwest; by the Lakshadweep Sea in the west; by Kerala in the south-west and Tamil Nadu in the south and south-east, Andhra Pradesh in the south-east and east and Telangana in the north-east. Karnataka extends to about 850 km (530 mi) from north to south and about 450 km (280 mi) from east to west.
Karnataka is situated in the Deccan Plateau and is bordered by the Arabian Sea to the west, Goa to the northwest, Maharashtra to the north, Andhra Pradesh to the southeast and east, Telangana to the east, Tamil Nadu to the south and southeast, and Kerala to the southwest. It is situated at the angle where the Western Ghats and Eastern Ghats of South India converge into the Nilgiri hills. The highest point in Karnataka is the Mullayanagiri hill in Chikkamagaluru district which has an altitude of 1,929 metres (6,329 ft) above sea level.

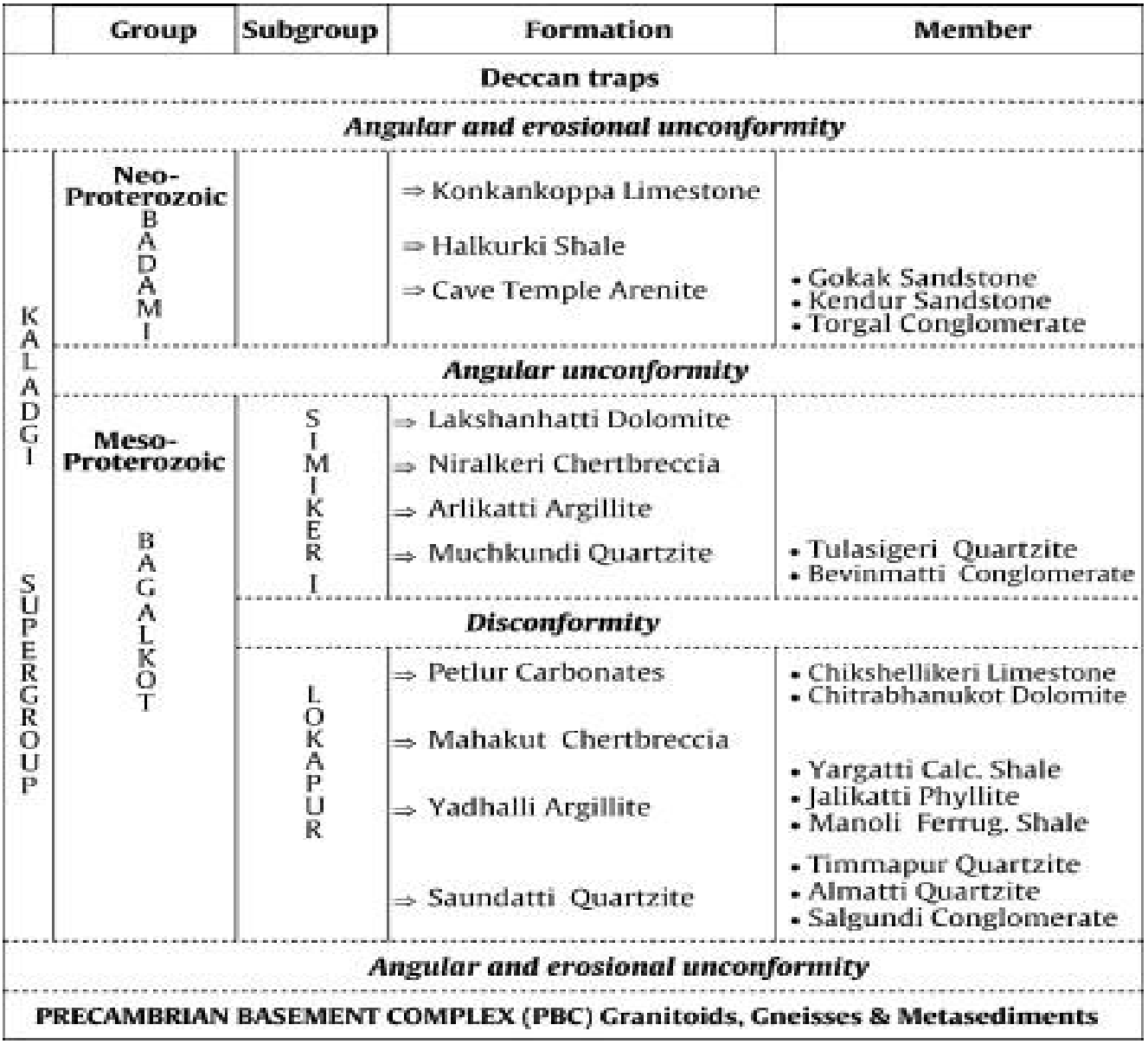
Geology and stratigraphy

Kaladgi Supergroup of rocks are exposed over an area of 8,300 km2 in North Karnataka defining an E-W trending irregular shape of Kaladgi Basin.They are comparatively least disturbed shallow marine sediments, deposited over the eroded basement of rocks of gneisses schist and granites of Archaean age. The original classification scheme by Foote (1876) has undergone several modifications. Jayaprakash et al. (1987) and it is divided it into the lower Bagalkot and upper Badami Groups.The former was divided into the Lokapur

and the Simikeri Subgroups on the basis of succession of strata and an intervening disconformity between them.
With accordance to the status of the Supergroup sequence, Badami Group overlies both the sediments of the Bagalkot Group as well as basement granitoids with a distinct angular unconformity and is marked by the presence of conglomerate horizon.This Group includes two formations, i.e. Kerur Formation and Katageri Formation.Kerur Formation consists of three members, viz. Kendur conglomerate,Cave Temple arenite and Halgeri shale. Type exposures of Badami Group are seen on either side of Badami town forming a chain of picturesque landscape extending from Gajendragad in the east to Gotak in the west. In the study area Kerur Formation with its lower two members, namely Kendur conglomerate and Cave Temple arenite rest unconformably over the basement rocks consisting of quartz-chlorite-sericite schist/meta-basic rock of Chitradurga Group. They comprise coarser clastics of conglomerate and arenite trending E-W with 10° to 20° dip towards North. The stratigraphic sequence .Here the unconformity surface is obscured by thick soil cover and a thin veneer of Deccan basalt towards south, studies have identified three litho units, with distinct lithological characters. They are lower conglomerate and quartz arenite, A thin unit of basal arenite sandwiched between lower conglomerate and schistose basement rocks is encountered only in the boreholes.

Fig 1:Map of Karnataka

Fig 2:Lithostratigraphy of the Kaladgi Supergroup (after Jayaprakash et al., 1987



