

# REPORT ON NATIONAL CONFERENCE AND FIELD WORKSHOP ON PRECAMBRIANS OF INDIA

22-24 November 2016

A National Conference and Field Workshop on “Precambrians of India” was organized by the Department of Geology, Bundelkhand University and The Society of Earth Scientists, on November 22-24, 2016 at Jhansi. The first day started with the registration of delegates from across the country followed by the inaugural function. The inaugural program started at the Gandhi auditorium, Jhansi with the holy Saraswati Poojan and Vandana. Prof. S.P. Singh (Bundelkhand University, Jhansi), Convener of the conference welcomed all the Precambrian earth scientists with a formal Welcome Speech after which, Prof. M.E.A. Mondal (Aligarh Muslim University, Aligarh), Organizing Secretary of the conference introduced the delegates about the Conference and proceeding of the conference and highlighted the special features which include strong response from all across the country. The response was very encouraging and around 120 abstracts were received which eventually were published in an astonishing “Abstracts and Field Guide Book” by The Society of Earth Scientists. Copies of the Abstracts and Field Guide Book were released jointly by the esteemed guests on the dais succeeded by a felicitation ceremony to acknowledge the contribution of some leading Precambrian geologists of India. Among them, first one to be bestowed with “Life Time Achievement Award” was Prof. A.B. Roy for his immense contribution in the Precambrian Geology of the Aravalli craton. The second one to be conferred upon with this award was Dr. A.K. Basu (Retired Dy. Director General, GSI) for his incredible contribution in the Precambrian Geology of the Bundelkhand craton. Adding to the list of gems, another star was Dr. Abhinaba Roy (Retired Dy. Director General, GSI). His landmark contribution to the understanding of Precambrian Geology of Central and Southern India was critically acclaimed by the gathering. Dr. V. Balaram (former Director, NGRI, Hyderabad) a renowned scientist got the “Life Time Achievement Award” for his significant contribution in the areas of the trace-element geochemistry, analytical geochemistry, PGE mineral exploration and standard reference materials. Dr. O.P. Pandey (Senior Scientist, NGRI) was



also felicitated for his contribution to the Earth Science.

After the felicitation, Guest of Honor, Prof. D.M. Banerjee (Delhi University) and Chief Guest of the program Dr. M.B. Verma, (Director, Atomic Minerals Directorate for Exploration and Research) shed light on the importance of organizing a National seminar on the theme of Precambrians of India. Prof. Banerjee also informed that India has won the bid to organize the 36<sup>th</sup> International Geological Congress (IGC) in National Capital Region (NCR), Delhi from 2-8 March, 2020. He urged the Indian Earth Science fraternity to prepare and participate actively in the forthcoming 36<sup>th</sup> IGC and cement a concrete position in the World Geological community. Both the guests also praised the hospitality of the local people and wished the seminar a grand success. Importantly, all dignitaries promoted the use of Hindi in their dialogues.

The patron of the National Seminar, Honorable Vice Chancellor of the Bundelkhand University, Dr. Surendra Dubey took pride in welcoming all the Precambrian geoscientists in one of the oldest geological terrain of the world. His speech was a blend of literature and basic science and he motivated, especially the young scientists, to actively carry on their research work and contribute more towards the benefit of the country and mankind. Mementos were presented to the dignitaries and the program came to an end with the National anthem.

