contamination zones in Pimpri Chinchwad Municipal Corporation area S. Chidambaram analyzed the effects of secondary leaching, saline water intrusion and anthropogenic influence on groundwater quality in Gadilam river basin Reuse of treated waste waters in fish farming and irrigation was discussed by V Sreekrishna and others

In the concluding session L C Jain, former Member of the Planning Commission spoke at length about rural development planning, of which water is a key input He was of the view that village development plans should be invariably based on technical information combined wit indigenous knowledge of soil, crop and water Development should not tamper with natural flow of water Equipped with GIS scientists should assist Panchayats to prepare area development plans He spoke about relevance of village plans for economic development and social justice

The recommendations of the seminar highlight the issues of harmonious development, conservation and augmentation of groundwater, S & T inputs in groundwater management. rainwater harvesting, conjunctive use, village level integrated multidisciplinary surveys merging science with indigenous knowledge, equity and sustainability of the resource and community participation The seminar successfully brought leaders of NGOs, and water managers at grass root level face to face with scientists, technologists, economists in iterative sessions on how modern science and technology can address the needs and aspiration of the people for mitigation of water crisis

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FLOW STRATIGRAPHY OF DECCAN TRAPS IN KARNATAKA*

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EXENDED ABSTRACT

Subsequent to the cessation of sedimentation in the continental interior basins of varying dimensions at the end of Neoproterozoic era, the Deccan Plateau segment in the Indian Peninsular Shield, witnessed a prolonged respite in geological events A quiescence of such longevity was complemented by a chain of events triggering one of the most prolific effusion of basaltic rocks lasting over a period of 5 million years during the late Cretaceous – early Paleocene epoch The early flows rapidly obliterated and concealed the pre-trappean landscape with the later ones, by and large serially occupying the already leveled up grounds

Southern central segment of the Deccan Trap occupies the major part of the northern districts of Karnataka with a 28,000 sq km spread This segment of basaltic country forms a relatively low lying undulatory terrain, where isolated small outliers of trap spread over the sedimentary sequence of Purana basins and peneplaned gneissic complex On the western side, it forms Sahyadri ranges where as on the eastern side with a gentle gradiant, the basalts are in contact with granitoids of Hyderabad Table land A gradual rise in elevation is seen from east to west upto Nipani hill ranges in the western part of the Belgaum district Northeast of Gulbarga town and north of Mullamari River, a steep rise in elevation gives rise to Bidar Table land, covered by a thick zone of laterite

A cursory look at the voluminous literature available on Deccan Trap shows that the lithostratigraphy of the flows is one of the least discussed domain Beane et al (1986) have provided a well accepted lithostratigraphic classification for the entire basaltic province of Deccan assigning a 'Group' status with 3 subgroups and numerous formations Formations were further divided as Members and Chemical types Major and trace element geochemistry supported by textural and petrographic characters and Sr isotopes ratio were the critical factors which determined their divisions into Members In that scheme of classification, flow sequence of Karnataka is considered to belong the uppermost Wai Subgroup with three Formations viz Poladpur, Ambaneli and Mahabaleshwar in the ascending order