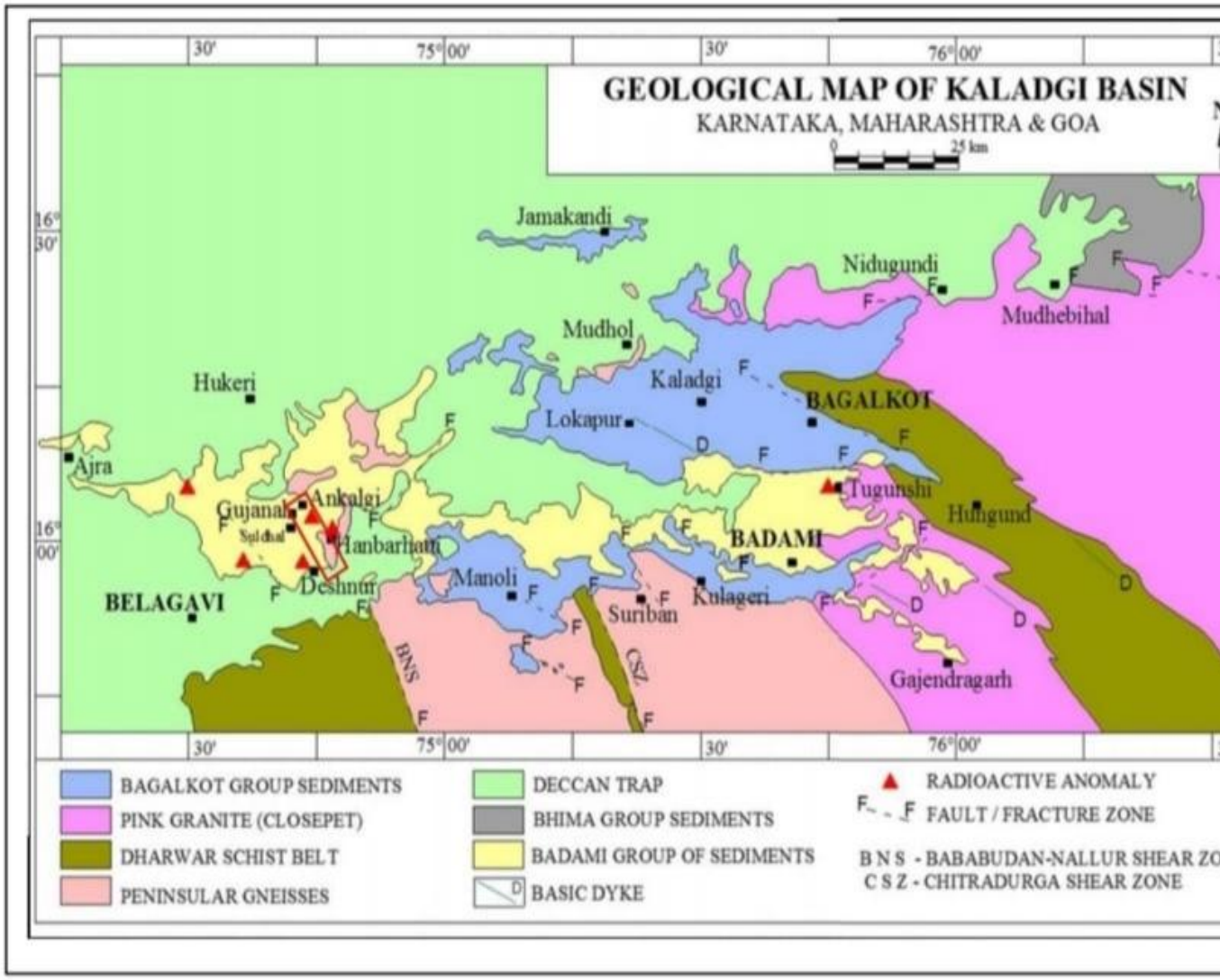


Fig 3; Geological Map of Kaladgi Basin.

Approach

On 10 December 2022,we left around 9am from Kadamba Bus, Panjim bus stand from there we headed to Belgaum, by local bus hired for entire Karnataka journey. On the way to Bagalkot we stopped at few spot observe and study the lithology.

DAY 1

Date :10/12/2021

Approach:On 10 December 2022,we left around 9am from Kadamba Bus, Panjim bus stand from there we headed to Belgaum, by local bus hired for entire Karnataka journey. On the way to Bagalkot we stopped at few spot observe and study the lithology.

Spot 1:

Location: Karidigudda , near Soman Airport)

Lat : 15°52'37"N
Long: 74°41'49"E

A ridge is exposed steeply dipping along the left side of the road.The area is moderately vegetated. The rock exposed here are conglomerate, these are Bevinmatti conglomerate part of Kundargiri formation of Badami Group. Variation in clast can be prominently seen as we move from base to top of the hill. At the base, the clast size vary between 1-5 cm.Clast size increases from bottom to topThe conglomerate is matrix supported and the clast has a composition of milky white quartz and feldspar minerals. Ferrugenous layers are encountered at the mid portion of the slope having a thickness of 2.7cm. At the base the rock is more siliceous as we move up the hill alternate bands of ferrugenous and siliceous matrix are seen and as we reach top of the the hill more ferrugenous type of matrix are encountered.The presence of conglomerate marks an unconformity.