After the inaugural program coming to an end, delegates had tea and assembled for the first technical session of the day in the Department of Geology, Bundelkhand University. The technical sessions were arranged according to the themes in two parallel sessions to accommodate all the speakers whose abstracts were accepted in the stipulated time interval barring the first session where noted speakers were invited to present their work. The first technical session with theme, “*Precambrians of India*” was chaired by Prof. D.M. Banerjee and co-chaired by Prof. S. Mohanty (ISM, Dhanbad). The first speaker of the session was Prof. A.B. Roy who gave an invited talk on the topic “Indian Shield: Precambrian evolution and Phanerozoic reconstitution”. He very articulately presented how Indian shield has evolved from the Precambrian to the present day and how it is different from other Precambrian shields such as the Canadian shield. The next to deliver was Prof. N.V. Chalapathi Rao (BHU, Varanasi) on the topic “Petrogenesis and geodynamic implication of the Mesoproterozoic-Late Cretaceous Timmasamudram kimberlite cluster, Wajrakarur field, Eastern Dharwar craton, southern India”. Prof. Rao who is understood synonymous to study of kimberlites and lamprophyres in India talked about the very fundamental differences between kimberlites and flood basalts keeping in mind about the young brains present in the audience. He provided the petrography, mineral chemistry, groundmass pervoskite U-Pb ages, pervoskite Nd isotopic composition as well as bulk-rock geochemical data for the Timmasamudram diamondiferous kimberlite cluster. Another invited talk by Dr. Abhinaba Roy on the topic “Structure, metamorphism and tectonic evolution of the Proterozoic Sakoli Fold Belt of Central India”. He very interestingly presented how a good field geologist can ascertain age relationship by closely observing the multiple deformational and metamorphic events. Prof. Santosh Kumar (Kumaun University, Nainital) in his topic “Geodynamic evolution of the Meghalaya Plateau, northeast India: constraints from U-Pb SHRIMP zircon geochronology and geochemistry of granitoids and enclaves” reported that the Meghalaya plateau has experienced four major magmatic episodes at ca. 1800 Ma, ~1600 Ma, ~1400 Ma and ~500 Ma. After some serious deliberations and scientific discussion, it was time for lunch where delegates from all over the country enjoyed the hospitality of the people of Jhansi.

After lunch, two parallel sessions (Smart classroom and Seminar room) were arranged according to different themes. In Smart classroom, the theme was “*Precambrian/Pericratonic Sedimentary Basins, Stratigraphic Boundaries, Life During The Precambrian*”, chaired by Prof. H.N.

Bhattacharya (JIS University, Kolkata) and co-chaired by Dr. Biplab Bhattacharya (IIT, Roorkee). In the Seminar room, the theme was “*Geodynamic Processes, Precambrian Plate Tectonics, Mantle-Crust Interactions*”, chaired by Prof. P.P. Chakraborty (Delhi University, Delhi) and co-chaired by Dr. O.P. Pandey (NGRI, Hyderabad). A total of fifteen presentations were made, including some of the very talented young minds. Dr. O.P. Pandey presented his paper entitled “Exhumed mafic crust and unusual thinning of Indian lithosphere: New inferences from deep scientific drillings at Killari and Koyna earthquake regions, Deccan Volcanic Province, India” and provided sufficient geophysical evidences of crustal thinning of the Indian lithosphere which was one of the most intriguing deliberations of the evening. Dr. Mukund Sharma (BSIP, Lucknow) gave an invited talk on “Megascopic Carbonaceous remains from Proterozoic basins of India: lessons in evolutionary biology” which was very enlightening for the audiences.

After the end of the two parallel technical sessions it was time for poster presentations by some young researchers and a science exhibition from Atomic Minerals Directorate for Exploration and Research (AMD). Delegates enjoyed cup of tea with some healthy discussions with the presenters. AMD also displayed some of its very finest Uranium bearing ores collected from various parts of the country.

In the last session of the first day, a total of twelve papers were presented in the two parallel sessions combined. The technical session in the smart classroom with the theme “*Magmatism, Geochemistry, Geochronology*” was chaired by Prof. Santosh Kumar (Kumaun University, Nainital) and co-chaired by Dr. Rajneesh Bhutani (Pondicherry University, Puducherry) and it comprised of eleven papers. Dr. B. Maibam (Manipur University, Imphal) presented his work on Precambrian mafic rocks of Assam and Meghalaya. He highlighted that the Precambrian rocks of this region are very much similar to Precambrian rocks of the Peninsular India and are not well constrained. He showed that these rocks are critical to understand Gondwanaland reconstruction and Alpine-Himalayan orogenic system. Technical session on the theme *Metamorphism, Deformation, Metallogeny* was chaired by Dr. V. Balaram (Former Director, NGRI). Dr. Adhir Kumar Basu (Retired Dy. Director General, GSI), a pioneer worker, of Bundelkhand craton presented his work titled “A new approach to Proterozoic crustal evolution of West-Central India - sequel to huge granite emplacement in Bundelkhand, North-Central India”. In his work he discussed the tectonic evolution of the Bundelkhand craton during Proterozoic with the help of structural geology. He made a detailed study to demonstrate that granitic intrusions within the Bundelkhand craton may have played a significant role in generating tectonic forces. This session included some very interesting papers covering different cratons/mobile belts of the India.

