

Classical mapping techniques combined with the new technology of GIS is the most innovative approach of the project. The international commission on stratigraphy had honoured Prof. Digby Johns with McLaren Medal for his chronostratigraphic calibration of sequence stratigraphy, which is a guiding force in Paleogene chronostratigraphy and geochronology. The 32nd IGC special medal was presented to Prof. Constantino Faillace (Tino to his friends) for his outstanding contribution in alleviating the suffering of tribal people of India and Africa from drinking water crisis through development of a low cost water lifting device,

the bucket pump appropriate to the local conditions.

Apart from the scientific sessions, the first international Earth Science Film Festival was organized by OGS (Trieste) and CNR-IRPI-RCS (Cosenza), Italy. The festival was devoted to scientific and teaching aid videos and multimedia products, in the field of Earth Sciences.

*P.G. Department of Geology
Khallikote Autonomous College
Berhampur – 760 001, Orissa
Email: mishrageol@rediffmail.com*

B. MISHRA

INTERNATIONAL WORKSHOP ON RECENT ADVANCES IN MAGMATIC ORE SYSTEMS

The IGCP-479 workshop on “Recent Advances in Magmatic Ore Systems Associated with Mafic-Ultramafic Rocks” was held during 14th -15th December, 2004 at the Department of Earth Sciences, The University of Hong Kong, Hong Kong. This is the one of the series of meetings planned under the IGCP Project 479 entitled “Sustainable use of Platinum Group of Elements in the 21st Century, Risks and Opportunities” being led by Prof. J.E. Mungal, University of Toronto, R.M. Iljina, Geological Survey of Finland and Prof. C. Ferriera Filho, University of Brasilia. It was co-sponsored by the UNESCO, IUGS, Chinese Academy of Sciences and several other professionals and academic institutions in China.

This meeting of IGCP-479 is the first to be held in China and has attracted about 60 participants from Australia, Canada, China, Egypt, Finland, Hong Kong, India, Russia, South Africa, UK and USA. Most of the participants were academic professionals, geologists/geochemists representing many R&D Institutes, Universities and private mining companies from various countries.

Prof. John Malpas, Pro-Vice Chancellor of the University of Hong Kong and Chair-Professor of the Department of Earth Sciences, Hong Kong University formally inaugurated the meeting. Being a geologist himself, Prof. John Malpas extended a warm welcome to the delegates and informed that the Department of Earth Sciences at Hong Kong University (HKU) is actively involved in a range of research endeavours centered around the geology of South and East Asia aimed specifically at greater understanding of magmatic ore deposits particularly in China and adjacent areas. These deposits include major magmatic deposits, PGE deposits and Ni-Cu (PGE) sulphide deposits. He also informed that HKU Department of Earth Sciences had registered considerable progress in the area of new techniques for the

PGE analysis. Greatly improved analytical techniques are a prerequisite in PGE exploration.

The programme was divided into four different sessions as follows: (i) General session, (ii) Magmatic ore deposit of North Central China, (iii) Magmatic ore deposits associated with Emeishan Igneous Province in South-West China, and (iv) Magmatic ore deposits elsewhere.

The first session was devoted to the fundamentals of PGE deposits as well as new theories on their formation. Prof. Anthony J. Naldrett who is an authority on PGE deposits, classified the PGE deposit world over into the following genetic types: (i) PGE rich zones associated with Ni-Cu deposits (e.g. Noril'sk, Sudbury); (ii) Stratiform layers of PGE rich sulphides in layered intrusions. (e.g. Merensky, UG-2); (iii) Stratabound zones of PGE rich sulphide near margins of layered intrusions (e.g. Platreef, Portimo); (iv) Associated with chromitite zones without sulfides (e.g. Bushveld lower zone chromitites, Ophiolite occurrences); (v) Associated with irregular zones of remelting within intrusions (e.g. Lac Des Iles); (vi) Hydrothermally remobilised (e.g. Duluth, Bushveld dunite pipes); (vii) Associated with crystallized chromite schlieren (e.g. Nizhny Tagil); (viii) black shales (e.g. Sukoi Log). He also emphasized that such a classification would aid in PGE exploration. Chromite deposits in many places in the world are used as a potential sources of PGE and also suggested the significance of the three types of magmas such as U-type, T-type and Hybrid type (mixing of two magmas of U and T types) which were considered to be the sources of Chromite, PGE and Ni-Cu sulphides. Dr. Ahmed Hassan Ahmed, from Cairo made a presentation on Oman Ophiolites. He tried to discriminate between the PEG-rich and PEG-poor chromitites based on the field observations, petrological and geochemical characteristics. He felt that

these features can be attributed to the difference in the tectonic settings of chromitite formations and could be used as a guide for PGE exploration.