Fig.4 A)Siliceous conglomerate,2 rupee coin as a reference.
(B) Graded bedding is prominently seen,15 cm scale as a reference.

Spot 2:

Location: (5-6 kms from spot 1) at the highway

Lat: N15°52'37"N
Long: 74°49'49"E

The next spot was just few km away and exposure was present along a turn and was exposed on the right side of the highway and the vegetation was moderate and dry. The rock present is conglomerate with cobble size clast which are of basaltic composition can probably be of Deccan Traps and this clast exhibit spheroidal type of weathering(exfoliation). The basaltic clast also shows vesicular structure and are highly fractured.

Fig 5.Spheroidal weathering of basalt, a pen as a reference.

Day 2

Date :11/12/2022

Spot 1
Location:Ramthal

Lat:16°25'78"N
Long: 75°50'88" E

The basement here is Hungund Schist belt of Archean age consist of metavolcanic with ultramafic metamorphosed, metasediments with some acid volcanic, greywackes with BIF and conglomerate. Competent layers that is of quartzite are forming class 1B type of folds and incompetent ferrugenous layer is forming class 3 folds. Crenulation hinge lineation and microfaults are also present. Phyllite are also present, but they are steeply dipping due NE. Structural data is as follows;

Strike Direction	Amount of Dip	Dip direction
N163°	76°	NE
N166°	67°	NE

The BHQ and phyllite show folding. S_n & S_{n+1} are visible,Sn is parallel to the axial plane and Sn+1 is the Intrafolial fabric Intrafolial folds are present in BHQ indicating two events of folding.Taking a plunge was difficult for these folds.


