BOOK REVIEW

UNIFORMITARIANISM REVISITED: COMPARISON BETWEEN ANCIENT AND MODERN OROGENS OF INDIA. Geological Survey of India Special Publication No.84, 2004, 392p. Price: Rs.325, US$ 24, UK£ 13.

The International Geologic Correlation Programme of IUGS-UNESCO has successfully completed recently the Project No.453: Modern and Ancient Orogens (2000-2004) under the leadership of J.B. Murphy of Canada and J.D. Keppie of Mexico. The goal of the project is to "enhance the understanding of the causes and effects of modern and ancient mountain belts, and how their relationships have varied with time". The project has brought together geoscientists studying modern and ancient orogenic belts with two different approaches, and harnessed their complementary expertise for a comprehensive understanding of mountain belts in general. India's contribution to this global project is significant and culminated in a workshop held in November 2004 at Geological Survey of India, Nagpur, and the publication of this handsome volume.

The volume containing 22 articles dealing with the Singhbhum (52p), Eastern Ghats (75p), Delhi-Aravalli (123p) and Himalayan (27p) orogens, besides the Central Indian Tectonic Zone or CITZ (78p), a lone paper on Dharwar and Bastar cratons (21p) and a general paper on plate tectonics (13p). Comprehensive state-of-the-art reviews, including the varying vicissitudes and modern perspectives on Indian orogens give the reader an invaluable bird's-eye-view on Precambrian mountain belts.

The volume commences with a succinct summary of the papers by Seva Dass (Chairman) and Abhinaba Roy (Convenor), who have done a commendable job of assembling the papers in record time. M.K. Mukherjee and A. Roy provide a critique of Precambrian plate tectonics and analyze alternate hypotheses. The Dharwar and Bastar cratons are described as superterranes consisting of many terranes that amalgamated along young granulite belts at their margins (H.M. Ramachandra).

Singhbhum orogen: Singhbhum shear zone is described as a fold-thrust belt part of a collisional orogen represented by the Singhbhum mobile belt (S. Sengupta and B.Chattopadhyay). Current evolutionary models are inadequate to explain the temporal relation between the Singhbhum mobile belt and Chhotanagpur Gneiss (S. Dasgupta). The segment between Singhbhum shear zone and Dalma thrust is described as a south verging fold-thrust belt developed near a continental margin (D. Mukhopadhyay and others). The mobility of aluminium during deep crustal metamorphism, contrary to the common belief of aluminium immobility, is emphasized from Singhbhum shear zone (P. Sengupta and others).

Eastern Ghats: A crust of different ages, deformed and metamorphosed at different times is described from the Eastern Ghats (S. Gupta). The relation between Nallamalai fold belt of Cuddapah basin and Eastern Ghat orogen is picturised in a tentative reconstruction of the Eastern Ghat orogen (D. Saha). The Eastern Ghat belt is described as a convergent orogen, developed under different thermal regimes in Archaean and Proterozoic (S. Bhattacharya). The significance of anorthosite-charnockite association in Eastern Ghats is highlighted in terms of Rodinia assembly (A. Joshi and others).

Aravalli-Delhi orogen: P. Gupta visualizes Aravalli orogen in terms of Archaean non-plate tectonic phase. Palaeoproterozoic vertical tectonic phase and Neoproterozoic plate tectonic phase in a secular pattern of tectonic evolution. S. Sinha-Roy explains Aravalli-Delhi orogen in terms of four major crustal terranes assembled by plate tectonic processes during different times in Precambrian. S.K. Bhowmik and S. Dasgupta correlate the boudin-type granulites from CITZ, Aravalli-Delhi orogen, Chhotanagpur Gneiss and Eastern Ghat orogen into a single major orogenic belt evolved at different stages in Precambrian. L.K.Das and others describe the crustal architecture of Aravalli orogen in terms of regional gravity, involving Wilson cycles. N. Kochhar believes that the Malani magmatism (essentially felsic) is intra-plate, anorogenic, A-type that is linked to Seychelles, but not to the Aravalli-Delhi orogen.

