REPORT OF THE WORKSHOP IN PETROLOGY

**DEPARTMENT OF GEOLOGY**

**Under DBT Star Status**

**Report on lecture series, hands-on training cum geological fieldwork organised from**

**04-12-2018 to 08-12-2018 for Advanced Learner Students.**

The lecture series, hands-on training and geological fieldwork was organised by the Department of Geology from 04-12-18 to 08-12-18 for the undergraduate students of Geology

**Participants**: Faculty and undergraduate students of Geology

**Number of participants**: @30 (since it involved only Advanced learner students)

**Venue**: College AV Room/ College Auditorium/ Department of Geology

**Objectives**

1. To give hands-on training to students and faculty in correlating rock textures and structures to tectonics and deformation.
2. To relate the microstructures observed under petrological microscope to meso- and mega-structures observed in field.
3. To understand how live samples of active volcanoes are collected in field.
4. To provide field training.
5. The lecture series cum hand-on training cum field work will help students and faculty in strengthening the concepts related to courses of Advanced Mineralogy and Geochemistry, Structural Geology, Optical Mineralogy, Geotectonics, Sedimentary Petrology, Stratigraphy of India, Metamorphic Petrology, Igneous Petrology, Rock Structures and Deformation Microstructures, Field Geology covered under Autonomy

**Resource Persons**:

1. Dr. HM Ramachandra, Retired Director, Geological Survey of India, Bengaluru.
2. Dr. Shrinivas G Viladkar, Director (Hon), Carbonatite Research Centre, Gujarat.

**About the Resource persons:**

1. Dr. H M Ramachandra, retired as a Director, Geological Survey of India, has more than 30 years of experience in research and identification of several mineral potential zones. He is a renowned Geologist whose works on Geophysical Modelling, Geological Mapping, Structure, Petrology and Mineralisation has been highly appreciated at various platforms. He has an extensive record of working in Central India and has been instrumental in research projects of base metals and other industrial minerals in the region.
2. Dr S G Viladkar, Ex Professor of Geology, St Xavier’s College Mumbai is currently the Director (Hon), Carbonatite Research Centre, Gujarat. He has specialised in the field of geochemistry and petrology. His research work on Carbonatites is extraordinary. He is a visiting Professor and visiting Scientist at Hamburg University, Germany, at Max-Planck Institut für Chemie, Abt. Geochemie (Prof. A W Hofmann Group), Mainz Germany, at University of Rennes, France, at Universite P et M Currie, Paris, France, at Mineralogisch- Petrographisches Institut der Universität, Heidel­berg, at Alexander von Humboldt Stiftung, Bonn, Germany. He was the Scientific Advisor at Wissenschaftlicher Beirat to the ICGS, Hamburg University, Germany.