Fig 6;A) Outcrop of BHQ **B)** Folding in BHQ.

Spot 2

Location: 5 m away from spot 1

Conglomerates are exposed above the basement rock of BHQ and phyllite and clast were of BHQ the clast size vary from 10-17 cm in length and approximately 9cm in width.

Fig 7:cross section of A thick layer of conglomerate,20cm notebook as a reference.

Spot 3

Location

Lat: 16˚14’54’’ N
Long:75˚39’45"E

Ferrugenous quartzite are present on either side of the road having a strike direction of N301° and moderate amount of dip of 36 ° due NE. These are Saundatti quartzites. Structural data is as follows;

Strike Direction	Amount of Dip	Dip Direction
N301°	36°	NE
N285°	36°	NE

Fig 8; ferrugenous quartzite (hammer for scale)

Spot 4

Location: 200 m away from spot 1

Lat:16°75'86"N

Long:75°62'60" E

The outcrop of Caliche deposits were present. It contained smokey quartz, cblorite and carbonate rock which was able to identify by the effervescence taking place when a drop of HCl was placed on it.If the carbonate rock had shown 3 sets of cleavage it would have been calcite,but the rock didn't show any cleavage it may be an Ankerite .

Fig 9 ; Caliche deposits,a coin as a scale.

Spot 5

Location:500m away from spot 4

Lat: 16°4’53” N
Long:75°52’29”E

Exposure of BHQ and phyllite are present. BHQ beds were inclined and qere dipping due NE in most of the place at one place the direction of dip changed to SW ,data of same is plotted on stereonet.BHQ also shows intrafolial folds and there is presence of slumping taking place in phyllite due to removal of overburden.
Hinge data is as follows:

Strike Direction	Amount of Dip	Dip Direction
N40°(left limb)	34°	NW

N306°(Hinge)	40°	NE
N320°(right limb)	74°	NE

Structural data of Beds of BHQ is as follows;

Strike Direction	Amount of Dip	Dip Direction
N334°	78°	NE
N326°	80°	NE
N332°	86°	NE
N338°	80°	SW
N325°	65°	NE
N315°	85°	NE

Fig 10: Intrafolial folds in BHQ

DAY 3

Date:12/12/2022

Spot 1:
Location:Nargund

Lat: 15°44’23”N
Long: 75°22’28”E

The rock seen are phyllite intercalated with BHQ. It is a metamorphic rock which can be inferred due to presence of foliation and alignment of minerals due to amount of stress present. Low grade metamorphism has taken place.
As we take reading from left to right there is some variations in the amount of dip.Quartz veins are parallel to foliation plane, formed before or same time of the formation of rock,or formed when deformation of the rock took place (synchronus).If the quarts is intruding in one direction, then there should be presence of fold.Shear zone is present, wherein warping has taken place just outside the shear zone. S_n fabric is present sub vertically, S_{n+1} fabric is present almost horizontal and is a spaced fabric and S_{n-1} fabric is also inclined and are not penetrative at all,oblitarated and bit curved. Within the shear zone there is alignment of minerals. Pinch and swell is also noticed in a pellatic layer of quartz. The quartz vein is of thickness of 0.8cm and shows Sinistral faulting
The structural data is as follows:

Strike Direction	Amount of Dip	Dip Direction
N168°	85°	SW

N174°	84°	SW
N160°	76°	SW

Fig 11;exposure of phyllite.

Spot 2

Location: 20 m away from spot 1 in left direction

A thick bed of conglomerate is seen in the upper part of the cross section and just below is there are quartz vein and below that there are inclined beds. This conglomerate indicates an angular unconformity. These deposition are recent and not of Proterozoic age. Quartz vein approaches to be horizontal as we move upward in the cross section. Having structural data of ;

Strike Direction	Amount of Dip	Dip Direction
N153°	85°	SW
N150°	84°	SW


Fig 12;Cross section of conglomerate layer ;reference man standing facing to North.

Spot 3

Location:

Lat:15°43'49"N
Long:75°22'46"E

The rock exposed here are ferrugenous quartzite wherein siliceous grain is fused in ferrugenous matrix and the grain size is fine. These quartzite exhibits conjugate joint set trending in N225° and N252° and orthogonal joints too having a trend of N250° & N161°.It also shows herring bone structure.There is a presence of a ridge wherein as we move away from the ridge older sequence of beds are encountered indicating and inlier.

