

map using live examples involve the reader in the process of undertaking the appraisal. However, taking one example in its entirety, starting from the objective of the project till the outcome should have been more useful. This kind of illustration gives us only a 'snapshot' picture of the response of people to a given aspect, but not so much the context and the utility of such an exercise to the overall objective of the project. It is also important to demonstrate, from the chosen examples, how the suggestions of the people were incorporated into the development model, so that people would have felt 'involved' in the process. Overall, the book is well written with a view to reach administrators and non-governmental agencies implementing the development programmes. The author has made a good beginning to motivate administrators and implementing authorities to approach people and discuss with them the prospects of different development programmes, and ways of implementing them.

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**Sahyādri, The Great Escarpment of the Indian Subcontinent.** Y. Gunnell and B. P. Radhakrishna (eds). Memoir 47 (1 and 2). Geological Society of India, P. B. No. 1922, Gavipuram P. O., Bangalore 560 019. 2001. 1054 pp. Price: Rs 1500/US \$ 150.

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Two edited volumes by Y. Gunnell and B. P. Radhakrishna respectively, having 62 papers are possibly the first of such detailed documentation and effort to compile, collate and elaborate various characters of the Western Ghats, which have been more appropriately called as the Sahyādri on the west coast of India, like the Himadri in the north. The volumes aim to present the morphology and prolonged uplift history of the Western Ghats, where landforms are comparable to many well-known rifted margins of the world.

It has been the experience of past workers that the factors governing the evolution of the Western Ghats (Sahyādri) are mainly controlled by rifting, scarp-retreat, uplift, subsequent erosion and deposition within onshore and by offshore marginal sedimentary basins.

The whole book has been organized in two volumes with an introduction of the term Sahyādri in Indian mythology and its logical adoption in this work, followed by collation of a few early papers on the origin of the Great Escarpment, followed by sections on the relief development, denudation, drainage pattern and offshore sedimentation, and finally by presentation of different models of rifting and plateau uplift with views on neotectonics and landscape rejuvenation. The second volume incorporates sections on Cenozoic uplift and its implications on environment and ecology, including climate (SW monsoon), bioclimate during Quaternary and Holocene, vegetation and relief.

The book starts with an editorial introduction of the term Sahyādri in the ancient Indian literature. The second part of the first volume introduces the changing views on the origin of the Great Escarpment in two sections: insights from field reconnaissance, and global tectonics and denudation chronologies. In the introduction, the editors present the elaborate data set on the pattern of south Indian terrain slope system and topographic profiles through Digital Elevation Modelling (DEM) on the basis of Remote Sensing Data (GTOPO30). The section on early insights from field reconnaissance contains ten papers of historical significance incorporating very early observations on the geological features of the south Maratha country and adjacent districts (Foote, 1876); changes of levels in the Indian peninsula (Oldham, 1983); the Western Ghats (Wadia, 1975) and their dykes of Western India and its relationship with the Deccan volcanism (Auden, 1949); physical geography of the Western Ghats (Pascoe, 1950); structural and physiographic evolution of the Mysore plateau (Radhakrishna, 1952), and other works.

The bulk content of the first volume on global tectonics and denudation chronologies has been divided into four sections: (1) relief development of the Western Ghats passive margin (11 papers); (2) onshore drainage and offshore sedimentation: spatial patterns and time slice analysis (11 papers); (3) models of rifting

and plateau uplift (11 papers), and (4) neotectonics and landscape rejuvenation: a debate around the Nilgiris and the Palghat Gap (4 papers). These sections deal with pre-existing theories of polycyclic denudations and development of continents, precipitous western edge of uplifted plateau and its relationship with cynatogenic uplift followed by rifting resulting into formation of scarps. The sequential events of the formation of the Western Ghats have also been narrated. The process started in Lower Cretaceous time with disruption of the Gondwana continent and formation of the East Coast followed by eruption of Deccan basalt in Cretaceous–Eocene time, and sequential evolution of the Arabian Sea, the Western Ghat scarp, the gorges and canyons and reduction of older plateau to a newer plateau surface. It incorporates papers on recent advances in geomorphic studies on Peninsular India and formation of planar surfaces in South India and its influences on stream profile and interfluvies (Vaidyanadhan, 1977; Dikshit, 1981). Deccan volcanism has also been critically evaluated as an important geological event in shaping the Indian Peninsula (Radhakrishna, 1991) along its mafic dyke swarm (Dessai and Viegas, 1995); large-scale Panvel flexures (Misra, 2001); identification of Tertiary palaeosurfaces on the Deccan Traps (Widdowson, 1997), and tectonics using gravity patterns and the estimation of volume of eroded materials which were deposited in adjoining basins (Balakrishnan, 2001).