**LECTURE CUM DISCUSSION SESSIONS (Morning session)**

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| **DAY/DATE** | **TIME** | **SESSIONS** |
| Tuesday  04-12-2018 | 10:00am | Welcoming and introducing the guest speakers Dr HM Ramachandra & Prof. SG Viladkar followed by tea break  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3840.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3844.JPG |
| 11:00-12:45am | **Lecture by Prof. Viladkar on “Volcanoes and Volcanic eruption involving volcanoes of Italy, major eruptions of Mt. St. Helens, Hawaii, Reunion hotspot responsible for Deccan Basalt Volcanic eruption**”  The speaker highlighted on the presence of why volcanic eruptions occur on specific location on the earth. He spoke on his experience of collecting live volcano samples from different parts of the world like the Italian, Lipari, Stromboli, Hawaiian, Kilauea volcanoes. The speaker also spoke on the significance of the Deccan Flood Basalts. The significance of research related to volcanoes was put forward to the students.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3883.JPG |
|  | Lunch Break |
| Wednesday  05-12-2018 | 10:00–11:45am | **Lecture by Dr HM Ramachandra on Microsection studies of Igneous and Metamorphic rock slides with respect to microtextures and microstructures in interpreting the tectonic and deformational history**.  The target group was introduced to the concept of deformation of rocks where how brittle type of deformation affects the upper layers of the earth leading to the formation of structures like Boudinage, cataclasis etc. and how and why the rocks are subjected to ductile type of deformation at the deeper levels of the crust and the result of the effects leading to the formation of compressive rock structures like folds and shearing. The session was supported by showing field evidences.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3888.JPG |
| 12:00- 2:00pm | **Lecture by Prof. Viladkar on “Carbonatites and associated mineral deposits”.**  Carbonatites are carbonate-rich rocks (Calcite, Dolomite and Ankerite) of magmatic origin. They occur as plutonic bodies, sub-volcanic as well as extrusives (lava flows). There around 529 known carbonatites worldwide. They range in age from Archean to present day. Found in about 70 countries and are confined to stable Archean continental crust, intracontinental rift, fault system, Within alkaline rock provinces. The group was exposed to how There is sharp increase in production of REE from 75,500 tonnes in 2013 to 123,100 tonnes in 2016 (Ref: Roskill, 2016b). Future demand to 2026 will be linked to mainly use of NdFeB magnets, electrical vehicles, wind turbines etc.    **Open Cast Fluorite Mine at Amba Dongar** |
|  | Lunch Break |
| Saturday  08-12-2018 | 10:00-11:45am | **Lecture and discussion related to methods related to bulk rock sample geochemical analysis by Dr HM Ramachandra.**  The lecture covered issues related to use of igneous whole rock chemical data which covered instrumentation methods, sampling issues and use of variation diagrams. Why and how precision and accuracy are significant in analysis, why and which instrumentation is the best to carry out analysis. How often was the process affecting the sample, the factors to be understood before getting the sample analysed. The constant sum effect and the closure problem, the concept of the log-ratio alternative. The problems associated with ternary diagrams. How Mobility of elements affects geochemical analysis |
| 12:00- 12:30pm | Feedback |
|  | Lunch Break |

**HANDS-ON TRAINING (Afternoon Session)**

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| **DAY/DATE** | **TIME** | **WORKSHOP SESSIONS** |
| Tuesday  04-12-2018 | 2:00– 4:00pm | **Laboratory session on hands on working on interpreting thin sections**.  Hands on exposure was given to the target group on identifying some of the different microstructures observed under a microscope to support the field studies related to pervasive mega and meso structures. They were apprised as how the structures help in detecting the depths at which the rock could possibly have formed and why. It also helped in understanding the deformational imprints in a rock based on the structures observed.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3867.JPG |
| Wednesday  05-12-2018 | 2:00-4:00pm | **Laboratory session on hands on working on interpreting thin sections**.  It was the continuation of the pervious day session wherein hands on exposure was given to the target group on identifying some of the different microstructures observed under a microscope to support the field studies related to pervasive mega and meso structures. They were apprised as how the structures help in detecting the depths at which the rock could possibly have formed and why. It also helped in understanding the deformational imprints in a rock based on the structures observed.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3876.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3880.JPG |

**GEOLOGICAL FIELD WORK**

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| Thursday  06-12-2018 | 8:00am-4:00pm | **Geological Fieldwork at Patnem**  At Patnem the PGC are intruded by the younger basic dykes whose geological age is later 2395±390 (?) Ma. These are vertical as well as inclined.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3920.JPG C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3945.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3929.JPGC:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3934.JPG |
| Friday  07-12-2018 | 8:00am-4:00pm | **Geological Fieldwork at Polem**  Geologically the spot of Polem covers the outcrops belonging to the Dharwar Supergroup including rocks like Amphibolites, Actinolite Schists with some minor nickel crystallisation and is part of the Dharwar craton. They lie exposed on Peninsular Gneissic Complex (PGC) of the Archean age. The rocks are highly deformed and tectonically stable involving various textures and structures. A correct interpretation of these textures and structures help in understanding the tectonic and deformation history.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3957.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN3979.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN4000.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN4020.JPG |

**VALEDICTORY FUNCTION**

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| Saturday  08-12-2018 | 12:00-12:30pm | Valedictory Function with a vote of thanks  Feedback on the workshop was given by the target group and the certificates were distributed.  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN4035.JPG  **Feedback by students**  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN4041.JPG C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\101NIKON\DSCN4042.JPG C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\101NIKON\DSCN4044.JPG C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\100NIKON\DSCN4033.JPG  **Distribution of Certificates**  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\101NIKON\DSCN4049.JPG C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\101NIKON\DSCN4056.JPG  C:\Users\Dell\Desktop\2018-19\Petrology Workshop\Photos\DCIM\101NIKON\DSCN4073.JPG |

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DBT Co-ordinator, Department of Geology Head, Department of Geology

DATE: 20 December 2018