Fig 13:A) Conjugate joint set B) Outcrop of Quartzite.

DAY 4

Date:13/12/2022

Spot 1
Location: Aihole (½km from heritage temple)

Lat: 16°00'49" N
Long: 75°53'05" E

The rocks were on the either side of the road.The quartzites present on right side of the that is southern part as per the magnetic compass were inclined in nature.The rock shows well defined bedding junctions with alternate bands of ferrugenous and siliceous layers. There were intercalation of breccia and conglomerates. The clast size were ranging from coarse to very coarse and the compositionally it was of quartz, cryptocrystalline varieties of quartz.The were 7 intraformational conglomerate and width of it were more than 10cm.Cross bedding structures are prominently visible. Structural data of these inclined bedding junctions;

Strike Direction	Amount of Dip	Dip Direction
N117°	41°	SW
N120°	42°	SW
N125°	36°	SW

Fig 14; A) Quartzite B)Intraformational conglomerate. (Scale;Climometer)

Spot 2

Location: The northern side of Spot 1

The region consist of a moderately dipping hill. The rock pink sandstone having lamination of off white and pink layer. The beds are horizontal. The indicates a presence of angular unconformity known as Badami and Bagalkot unconformity.

Fig15: landscape view of the field of study.

Spot 1

Location:Ramlingeshwar temple

Lat: 16°5'34"N
Long: 75°46'39"E

The exposure is of quartzite wherein there is a fault present.The striations are prominently visible on the fault plane, these are surface lineation and By applying Anderson's theory of faulting we could conclude that it was a thrust fault. Intraformational conglomerates are present in the rock. En-echelon type of cracks are present showing sinistral shear sense. pot hole structures are visible. Angle between strike direction (I.e N111°) and lineation is 88°

Fig 16 :A)Striations on Quartzite. B)En-echelon faults (scale: coin)

DAY 5

Date:14/12/2022

Spot 1
Location:Amingad

Lat:16°03'22"N
Long: 75°56'43" E

An extensive outcrop of pink granite is observed at the base of the hill.The grain is coarse which composed of pink feldspar, biotite and quartz. No deformation event has taken place, since they do not show any preferred orientation .The rock contains a xenolith having a mafic mineralogy. The size of the xenolith vary from 8-10 cm. And they are of Archean age can be a part of supracrustal rocks.

Fig 17; A) Pink granite (scale- a pen) B) Presence of Xenolith in Granite.

Spot 2
Location: higher up the hill.

The rocks exposed here are same as spot 1 , Jointing had been observed here which was N17˚. There was lineation on erosional surface. Trend alignment here was 145˚N which was weakly and locally formed and was same as that of Hungund Schist.

Spot 3
Location:Sulebhavi village

The rocks exposed here are reddish in color this are ferrugenous sandstone having orthogonal and conjugate joint sets.
The structural data is

Strike Direction	Amount of Dip	Dip Direction
N129°	19°	NNE
N125°	14°	NNE

Spot 4
Location:Hundgun Schist Belt (Behind Adarsha Mahavidyalaya School)

Lat: 16˚4’8”N
Long: 76˚3’33”E

The exposure is somewhat similar to Hundgun schist, but the Fe content is more than that of a schist.The rock is phyllite.It shows alternate bands of light grey and brown layers. The rock is traversed

by younger quartz veins and some intercalation of BHQ. The rock is weathered having minor fractures which are perpendicular to foliation plane. Ductile shear is present between BHQ and phyllite layer, the BHQ bed is tapering at the ductile shear zone which is prominently visible as it is breacciated .
Structural data is as follows of the phyllitic bed.

Strike Direction	Amount of Dip	Dip Direction
N125°	56°	NNE
N127°	73°	NNE
N118°	82°	NNE
N111°	87°	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

Fig 18; BHQ outcrop(Scale: hammer.)

