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BOOK REVIEWS

VOLCANISM - RADHAKRISHNA VOLUME 1994. Ed. K.V. Subbarao, Wiley Eastern Ltd., New Delhi - 110 002, 332p.

This volume so aptly dedicated to Dr B.P. Radhakrishna, the doyen of Indian Peninsular Geology on his 75th birthday, has a wide coverage and includes papers on extra-terrestrial volcanism, oceanic volcanism, Deccan and Columbia River Volcanism and in general fields of seismic tomography, terranes of south India, plate movements and Igneous database. Nine out of the 17 papers relate to Deccan volcanism. Though the papers are not arranged in the order of subjects mentioned above, an introduction by the editor groups the papers subjectwise and places the reader in an excellent perspective to go through the volume.

Ross Taylor presents an analysis of the characteristics of basalts in the three "one-plate" planets, the Moon, Venus and Mars. The morphology, chemistry, evolution and mineralisation of the submarine volcanics of East Pacific Rise are discussed by Hekinian and Bideau. The paper throws interesting light on both the high and low temperature Cu-Zn-Fe sulphides of hydrothermal origin and also the Fe and Si-rich hydroxides of more complex origin.

A significant landmark in recent advances in Deccan volcanism is the mapping of the flow and chemical stratigraphy of the Deccan traps in the Nasik-Mahabaleshwar region of the Western Ghats. The mapping has been extended to the Narmada valley in the north and to Aurangabad in the east by Subbarao *et al.* who report the extension of the Wai group in this region, with a possible southerly source and easterly overstepping. Sethna and Maussavi discuss the interrelationship between the alkaline, tholeiitic and ijolite-lamprophyre phases of magmatism along the western coastal tract. De provides an insight into the classification and source regions of the diverse Deccan magmas of Gujarat and Satpurus. Bhattacharji *et al.* emphasise that the feeder dyke systems along the Narmada valley indicate a N-S extension and rifting. Sen and Cohen present geochemical and age data on the Chakhla-Delakhari sill and speculate that the plume head that caused the magmatism had a head of at least 800 km or migrated eastwards into the Satpura region. Pankov *et al.* present interesting data on the inclusions of mineral melts (olivine, pyroxene, magnetite and ilmenite) and vapour in the large phenocrysts of plagioclase in the basalts of Western Ghats and compare with those in the Siberian traps of comparable composition. The authors point to the problems of mineral thermometry applied to non-equilibrium conditions. The data presented support presence of shallow magma chambers and the role of RTF process. Cohen and Sen present results of an experimental work on the aphyric basalts from Thakurwadi formation at 6 kb pressure (18 km depth) and analyse the implications on fractionation processes. Ramanan and Subbarao discuss the source characteristics of the Deccan Basalts

based on REE chemistry of the basalts in the different stratigraphic groups. Hooper examines the extent of lithospheric contamination in continental flood basalts of Karoo, Parana, Deccan and Columbia from geochemical characteristics. Wilkins *et al.* present data on the chemistry of the "bole" horizons within Deccan traps and trace them to a pyroclastic parentage. Goles and Brandson discuss the geochemistry of the Miocene basalts of Blue Mountain Province, lying to the south of Columbia River Basalt Group (Eastern Oregon, USA) and the role of contamination and fractionation in deep to mid-crustal magma chambers.

Among papers in other but related disciplines, H.M. Iyer presents a review of the results of teleseismic tomography experiments carried out in various volcanic environments. Rogers and Mauldin review the tectonic configuration of the different terranes in south India. Danes calls attention to the pumping action due to earth tides and its influence on plate motions, and Chayes and Nagy discuss the measures to eliminate erroneous data from the IGBA (one of the first Igneous data Bases).

The volume is well illustrated with even a few coloured diagrams and photographs and a very attractive cover photograph of the Mahabaleshwar sequence which seems to throw a challenge- DISCOVER ME IF YOU CAN. The book will be a valuable addition to libraries on Earth Sciences and very useful reference.

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ENVIRONMENTAL ASPECTS OF GROUNDWATER DEVELOPMENT 1994. Published by The Indian Association of Hydrologists, Dept. of Hydrology, University of Roorkee, Roorkee, 408p.

This volume is a compilation of papers presented at the Regional Workshop held between 17-19 October, 1994, at the Department of Geology, Kurukshetra University, Kurukshetra. The publication is brought out in honour of Prof. B.B.S. Singhal by way of appreciation of his valuable contribution to teaching and research on hydrogeology in India. Included in the volume are 53 papers spanning over 400 pages, divided into 4 themes, each with a key paper.

Theme I deals with ground water contamination and modelling pollution transport in aquifers. The key paper by Handa gives a review of the physico-chemical processes of pollution and cites numerous problem areas, extent and severity of pollution problem in the country. Handa and others focus on the high concentrations of Fe^{+3} , Cd^{+2} , Cr^{+3} , Cu^{+2} , Pb^{+2} , Zn^{+2} , Ni^{+2} and CN in ground water, several of them many times in excess of permissible limits for drinking, due to pollution from industries. Pollutant transport model devised for tracking contaminant entering drinking water supply wells in the cities of Waterloo and Kitchener is described by Fitzpatrick and Mcbean. Sekar *et al.* describe a management model for coastal aquifers for exploitation of fresh water without causing sea-water intrusion. Application of nuclear technique in pollution problems with illustrative examples from research work is provided by Kulkarni and Navada. Other topics covered in the theme include microbiological contamination, excessive nitrate and other ions and properites routinely determined in chemical analyses.

Theme II covers ground water development and ecological impact. The key paper by Tanwar emphasizes on ground water management for sustainable development. Saraf *et al.* illustrate the use of geographic information system (GIS) in providing output images of areal variation in ground water quality and water table in the Lower Maner Basin. Ghosh examined the digitally processed air-borne synthetic aperture radar (SAR) X-band data with limited field observation to bring out areas of high discharges in cross-fracture