## **DAY 2**

“*Granite-Greenstone Terrains, Mobile Belts*” session Prof. N.V. Chalapathi Rao (BHU, Varanasi) and Dr. Nurul Absar (Pondicherry University, Puducherry) acted as Chairperson and Co-Chairperson, respectively. “*Remote Sensing and GIS Application, Environmental Impact of Mining, Groundwater Problems in Precambrian Terrains, Geoheritages*” session was chaired by Dr. V. Balaram (CSIR-NGRI, Hyderabad) and Dr. S.C. Bhatt (Bundelkhand University, Jhansi) as his Co-Chairperson. Both themes covered interesting presentations with a blend of experienced and young researchers of the country. Dr. Rajneesh Bhutani (Pondicherry University, Puducherry) in his invited lecture shed light on Precambrian crustal evolution in the Southern Granulite Terrain with special emphasis on the Madurai Block. He revealed that the geochemistry and isotope geochemistry as well as geochronology indicate that the Wilson cycles are recorded in terms of placement of granite-charnockite association, high-and ultra-high grade metamorphism and subsequent retrogression. Prof.

H.N. Bhattacharya (JIS University, Kolkata) beautifully presented multiphase evolution Chitradurga greenstone belt using field based evidences. He showed that the Chitradurga greenstone belt evolved due to initially slow sinking of the granitoid basement followed by opening and rifting of a back-arc along a continental margin, and finally closure, collision and accretion of the arc to the continental margin. Dr. V. Balaram (Former Director, NGRI, Hyderabad), an eminent scientist known for geochemical studies, mineral exploration studies and development of standard reference materials, illustrated hydrogeochemical prospecting (direct and indirect) methods for platinum group elements (PGE) deposits associated with layered mafic-ultramafic complexes in Madawara Igneous Complex, Bundelkhand craton. He demonstrated the usefulness of determining the most promising hydrogeochemical markers in mineral exploration studies. The session also witnessed two impressive contributions by Prof. Partha Pratim Chakraborty (Delhi University, Delhi) and Dr. S. Mohanty (ISM, Dhanbad) on the probable redox conditions of ocean and atmosphere during Precambrian. Prof. P.P. Chakraborty delivered an invited lecture to discuss the redox condition of ocean during Paleoproterozoic. Using petrographic and geochemical signatures of iron formations and carbonates from the Morar Formation (Gwalior Group) he demonstrated that the Gwalior sea had suboxic condition during Paleoproterozoic. Dr. S. Mohanty (ISM, Dhanbad) presented a case study from the Sausar belt of the central India to showcase substantial changes in redox state of the atmosphere and ocean across the Archean-Paleoproterozoic boundary. Using geochemical proxies he proposed that the Sausar Group witnessed dominantly reducing conditions in the shallow ocean during the Archean-Paleoproterozoic transition.

### **Valedictory Function**

After successful completion of technical sessions the delegates assembled in a hall for valedictory function. At the outset Dr. S.C. Tripathi thanked all the delegates for their participation and paper presentation. He invited Dr. O.P. Pandey and Prof. N.V. Chalapathi to chair the valedictory function. Dr. O.P. Pandey gave a brief description of the conference and said that still a lot of study remains to be carried out on the Indian shield. He said that the North China Craton (NCC) has great potential to reveal the earth system processes and as a result it has attracted scientist from various corners of the globe. Further, he pointed out that the Indian craton, like NCC, too has similar potential and needs to be tapped in the right direction. Prof. N.V. Chalapathi Rao in his speech said that earlier he thought that India is facing dearth of young researchers working on the Precambrian terrains. However, his experience at the conference with large number of young participants working on Precambrian terrains and their outstanding presentations has forced him to change his mind. He expressed happiness to see the young brigade with strong shoulders and strong hands ready to hold the baton. Overwhelmed by the experience he urged the young minds to think differently, keep publishing their research and remain informed of new research being carried out in the world.

