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"Recent Advances in Geomorphology, Quaternary Geology and Environmental Geosciences: Indian Case Studies"

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Felicitation Volume in Honour of Professor V. K. Verma; Manisha Publications, 90, Shaheed Bhagat Singh Places, Gole Market - New Delhi, pp - 461, Price Rs. 1000/- or Us $ 200,

A land bordered by the loftiest mountains in the world, a mountain chain glorious not only in terms of its magnificence, but also for its complexity in geology and geomorphology, overlooking monotonous plains of the Ganga, basin: Himalaya, the restless giant! A land that shelters an accident of nature: that is the river Bramhaputra! And a land, that should be proud of its diversified landforms; Thar Desert, Sunderban, Delta, Khasia Jayantia hills in the North East. Deccan Shield, Aravalis, the denuded hills. The mighty rivers, thousands of kilometers of coastal lands, and ... only the descriptions fall short. That is the Indian subcontinent!

This is a land with rich geomorphology, but isn't it unfortunate that much of what is being taught in geology and geography departments under the rubrics of geomorphology today is drawn from researches done elsewhere, not in India? None of the landform theories that we are studying now are derived from Indian studies! This fact has been rightly acknowledged by Dr. R.P. Mishra, former Vice-Chancellor of Allahabad University, right in the beginning of the book.

But better late than never! One has to read this book, titled "Recent Advances in Geomorphology, Quaternary Geology and Environmental Geosciences: Indian Case Studies", a compilation of 36 research articles, devoted to Indian landforms, to realize that, a good beginning has been made and perhaps the day is not very far for Indian Geomorphologists to present Indian Geomorphology at international forums.

The volume is in honour of Professor V.K. Verma, a geologist who has made, significant contributions to Indian geomorphology, he authored several books, edited a number of volumes, and published 116, research articles in international and national journals.

The 36 articles have been categorized in seven themes - 1) Erosion and Mass-Wasting 2) Fluvial Morphology 3) Hydrogeology 4) Aeolian Processes 5) Coastal and Oceanic Processes 6) Neotectonics and Evolution of Landforms and 7) Environmental Aspects of Geosciences.

In the first category, there are eight papers. The first paper is by M.J. Haigh, a geomorphologist, who devoted several years of his research on this theme, by giving a critical account on landslides. The author has proposed landslides as an open system that result from the self organised criticality of hill-slope systems and their morphological attributes, especially volume frequency relationship, as fractal. The conclusion has

been drawn from the case studies of Himalaya of Uttarkhand - well written and a very thought provoking article where, this phenomenon has been dealt from an unusual prospective. Two more papers in this section deal with landslides. 'GIS-based rock-fall modeling' by Gupta and Saxena justifies the title of the book. GIS techniques have been employed in this study to model rockfall and hazard mitigation in Asingana valley, a tributary of the Bhagirathi River. The identified zones agreed with the field observations, indicating the validity of the concept and the methodology. The third article on landslide is again reported from Nepal Himalayan zones, authored by Thakur and Poudel. They have identified the landslide hazard zones by employing morphometric analysis. The following three articles present the accelerated rates of erosion, of which two of them are from the Himalayan region. The sixth article is by Singh and Dubey, in which the authors stress the role of humans in gully evolution and expansion. Their study is based on four years of intensive monitoring of a gully system in Deoghat, Allahabad. The researchers in this study could convincingly portray the concept of anthropo-geomorphology. This paper leaves no room for any doubt in the minds of the reader that 'it is high time we evaluate the damage we are causing to the natural landscape. A serious thought should be given to this aspect. The next article by Joglekar came as a breath of fresh air as the author pulled the readers away from the Himalayan areas to the Southern Trappean Terrain. The author evaluated the weathering characteristics of this massive landform and related the weathering parameters with the different rainfall zones. The section concluded with an article on soil resource classification of Uttaranchal by Parihar, using RS GIS techniques. An overall assessment of the section is that it would have been very relevant to include few papers from the Deccan Province that focus on landslides and soil erosion. The comparison of these two distinctly different geomorphic zones in these regards would have been beneficial to any reader.

The second theme of the volume is Fluvial Morphology. Six well documented papers on various parameters of river morphology and dynamics, dealing once again with only the northern rivers of India adorn this section. Sinha and Jain contributed an exhaustive review paper on Quaternary Geomorphology of Ganga Basin, followed by a channel pattern study of Bramhaputra River by Goswami. Rai and Bhattacharya have traced the characteristics of alluvial fans in North Bengal and their formative history. Quantitative techniques have been employed by Chandel and Singh to evaluate river morphology of Song and Assan River. The last paper in this section is contributed by Mukhopadhyay in which the author has presented the complex neotectonic history of Bramhaputra-Barak-Manipur Basins. It would have been very appropriate to have included a few articles on this theme based on satellite image studies, not only because the title of the book claimed it to be a compilation of articles displaying recent trends and techniques, but also because remote sensing data provide a useful means to evaluate channel dynamics and morphology in any region.