Dr. Liang Qi from the University of Hong Kong made a presentation on the determination of the concentrations of the REE and PGE in mafic rocks by ICP-MS using an improved Carius tube method. Dr. H.H. Prichard, University of Cardiff, UK, spoke on the association of PGE minerals with sulphide droplets hosted in a small dyke in Uruguay and modeling their miniature sulphides through the study of MSS and ISS compositions. The magmatically derived metals (e.g. Ni, Cu, Fe, Ti) in South and East Asia, particularly in China are becoming important targets and therefore, two complete sessions were organized to focus on magmatic ore deposits of China. In the session entitled "Magmatic ore deposits of North Central China" the focus was on the world class Jinchuan Ni-Cu-PGE deposit and the magmatic and tectonic settings of other North-Central Chinese deposits. Prof. Zhongli Tang and his co-workers, in their presentation divided the magmatic sulphide deposits in China into four types based on their tectonic setting, emplacement environment, size of intrusive body, deposit scale, main rock association and metallogenic element association. Prof. Mei-Fu Zhou, who is also the Chairman of the Organizing Committee of this international workshop, spoke about the tectonic setting of Magmatic Ni-Cu-PGE sulphide deposits in China which are listed as (i) Permian-Triassic (LIP) 270Ma-Superplume event (several Ni-Cu, PGE and Chromite deposits such as Jimboshan etc.) (ii) Neo Proterozoic 760-860 Ma arc-related mafic intrusions and sulphide deposit of Ni-Cu-PGE Jinchuan deposit. (iii) 1700-1760 Ma intracratonic mantle plume related sulphide deposits hosted in mafic dyke swarms. He revealed that magmatic deposits hosted within large layered intrusions, such as Stillwater and Bushveld, are not known in China. Instead, most of the sulphide deposits are hosted by small mafic-ultramafic bodies formed in a variety of tectonic environments. Most of the major deposits appear to be associated with mantle plumes, but several of the minor deposits are associated with arc related intrusions. Prof. Chusi Li spoke on the origin of sulphide ores at Jinchuan. Dr. Gang Yang et al. dated the Jinchuan Cu-Ni-PGE deposit using Pt-Os and Re-Os dating techniques by N-TIMS and ICP-MS. The Os concentrations and isotopic ratios determined by N-TIMS and Re and Pt concentrations by ICP-MS gave an isochron age of 852 ± 25 Ma proving that Pt-Os isotopic system is capable of dating PGE deposits. The age further suggests that the formation of the Jinchuan deposit may be related to the magmatism responsible for the break up of Rodinia Supercontinent.

The third session on Magmatic Ore Deposits associated with the Emeishan Large Igneous Province in South West China is devoted to ore deposits related to the Late Permian Emeishan Large Igneous Province (270 Ma) which has significant occurrences of both Fe-Ti-V oxide and Ni-Cu-PGE sulphide ores. PGE metallogeny associated with mantle plume activity in LIP's, CFB and Picrites of China was also highlighted. Prof. Mei-Fu Zhou reported the result of a geochronological and geochemical studies of the representative mafic-ultramafic and syenite intrusions associated with the Emeishan Large Igneous province. Zircons from these intrusions yielded 263 ± 3 Ma for Panzhihua, using U-Pb isotopic data by SHRIMP. Dr. Dan Zhu et al. in their presentation on Zhubu mafic-ultramafic intrusion in SW China attributed the origin of the PGE mineralisation to a novel process called "Soret Fractionation". They opined that when the parental magma was emplaced in Zhubu, the temperature gradient between the magma and the wall rock would have induced the Soret Fractionation, which produces chemical fractionation. In addition to the above, several new concepts such as crystal mush, staging magma chambers and magma mixing models were suggested for the formation of PGE rich zones.

The fourth and final session on Magmatic Ore Deposits Elsewhere featured presentations on recent studies on magmatic ore deposits from around the world including Noril'sk (Siberia), Bushveld and Munali (South Africa) and a few promising deposits from India such as Nuasahi in Singhbhum Craton, and Nuggihalli greestone belt in Western Dharwar Craton and Naga Ophiolite Belt in NE India. The poster session focussed more on the techniques of ICP-MS analysis of PGE in different rock formations. The techniques used include NiS preconcentration, Carius tube sample digestions, etc.

The workshop convener Dr. Mei-Fu Zhou and his colleagues must be congratulated for organizing such a successful international event. The Indian participation in this IGCP Workshop included Dr. Sisir K. Mondal (who is also Co-Chairperson) from the Department of Earth and Planetary Sciences, American Museum of Natural History, New York, Dr. V. Balaram and Dr. D.V. Subba Rao from National Geophysical Research Institute, Hyderabad. Finally, two post-conference field workshops to Panzhihua Fe-Ti-V oxide deposit and Jinchuan Ni-Cu-PGE deposit were organized as a part of the workshop.

National Geophysical Research
Institute, Hyderabad - 500 007

Email: ¹balaramv1951@yahoo.co.in

²dvsubarao3s@rediffmail.com

V. BALARAM¹

D.V. Subba Rao²