DAY 6

Date:15/12/2022

Spot 1
Location:Bilgi

Lat: N16°20'43"
Long: E75°37'02"

The rock exposed here are grey granite containing quartz, feldspar, apatite in its composition.The grain size is medium.The rock is traversed by quartz vein which shows pink to off white colouration. Exfoliation (spheroidal) weathering of granites are seen. Elongate xenoliths are present in the rock body. The elongation is towards N63°, having fine grain of quartz and Hornblende. The length of xenolith is 33cm and a width of 17cm.Xenolith within a xenolith , it is an accidentally type of xenolith having muscovite and plagioclase in it's composition.This xenolith is also elongated and the elongation is in N101° direction.
So we could conclude that at first there was formation of Granite which later got recrystallised then the basement Granite was intruded by pegmatite veins and further the development of jojnts that affected the pegmatite vein.
The pegmatite veins are seen traversing the granite , at an extend of ~4.8m and a width of 4-5cm and trending N242°.Pot hole structures are also present. There are joint sets,joint 1 trending N260, joint 2 trending at N133°

Fig 19;A) Xenolith within xenolith. B) Grey Granite.

Spot 2

Location:Quary opposite to Siddeshwar Temple (500 mtrs away from spot 1)

Lat N16˚33'72"
Long E75˚36’50”

The rocks exposed are quartzite which is gently dipping towards SSE. There are alternate bands of siliceous and ferrugenous in the quartzite. The beds have slight inclination, well bedded and show numerous primary sedimentary structures like ripple marks and cross bedding. chemical weathering structure due to leaching are seen

Strike Direction	Amount of Dip	Dip Direction
N40°	12°	SE

N68°	6°	SE

There two joint sets present, joint 1 trending N46° and scissor joints are trending N40° and N96°.

Fig 20; outcrop of quartzite.

Spot 3

Location:(around 11 kms away from spot 2)

Lat: 16°20'29"N
Long: 75°36'58"E

Outcrop of intraformational conglomerate having thickness of 2-3 cm was observed. It shows cyclic deposition and graded bedding. Syndepositional structures like cross bedding/current bedding were observed. It is an oligomictic conglomerate. Data of bedding plane is as follows;

Strike Direction	Amount of Dip	Dip Direction
N115°	11°	SW

Fig 21;A) Bands of conglomerate in sandstone (hammer as a scale).
B) Gradation in conglomerate (Pen as a scale)

DAY 7

Date: 16/12/2022

Location: Shirur

Lat:N16°05'47"
Long: 75°48'7" E

The area us moderately vegetated with shrubs ans thorny bushes.Quartzite are present which are pink in colour. The rock has numerous weak planes. Structural data of quartzite is as follows;

Strike Direction	Amount of Dip	Dip Direction
N54°	50	SE
N74°	56	SE

Joint sets are also present having a trend towards SE. The us highly fractured. No bedding planes are seen.Trend of some joint sets are similar. Whereas some joint sets extends upto m to 2m and are discontinuous.
Quartzite is also traversed by quartz veins which are trending N32°.These veins exhibit comb structure and the grains are coarse.In Comb structure mineral growth is perpendicular to the vein wall and the crystals grow into each other. Some veins are orthogonal to each other.Younger joint sets trend N 48° and older trend N136°.
Quartzite requires a temperature of ~700°C.Hence we are standing on a fault zones which is trending E-W,spacing in veins are formed when vein is extending. They are called as Gash veins. The thickness is varying from 3.5-4.5cm.

There is a fault line which is trending N46°.

Fig 22 : Comb structure in Quartzite; clinometer for a reference.

Spot 2
Location

Lat : 16°5'8" N
Long: 75°48'46" E

The exposed rock is pink granite,which are deformed and shows alignment of grains.The rock is traversed by sets of quartz veins which are perpendicular to each other. There are 3 prominent veins exposed. Youngest one is sub horizontal having a trend of N72° and is parallel to foliation plane followed by younger one which is steeply inclined, trending N155° whereas the oldest vein is also steeply inclined with a trend of N189°.Thickness of veins vary from 2.5-12 cm. En-echelon veins are also seen. It is a single generation if veins.