The next two sections are on Hydrology and Aeolian processes. In the hydrology section, two papers dealt with the exploration and evaluation of groundwater development in general, authored authored by Rao and

second by Chada. The third paper in this theme, written by Kumar et al, presented the palaeochannels of Imphal valley. So far, very few researches have been carried out in this part of the country, even though the area is characterized by variety of geomorphic features. In the true sense of the word, the article is a real contribution to the understanding of Indian geomorphology. S. Singh has reported the morphology, dynamics and rehabilitation of sand dunes of the Thar Desert in the Aeolian section. The author has identified six types of sand dunes in this region and traced their evolutionary history and evaluated their morpho-dynamic characteristics. The second article is the granulometric study of the bedforms of the extremely dry Jaisalmar District, written by A Kar. In addition to a huge textural data demonstrated in the paper, it also includes some very attractive illustrations.

The next category is Coastal and Oceanic Processes, comprising five articles. The first paper, a geomorphic analysis of the Kerala Coastal Plain by S. Chattopadhyay is based on radiocarbon dates, regression and transgression phases of the sea and the associated, geomorphic units. These are chronologically arranged in the study. G.K. Panda has identified Orissa Coast as a neutral coastline with the predominance of land prograding towards the sea, in the next article S. Karlekar has highlighted the problems of beach erosion at Devbag in the west coast of Maharashtra. The author has employed IRS image analysis in the study and DEM was generated to identify the areas of erosion and accretion. The last paper in this section is a contribution from Thamban and Rao where the investigators used clay minerals collected from two sediment cores from the SE Arabian Sea, as palaeoclimatic proxies.

Neotectonics and Evolution of Landforms constitutes the sixth category. The beginning with a review article by A. Kumar, it is followed by Morphotectonic Evolution of Maharashtra Coast by R.K. Suktankar. Neotectonic activity in the Kali Basin in the NE Kumaun Himalaya was investigated by Chamyal and Kaur, while

H.S. Sharma evaluated the geomorphology of Ranthambore Park. All these studies have one thing in common, - geomorphic signatures have been used to identify the neotectinic zones.

The last theme in the volume is "Environmental Aspects of Geosciences", which perhaps implies the degrading geomorphic environment as a response to various anthropogenic activities. The section contains eight articles. The first two papers by Rai S.C and Singh R.B are studies concerning tourism and their impact on the environment, both in the Himalayan region. Site-specific problems were highlighted – but the message is simple, clear and well known: infrastructure construction for tourism has degraded the environment of the area. The next article is a kaleidoscopic view on a similar issue by Druvigen P.C.J, titled "Environmental Aspects in the Urban Fringe". There are two very interesting and informative articles, one on cloud burst in the Himalaya by Prasad et. al and the other on forecasting tropical cyclones in India by Kaur. The reviewer wondered ... what two papers on pure climatology are doing in this volume. The articles though very informative, dealing with complex atmospheric phenomena, are totally out of place in this book. If the cloudburst phenomenon had correlated with certain geomorphic responses, the inclusion of the paper would have been justified. Similar

observations and comments have been expressed in the next paper "Role of Women in Rural Resource Management-Sustainable Development: A case study of Himachal Himalaya" by Monica Rao. The book ends with two essays: Environmental Education for the Earth Scientists and Environmental Impact assessment.

An overall assessment of the articles presented in the present volume reveals that a promising trend of research is going on in various themes in different parts of the country. Data presented in many of these articles of these articles are exhaustive - the results of decades of laborious work by many researchers in the country. The book has covered almost all the themes in geomorphology, but the same cannot be said about regional representation as the bulk of the of the contributions are from the Himalayan Region and the Great Northern Plains. With the exception of the lone article by Joglekar, the Deccan Plateau, particularly the Western Ghats are missing from the scenario. It is surprising that in such an exhaustive compilation how one could have missed the Western Ghats and the Deccan Trap. They have not received the attention they merit. Notwithstanding this omission, there is little doubt that the book has lived up to the expectations raised by the title of the volume and is indeed a reflection of recent trends in geomorphological research. This book will serve as a valuable reference manual for students, teachers and Earth Scientists in India and abroad.

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