Dr. A.K. Basu, a senior member, was invited to express his views on his experience at the conference. He said that geochemistry is a powerful tool of geology but field geology should not be ignored. He also urged that such conference should be organized on a regular basis. In line with the views of Dr. A.K. Basu, Dr. Abhinaba Roy also highlighted the importance of field geology and physics/rheology of the rocks in understanding the problems of geological science. Prof. Partha Pratim Chakraborty expressed that young workers are doing exceptionally well and they have the potential to become future leaders. However, apart from praising the organizers for successfully organizing the conference, Prof. Chakraborty highlighted an important shortcoming of the conference i.e. lack of papers from the Precambrian Himalaya and the Marwar craton. He also emphasized that certain organization (e.g. The Society of Earth Scientists) needs be established to look after the grey

areas in the geology of India, organization of conferences periodically and coordination amongst workers from various parts of the country. He also prompted the workers to prepare themselves for the upcoming 36<sup>th</sup> International Geological Congress which will be hosted by India in Delhi. Complementing the shortcoming of the conference, i.e. absence of papers on Himalaya, Prof. Santosh Kumar proposed that the Kumaun University, Nainital will hold a national conference on Precambrian Himalaya during 2017 and urged everyone to participate in it. Prof. Kumar also emphasized that workers from various fields and institutions should collaborate and interact to solve different geological problems. Dr. V. Balaram also appreciated the orderly organization of the conference. He applauded and thanked Prof. M.E.A. Mondal (Organizing Secretary) for sending the technical program beforehand due to which workers could comply with the time limit for their presentations. He also praised and said that the young workers are doing a fine job on Precambrian terrains. He suggested that such conferences should be organized routinely. Dr. Yamuna Singh of the Atomic Minerals Directorate for Exploration and Research said that 80-90% of mineralisation is present in Precambrian rocks and as a result they become an important material of study. He also said that geological processes are interlinked and should not be seen in isolation. He urged that everyone, particularly youngsters, should come forward and contribute towards development of geology of India. After this, chairpersons invited some young participants to express their views. Ms. Soumya Shukla (CSIR-NGRI, Hyderabad) said that this conference provided a platform for interaction between senior and junior workers of the country due to which new ideas can be generated. Mr. Ashutosh Pandey (BHU, Varanasi) said that after attending this conference on Precambrians of India he came to know what others are doing in their respective fields/areas. He highlighted that this conferences has forced him to think for considering multi-dimensional problems in geology. Dr. Ashima Saikia (Delhi University, Delhi) pointed that the veteran workers who have vast knowledge of field geology remain largely inaccessible. As a result young workers remain deprived of knowledge on field geology. To fill the knowledge gap of field geology as well as geophysical techniques, she suggested that regular field workshops should be organized. Upon this Dr. S.C. Tripathi proposed to organize a field workshop in the southern terrain of India in coordination with Dr. Rajneesh Bhutani. Dr. Bhutani agreed to this and said he will chalk out the plans. Mr. Iftikhar Ahmad (AMU, Aligarh) urged that some time should be allocated during every conference during which youngsters can interact with the expert workers. He also suggested that electronic medium should be adopted for wider dissemination of news and developments. Dr. K.R. Randive (RTM Nagpur University, Nagpur) expressed that the geologist should attain passion for profession and become a learner irrespective of their age. Dr. S. Mohanty who was invited to express his views raised substantial shortcomings of the conference. He said that he did not see youngsters asking questions during the technical session. Further, he emphasized various important models of sciences or discoveries were postulated by workers at an age of <40 years. He also pointed out lack of participation of geophysicists in the conference. With these deliberations and interactions, the conference came to an end.

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