CITZ: Acid magamatism related to collision orogeny is described from Tan shear zone (A. Roy and others). Arc-type plutonism marked by Padhar ultramafic-mafic complex is described from Betul supracrustal belt (A. Roy and others). Sausar fold belt is visualised as a fold-thrust belt in a convergence-collapse model (A. Chattopadhyay and B.K. Bandyopadhyay). Betul belt of CITZ is linked to the

Sendra-Ambaji belt of the Aravalli orogen (M Deb and A Chattopadhyay) Metallogeny in terms of plate tectonics in the Central Indian shield is also debated (K G Bhoskar and others)

Himalaya P K Verma analyses the metamorphism and magmatism in the Himalaya in terms of modern plate tectonics C Wangdus and others deal with the Indus tectonic belt in detail

General Observations Recent GSI publications provide a refreshing change from the old unappetizing format They are also commendably up to date Their accessibility and timely distribution has not, however, kept pace with current trends in the marketing of publications Despite, and probably because of, the unduly long credit list, most of which is apparently honorary, editing leaves a lot to be desired It is frustrating to match the symbols in the index with those in the poorly produced maps Reproduction of photographs is no better It is also difficult to find some references quoted in the text in the reference list given at the end of the paper Tables in non-standard format stick out like a sore thumb These deficiencies lead to the suspicion that editorial quality probably suffers at the altar of speedy release Diffuse editorial responsibility, with no authors or editors for a volume, is also a deterrent for excellence In spite of such handicaps, the strong scientific content, prompt publication of a wealth of new data and improved production values make the present publication a 'must' for Precambrian geologists and other plate tectonic enthusiasts This volume will be invaluable asset to every earth science library

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SPECIAL ISSUE OF *MINERALOGY AND PETROLOGY* ON CARBONATITES AND ASSOCIATED MINERALIZATION. Editor L G. Gwalani, 2004, v.80, no 3-4, 140p

Differentiation of magmas at upper mantle and crustal depths leads to a variety of evolved rocks that may be Si, Fe, alkali and carbonate-rich with a host of elements such as P, F, Cl, REE, Nb, Ta, Zr, Y, Sn, Li, Be, Th and U which if sufficiently enriched may become economic deposits of multi-metals and industrial minerals A holistic approach integrating field, petrological, mineralogical and geochemical studies enables not only a better understanding of the different suites of rocks but more importantly the associated mineral deposits Publications that enrich our understanding on these aspects, as the present one under review, are most welcome for both academics and the professionals

This special issue representing the IUGS-UNESCO Project No 314 is dedicated to the memory of Nicholas Rock (author of the book on Lamprophyres) who pioneered the recognition of genetic links between alkaline rocks and a whole suite of world-class mineral deposits that are both diverse and unique

The issue contains six papers which have been peer reviewed by over 17 experts in the fields of carbonatite magmatism and modeling of mineralization process Carbonatite magmatism and associated fluorite deposits are discussed in two papers, one from Speewah, East Kimberly region, Western Australia (Dunphy and Groves) and the other the giant palaeoproterozoic Vergenoeg deposit from the Republic of South Africa (Goff et al) The Australian example is a small deposit (>2 28 Mt at 25 5% CaF_2) comparable in several aspects with the Amba Dongar fluorite deposit It is an epithermal (<160°C), replacement type intimately associated with the carbonatite with similar mineralization and geochemistry (Mn-bearing calcite, and similar REE characteristics between carbonatite and fluorite) The Vergenoeg deposit with over 174 Mt at 28% CaF_2 at a cut-off grade of 10% CaF_2 represents the largest fluorite deposit in the world It has similarities with the Phlaborwa and Bayan Obo carbonatites and could represent a pegmatoid type of 'an extreme carbonatite-associated member of the Fe-oxide-Cu-Au (+REE, +P) group of deposit' (Goff et al) The links with breccia complex type uranium deposit of the Olympic Dam, Southern Australia and other similar types linked to alkaline magmatism described by Oreskas and Einaudi (1992) need to be researched further

In an interesting study of the first oceanic carbonatite at Fueteventura, Canary Islands, Demeny et al report combined cathedoluminacence and crystallization temperatures using oxygen isotope geochemistry of calcite,