

NATIONAL TRAINING COURSE ON INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY (ICP-MS) AND ASSOCIATED ANALYTICAL TECHNIQUES FOR GEOCHEMICAL, MINERAL EXPLORATION AND ENVIRONMENTAL STUDIES AND DIAMOND JUBILEE WORKSHOP-VI ON TRENDS IN GEOCHEMISTRY

The Department of Science and Technology sponsored the *National Training Course on ICP-MS and Associated Analytical Techniques for Geochemical, Mineral Exploration and Environmental Studies* held at the Geological Studies Division of National Geophysical Research Institute (NGRI), Hyderabad during 21st - 25th July, 2003, which also included the CSIR Diamond Jubilee one day Workshop-VI on *Trends in Geochemistry* on 25 July, 2003. The objective of this endeavour was to provide the young participants from different organizations of the country with an opportunity to learn the theoretical and practical aspects of some important analytical techniques in the field of geochemistry, mineral exploration and environmental sciences.

The inaugural function was presided over by Dr. N.K. Agarwal, Dy. DG. Training Institute, Geological Survey of India, Hyderabad who appreciated the efforts of the

course coordinators, Dr. V. Balaram and Dr. S.N. Charan. Dr. V.P. Dimri, Director, NGRI, welcomed the participants to NGRI and exhorted them to actively interact with the scientists of different divisions of the institute. Dr. Balaram in his introductory address, highlighted the background and objective of the course. Dr. S.M. Naqvi, who formally released the proceedings volume of this training course, as well as the workshop, urged the participants to make best use of the opportunity. The inaugural function was attended by many scientists from different academic and R&D Institutions from all over the country.

On the first day of the Course, in the forenoon session, Dr. C.R.M. Rao, Geological Survey of India, Hyderabad introduced F-AAS and GF-AAS and their applications in the analysis of geological materials. Dr. Sarin, PRL, Ahmedabad gave an introduction to various types of nebulizers and their applications in ICP-MS studies.



Dr. S.M. Naqvi, Sr. Scientist, NGRI releasing the volume on the Training Course and the Workshop in the presence of Dr. N.K. Agarwal, Dy. D.G., Training Institute, GSI, Hyderabad, Dr. V.P. Dimri, Director, NGRI and Dr. V. Balaram, Course Coordinator and Convener.

Dr. D.V. Subba Rao, NGRI, presented the application of REE and HFSE data in understanding the processes related to the source, formation and metamorphism of sedimentary rocks. On the second day, Dr. Balaram, NGRI, Hyderabad highlighted current challenges to geochemists, both in basic and applied aspects and presented a review of the developments and the recent trends in analytical instrumentation which have contributed immensely to the progress of the geochemistry and its application to mineral exploration studies. Prof. N. Someswara Rao, Andhra University, Visakhapatnam, gave a presentation on some case studies in environmental projects where the data obtained by ICP-MS was effectively utilized. Dr. K. Chandrasekhar, IICT, Hyderabad, presented an overview of different analytical techniques for the inorganic analysis of environmental materials with emphasis on element-speciation studies by ICP-MS. Dr. J. Arunachalam, Centre for Compositional Characterizations of Materials, Hyderabad, covered applications of ICP-MS in the analysis of high purity materials such as arsenic, gallium, tellurium and cadmium, required in electronics industry. Dr. T. Gnaneshwar Rao, NGRI, Hyderabad presented an overview of the development of ICP-MS spectrometry stressing on the principles, instrumentation and geological applications. He also covered aspects related to various methods of sample dissolution.

The third day of the training course started with an exhaustive presentation by Dr. Ramavati Mathur, NGRI, Hyderabad on the application of fire assay methods in combination with ICP-MS for the precise estimation of platinum group elements (PGE) and gold in different types of geological samples, which is critical for understanding aspects such as planetary differentiation, core-mantle interactions, magma genesis and meteorite impacts, and also in exploration studies for these metals. Dr. H.C. Arora, Atomic Mineral Division, Hyderabad, gave an account of the role of a chemist in various stages of uranium exploration programs implemented by AMD. Dr. B. Sreenivas, NGRI, Hyderabad, discussed the importance of utilizing contamination-free sample powdering techniques in order to get high quality data for a proper understanding of various aspects in geochemical studies. Dr. T.S. Madoom Hussain, NGRI, Hyderabad, brought out the salient aspects of presentation and interpretation of REE data in different kinds of mineral and rock samples. Dr. M.L. Patil, Hutti Gold Mines Co.-Ltd., Hutti explained various stages of gold exploration carried out at Hutti, Uti and Hirabudini deposits in Hutti-Muski greenstone belt.

The fourth day started with a presentation by Dr. P.K. Govil, NGRI, Hyderabad, on the principles and

instrumentation of XRF, sample preparation and applications in geochemical analysis. Dr. Y.J. Bhaskar Rao, also from NGRI, Hyderabad, focused attention on the precise estimation of radiogenic isotope ratios by classical TIMS and the emerging MC-ICP-MS technique. Dr. Anil Kumar, NGRI, Hyderabad in his presentation emphasized on the utility of Sr-Nd isotopes to answer the present day earth structure and its historical development. Afternoon sessions on all these four days were devoted fully to different aspects of practical training which included sample preparation, elemental and isotopic analyses and data generation by different instruments.