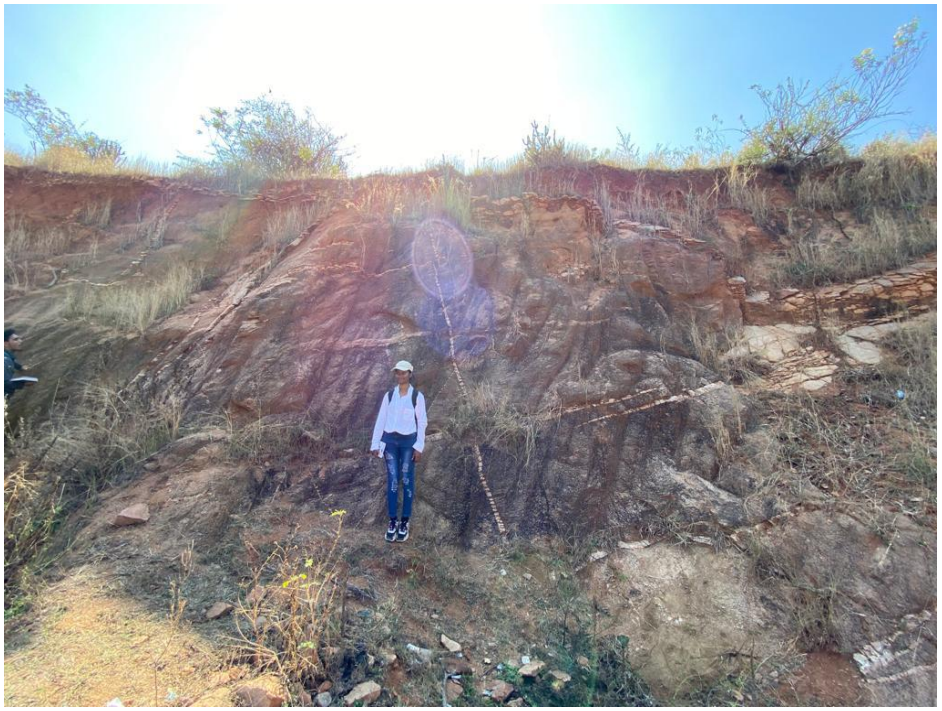


Fig 23; Pink granite

Spot 3 (50m from previous spot 2)

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. Schist and granite contacts are well exposed.Granite here was hornblende rich.Grade of metamorphism increases as move from spot 2 to spot 3.

Spot 4
Location:. Murdi

Lat: 16°02'06" N
Long:75°45'26" E

The exposure of siliceous quartzite with porphyroblast of BHQ are seen ranging from 5-6cm in thickness. These quartzite belong to Saundatti Quartzite formation of Bagalkot

group.These quartzite are horizontally dipping Orthogonal joint sets shows a trend of N90° and N180°and the conjugate joint sets are trending N114° and N263°.
Some boulderes of quartzite contains clasts of cryptocrystalline to amorphous variety of quartz. The quartzite shows crossbedding and herring bone structures.The surface appears red due to weathering (leaching action).

Fig 24: Siliceous quartzite(Saundatti quartzite) scale : hammer.

Spot 5

Location:Niralkeri,approximately 5kms away from spot 4)

Lat: 16°04'28"N
Long: 75°42'10"E

Outcrop of phyllite is present on the right side of the road. It is folded and overlained by lateritic soil and clast.
Structural data of the fold:

Strike	Dip Amount	Dip direction

N82°	30°	NNW
N94°	14°	NNW
N103°	19°	SSE
N166°	22°	SW

Fig 25; Folding in Phyllite. (Clinometer as a scale)

DAY 8

Date: 17/12/2022

Spot 1
Location:Kagalcomb

Lat: 16°06’52”N
Long: 75°38’24”E

Extensive milky white quartz are exposed and it is highly fractured. The outcrop is trending E-W. The extensive deformation has happened. There are 3 joint sets are present wherein
joint 1) is trending N114°
Joint 2) trending N38°
Joint 3) trending N132°
Radiating joints are present which are formed due to blasting. Even tensional and extensional joints are seen both are present perpendicular to each other. Comb structure and gash veins are also seen in the rock, wherein hexagonal crystals are seen growing in that vein. Trend of gash vein is N112°.
Fault are visible which show minute displacement. Leaching has taken place which is indicated by red colouration seen on the surface.

Fig 26;A) Tensional and extensional joints. B) Radial joints.

Spot 2
Location:

Lat:16°07'29" N
Long: 75°35'46" E

Massive outcrop of moderately dipping dolomite are exposed and it is dipping due SSE facing the roadside.Dolomite exhibits dull lustre. Structural data is as follows:

Strike	Dip Amount	Dip direction
N106°	44°	SE
N108°	47°	SE
N101°	44°	SE

Spot 3
Location: Sulikeri (Dolomite mine)

Lat:N16°8'39"

Long: 75°29'37E

Excavation of dolomite which is trending in same direction as spot 2.The bench height is ~6m.Dolomite is a monomineralic mineral or rock.

Fig 27 : Dolomite quarry.

