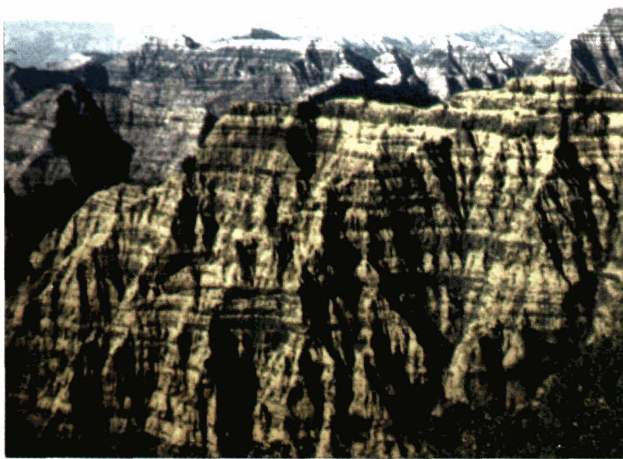


WORKSHOP ON SAHYADRI: EVOLUTION AND EROSIONAL PROCESSES

The *Sahyadri* (Western Ghats), the precipitous edge of an uplifted, rifted and dissected continental margin form the watershed for the major river systems of southern India. The great escarpment of the *Sahyadri* has thrown many questions and challenges to earth scientists in terms of its evolution, erosional processes, drainage, climate and rainfall, biodiversity and environmental management. Against this background, the Geological Society of India organized a workshop on '*Sahyadri*' on 9th May 2005 to enable interaction among scientists working on various aspects of this mountain range and to chart a course for future research activities and motivate young earth scientists. More than 40 scientists from India and abroad participated in the workshop; of these 14 participants made their presentations. The workshop was sponsored and generously supported by the Department of Science & Technology, Department of Ocean Development and Indian Space Research Organisation.



The *Sahyadri*, Mahabaleshwar (after: Kale, V.S. and Subbarao, K.V. (2004) Trans. Japanese Geomorph. Union, v.25, pp.231-245).

Dr. Vinod K. Gaur, Distinguished Professor, CSIR Centre for Mathematical Modeling and Computer Simulation, inaugurated the workshop and Professor Peter Molnar of Colorado University delivered the keynote lecture. Dr. B.P. Radhakrishna, President, Geological Society of India, presided.

Dr Gaur in his speech highlighted the arguments that among rifted continental margins, the Western Ghats exhibits a sharp boundary with extraordinary high relief, but in a region of mild tectonics. He posed the question as to the processes maintaining such high relief in a region of low



Prof. V.K. Gaur delivering the inaugural address at the workshop.

tectonic activity. The *Sahyadri* provide a region of (apparently) low erosion rate, despite extraordinary rainfall. He complimented the Geological Society of India for its fostering the earth sciences, in particular in organizing such workshops.

In his address, Dr. B.P. Radhakrishna dealt elaborately on the evolution, uplift and escarpment of this great geomorphic feature and called upon the scientists to take up research on rates of uplift and erosion. He also emphasized the need to widely employ and popularize the term '*Sahyadri* Hill Ranges' rather than simply referring to them as Western Ghats, as the term 'ghats' conveys a totally different meaning.

Peter Molnar gave a lucid lecture on the effect of climate change on erosional and sediment accumulation rates with examples from different mountainous regions world over, such as Alps, Appalachians, Andes, and Himalayas. He correlated the tectonic uplift and exhumation rates of different mountain regions through geological time with climate change and erosional rates.

Robert Anderson of Colorado University presented his paper on cosmogenic radio-nuclides and their application in geomorphic deduction rates with examples from Santa Cruz, California. He stressed the importance of radio-nuclides in estimating the landscape denudational rates and river-bed erosion rates. Suzanne P. Anderson illustrated in her presentation the linkages between physical and chemical weathering. She discussed the relationship between mean relief and mean denudational rates and erosional rates from large rivers of the world, including Ganges and Brahmaputra.

Dr C Subrahmanyam in his lecture on 'Geophysical signatures of the Western Ghats uplift' raised some outstanding questions that need to be addressed whether underplating has taken place and if so, how much of underplated material is present at intra- and sub-crustal levels, how much of the sedimentation in the offshore region is attributable to denudation process, which determines the volume of sediment to be backstacked, A comparison of the offshore/onland features of the conjugate continental blocks of western India and eastern Madagascar indicates that the comparability begins and ends with onland topography of both the landmasses

T M Mahadevan, in his paper, projected several tectonic features that surround the Periar-Anamalai Plateau (P-A-P) segment of the Western Ghats and highlighted their character as remnant charnockitic massifs dissected down on the north successively by the Trichur-Vaniyambadi fault and the Palghat-Cauvery rift zone. He further explained that low to moderate seismicity of the region points to the low levels of horizontal and vertical deformation that may therefore set limits on geodetic measurements, and felt the need for quantitative geomorphic studies that can throw light on the rates of uplift

Dr R N Singh discussed the modeling of erosion induced subsurface thermal changes. He discussed Lachenbruch's exponential model of radiogenic heat and surface heat flow and heat generation relationship, and time dependent changes in the surface temperature boundary condition. He also placed before the participants the supportive evidences of quantitative estimates of the scarp retreat rates of the large escarpments bordering the passive margins from other parts of the world

Dr Vishwas Kale in his provocative and enthralling talk presented the geomorphological aspects of the Western Ghat escarpment in the Deccan Volcanic Province. He suggested

that the present face of the Ghat escarpment is predominantly the result of fluvial erosion rather than scarp backwasting, and that the Ghat scarp was created great deal closer to the present-day Ghat scarp line than previously suggested

Dr K S Misra gave an in-depth description of the geological and geomorphological evolution and related characteristics of *Sahyadri* mountain ranges, and suggested how these characteristics can be utilized in management of water resources. He delineated geologically and geomorphologically suitable sites in northern *Sahyadri* ranges, where water can be stored on the western side and can suitably be transferred to the east by tunneling through the hill ranges

Dr R Shankar presented rock magnetic properties of soil profiles from the *Sahyadri*. He observed low magnetic susceptibility in soils developed on rock formations such as Sargur schists, Peninsular gneisses, and charnockites and moderate susceptibility in soils of Chitradurga Group schists, but very high for those developed on ultramafics

Dr Sheila Mishra discussed the Quaternary deposits of the Bhima Basin and their implication in the evolution of the *Sahyadri* escarpment. Dr Aparna Watve gave a lucid presentation on a zonal vegetation of duricrusts and mesas in northern Western Ghats, and presented her observations on geobotanical aspects of laterites and Deccan basalts in an excellent fashion

The workshop came to an end with the plenary session with Prof K V Subbarao summing up the salient outcome of the day's deliberations

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