Denudation, onshore drainage and offshore sedimentation section (II-B-2) contains papers dealing with drainage-capturing across mature and elevated plateau to a youthful stream resulting into Sharavati (Jog) (Radhakrishna, 1964), and forms and characteristics of drainage basins of Konkan area to evaluate the processes of rejuvenation giving rise to different types of river profiles and river basins (Dikshit, 1976). A paper by Biswas (1988) provides insight into the tectonic framework of the western continental margin of India and its relation with the Deccan Flood basalts. Description of this margin would have remained incomplete without incorporating the details of the petroliferous Bombay Offshore Basin (Mathur and Nair, 1993); Konkan–Kerala Basin (Singh and Lal, 1993), and stratigraphic development of the western continental margin of India incorporating subsidence history since late Mesozoic

(Whiting *et al.*, 1994). Work on apatite fission-track thermochronology (AFT) makes interesting reading, wherein denudation maps have been prepared since 150 Ma of the western coast (Gunnell and Gallagher 2001) and provides indisputed evidences of tectonothermal imprints during the Cenozoic as well as in southern Peninsular India like the Himalaya.

Collation of papers dealing with various models of rifting, plateau uplift and the related editorial comments make this book interesting. This section incorporates the dynamics and kinematics of rifting and uplift of the western margin by applying geophysical, numerical, evolutionary, geochemical, sedimentological and denudational data sets, where role of mantle plumes in the formation of Western Ghats, its geomorphology, control on drainage pattern and evolution of Deccan basalts have been effectively documented through a series of publications by Chandrasekharam (1985), Beane *et al.* (1986), Devy and Lightfort (1986), Cox (1989), Summerfield (1990), Watts and Cox (1989), and Gunnell and Fleitout (2000).

The last section of volume 1 deals with control of neotectonics on landscape rejuvenation along the Western Ghats, Nilgiris and Palghat wherein information on the geological structure, seismicity, geomorphology, rock hardness and apatite fission track ages from Nilgiri and southern Dharwar Craton have all been documented. In a thought-provoking paper, Gunnell (1998) has demonstrated the existence of numerous palaeosurfaces and denudation

chronology since Cretaceous and control due to diffused stress field on the geodynamics of South India.

The second volume contains one section dealing with the Cenozoic upliftment of the Western Ghats and its consequences on the environmental change in Peninsular India. This part has been subdivided into two different subsections on coastal laterite (5 papers) and ecological structuring of climate, soil and vegetation zones (9 papers). The latter has been further subdivided into role of the Western Ghats in controlling SW monsoon and bioclimatic change in the Quaternary and Holocene. The section on coastal laterite is important in understanding the denudation chronology of the Western Ghats and it also provides a detailed account of evolution of the lateritic terrain across the Indian Coastal Plateau in the Editorial Introduction. The section on ecological structure of climate, soil and vegetation zones starts with the paper on the Western Ghats as a barrier to the SW monsoon, and a comparison with Brazil and West Africa. It concludes that the topographic evolution of rifted margins, irrespective of latitude, has a similar effect on the climate in palaeoenvironment (Gunnell, 1977). This section contains papers dealing with the bioclimatic changes during the Quaternary and Holocene with  $^{14}\text{C}$  dates from northwestern Deccan Upland region (Kale and Rajaguru, 1987) and Quaternary marine deposits from Konkan coast (Bruckner, 1989); landforms, soils and weathering patterns along the Western Ghats (Bourgeon, 1989), and black soils of Nilgiri

Highlands (Caner and Bourgeon, 2001). Detailed accounts of vegetation patterns along with biodiversity and relief in the Western Ghats have been incorporated in the last section through contributions by Subramanyam and Nayar (1974) from the Malabar province, while Pascal (1991) carried out painstaking mapping of evergreen forest types while distinct patterns of vegetation biodiversity in the Western Ghats have been worked out by Ramesh (2001).

The appropriate tribute to this encyclopaedic, monumental work, in the opinion of the reviewers, will be the usage of the term Sahyādrī for the Western Ghats by those who are engaged in the study of its geomorphology, geology, hydrology, biodiversity, etc. Gunnell and Radhakrishna leave their everlasting scholarly impressions through this work for all time to come in younger generations, as these volumes are bound to be an easy reference material for many earlier works, which are, otherwise difficult for those having access to inadequate library facilities. Both the volumes have excellent printing quality with distinct clarity in photographs, drawings and text. With references running into 55 pages, these volumes definitely attain the status of a textbook.

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