Diamond Jubilee Workshop-VI on Trends in Geochemistry

During this Diamond Jubilee Year of the CSIR, a series of thematic workshops are being organized with the prime objective of showcasing the CSIR's scientific capabilities and achievements to the public and industry. *Trends in Geochemistry* forms the 6th in the series of Workshops organized at the NGRI, Hyderabad. On 25th morning the Workshop was formally inaugurated by Dr. S.M. Dutta, Dy.DG (SR) Geological Survey of India, Hyderabad as a representative of Dr. P.C. Mondal, DG, GSI, Kolkatta. The inaugural address was also presented by Dr. S.M. Dutta on behalf of Dr. Mondal. Dr. Mondal said that GSI is soon to embark on an ambitious project to map the geochemical profile of the entire country on a 1:50,000 scale. He also said that plans for geochemical mapping of the country had been on the anvil since the 8th plan and some initial work had been done in a few states. Listing the benefits of such mapping, Dr. Mondal said that apart from identifying minerals of economic value, it would also contribute to agricultural planning and public health care. He provided examples from the UK and China where geochemical mapping had provided clues to diseases caused by trace elements in the soil, as well as indicating the probable causative reasons for differences in agricultural productivity of the same crops in proximal areas.

Padmashree Dr. Hari Narain, former Director, NGRI, as a Guest of Honour, explained the historical background of circumstances leading to the starting of Geochemistry Division at NGRI about 30 years back. Dr. S.M. Naqvi, Sr. Scientist, NGRI presenting a paper on mantle processes, stressed the importance of integrating geology and geophysics with geochemical studies not only for understanding earth's processes but also for finding out concealed mineral deposits. Dr. R.K. Gupta, Director, Atomic Mineral Division, Hyderabad presented an account of the survey and exploration of atomic minerals by an integrated approach using techniques defined by the

International Atomic Energy Agency (IAEA) like ground survey, jeep borne radiation survey, airborne gamma spectrometric and magnetic surveys, geochemical, geophysical and geobotanical surveys Prof Mihir Deb, Univeisity of Delhi, Delhi presented a brief review of the geochemistry of sulfides with case histories in the context of mineial chemistry and ore deposit modelling Prof V Subramanyan, Jawaharlal Nehru University, New Delhi, delivenng a lecture on river geochemistry - South Asian scenario, said that monsoon driven, the river water chemistry does not necessarily reflect high proportion of atmospheric contribution for all parameters According to him continent derived materials are modified to various degrees at the estuanne region before their final delivery to the oceans He also suggested that with higher rates of sediment accumulation in the fresh water regions, flood plains act as store-houses of key nutrients of the ecosystem and anthropogenic signatures are being reflected for metals such as Hg in some of the rivers Prof S K Bhattacharya, Physical Research Laboratory, Ahmedabad gave an account of the data on concentrations of trace gases CO₂, CH₄, CO, N₂O and H, and stable carbon and oxygen isotopic compositions of CO₂ that show clear signatures of continental and oceanic air mass resulting in complex seasonal variation of trace gas characteristics He also emphasized that detailed transport and chemical modelling will be necessary to interpret these records Dr C R M Rao, Geological Survey of India, Hyderabad, presented an overview of geochemisti of precious metals and different analytical techniques for

their precise estimation in different kinds of geological samples While presenting the importance of reliable precious metal data for both basic and applied geochemical studies, he stressed that there is a greater need for the preparation of a series of certified reference materials (CRMs) for precious metals to help in reducing the inconsistency in precious metal data

During the concluding session, five representatives from among the participants of the National Training Course gave their impressions on the course All of them felt that the course had helped them immensely to improve their knowledge and that NGRI is one of the few select centres in the country to have such world-class and state-of-the-art geochemical and isotopic instrumentation under one roof They also felt that this exposure would certainly benefit them in focusing and shaping their scientific endeavours Dr S M Dutta, Dy DG, Geological Survey of India, Hyderabad, awarded the Certificates to all the participants Dr VP Dunn, Director, NGRI who was also present during the concluding ceremony, congratulated the participants and advised them to utilize the expertise gained by attending this Course, in their research endeavours

*National Geophysical Research
Institute, Hyderabad - 500 007
Email: balaramvl951@yahoo.co.in*

V BALARAM

Email: mrmalcharan@yahoo.com

S N CHARAN

Geological Society of India

SUBMISSION OF MANUSCRIPT IN ELECTRONIC FORM

Authors can send reviewed and accepted manuscripts (revised as necessary) in electronic form (2 sets to be sent) as MS Word document with all the typesetting information (bold, italics, subscript, superscript etc) Tables should be saved as separate files (MS Word or MS Excel) or can be included at the end of the document A hardcopy of the manuscript should be sent by snail mail