Spot 4

Location:Konkankappa limestone

Lat: 16°03'19"N
Long:75°38'45"E

Limestone exposure along the Riverside which shows light colouration and have shallow dip and foliation plane which is dipping into the stream. Structural data is

Strike	Dip Amount	Dip direction

N86°	4°	S
N81°	4°	S
N85°	4°	S

Spot 5

Lat:N16°1'14"
Long:75°46'58" E

The rock exposed are shale having alternate bands (lamination) of brown and white layer, Clay is present which is fine grained having grain size of <1/256mm which is visible under microscope. Present of mineral are based on chemical analysis of this rock. Presence of shale indicates abyssal plain,it is Neoproterozoic in age -sedimentary ocean basin of Badami group. A broad warp is present, hence we can see different direction of dip.

Strike	Dip Amount	Dip direction
N20°	6°	SE
N125°	3°	NNE
N79°	3°	SE

Fig 28 : Outcrop of shale.

Spot 6

Location:

Lat:15°56’18” N
Long:75°40’35” E

Horizontal layers of Arkosic sandstone 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.

Fig 29: Outcrop of Arkosic sandstone.

DAY 9

Date:18/12/2022

Spot 1
Location:Lokapur

Lat:16°10'04" N
Long: 75°21'31" E

Exposure is situated on the left side of the road as head to lokapur from Bagalkot.The area is moderately vegetated having shrubs and thorny bushes and hay.The rock exposed in the field is intercalated rock known as Marly limestone or impure limestone. Show well developed foliation planes trending N116°.These limestone are steeply dipping in direction of SSW. These rocks contains bands of Stromatolites which are pinkish to off white in color and trend similar to the limestone.Stromatolites are highly deformed and with intercalated layers of quartz and carbonate.Stromatolites structure is not Penetrative.Some parts of the rock also exhibit nodular structure. Joint are also present with a trend of N26°.Structural data of lst;

Strike	Dip Amount	Dip direction
N118°	72°	SSW
N120°	71°	SSW

Fig 30; A) Stromatolites in Marly limestone (scale: clinometer compass). B) Nodular structure in limestone, coin as a scale.

Spot 2

Location: Jalikatti

Lat:16°09'33"N
Long:75°22'58"E

The rock mined are limestone which is trending N130°.The rock body has numerous foliation which is dipping due S. These limestone are light grey in colour.

DAY 10

Date:19/12/2022

Location:(Almatti dam)

Lat:16°33'10"N
Long:75°88'80" E

Krishna river is situated here, which originate from Mahabaleshwar. It is a concrete dam started in 1964.Foundation was laid by Shri Lal bahadur Shastri. It took almost 30 years to build this massive dam. The dam generates a power of 290Mw.180 villages are submerged, around 2 lack families are displaced, that is part of Bagalkot and created Navnagar as new settlement place.
This dam has 6 turbines from which each turbine generates 15Mw.There are 26 gates and basement of this dam is a granite. Height of the dam is 528m.Through this dam 2 lack hectares of land is irrigated ie (60% of Karnataka). Declared as bird conservation reserve because almost 186-100 bird species are seen here and out of which 85 species are migratory birds.

Spot 2
Location:Way to Vijayapura

Lat:16°20'28" N
Long:75°55'33" E

The exposure is situated on the left side of the roadroad, way to Vijayapur from Almati dam. The rock exposed are migmatites having an age of >3 Ga resulted due to melting of TTG Gneisses of Dharwar Gneiss.The grain size of migmatites vary from fine to coarsed.Apart

from migmatites ,grey granites,pink granite,pegmatites and banded gneiss. Veins of quartz and feldspar are found cross-cutting the rock . Silica is changing to epidote hence we can see the green colour. Joint sets are present, showing conjugate and orthogonal joints.The order of superposition of rocks exposed in that region.

Rocks	Sequence
Pegmatite	Younger
Pink granite	-
Grey granite	-
White granite	-
Gneisses	-
Dark rocks	Older

Fig 31;outcrop of migmatites with combination of grey, white and pink granite.

REFERENCES

- Ram, A.Ramachandran & Srinivasalu, S. & Sooriamuthu, Ramasamy & Bhuvaneswari, s & Gnanaval, D. & Krishna, K.. (2019). Mineralogical Studies of Kerur Formation Badami Group, Kaladgi Basin, Karnataka. Journal of the Geological Society of India. 93. 343-350. 10.1007/s12594-019-1182-0.