In the northeastern sector of Karnataka, Mitchell

**Gist of the lecture delivered on 28th March 2007 at the Geological Society of India, Bangalore*

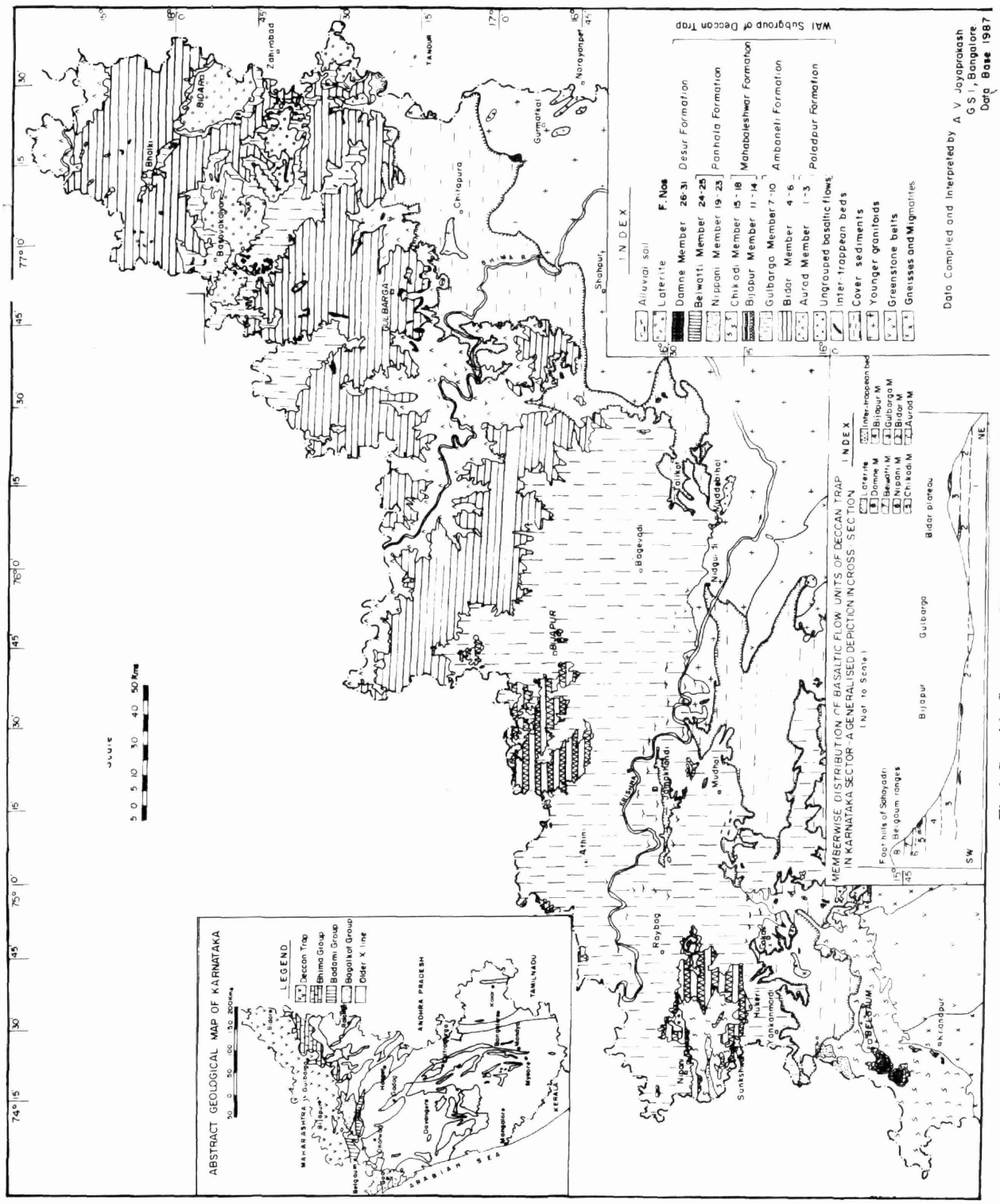

Fig.1. Basaltic flow map of Deccan Trap, Karnataka sector.

and Cox (1988) recorded Poladpur, Ambaneli and Mahabaleshwar Formations Subba Rao and Hooper (1988) in their reconnissance map of the southern edge of the Deccan basalts with selected plotting brought out the presence of all the five Formations of Wai Subgroup in this sector Geological Survey of India has carried out the systematic regional geological mapping of the Deccan Trap on 1 50,000 with a main objective of identifying individual flows A total of 31 flows have been identified from the Karnataka-Andhra Pradesh border in the east upto Karnataka-Maharashtra/Goa border in the west. They have a total thickness of 630 m in the elevation ranges of 390 m on the banks of Bhima River in Bijapur district to 1020 m above msl in the Damne area of Belgaum district Certain isolated or disconnected patches occurring as outliers on Archaean basements and Proterozoic cover sediments were labeled as undifferentiated flows (Table 1)

In this scheme of classification each individual flow is equated to the formal unit of a 'Bed' in the lithostratigraphic nomenclature (Amos Salvador, 1994) With great emphasis on field characters, each flow is identified by the characters seen at their contacts, such as presence of boles, intertrappean beds, internal changes such as the presence of vesicles at the top, break in slope of topography, which is a manifestation of sudden changes in physical and chemical properties Flows are clubbed to be called Members prefixed with the local names This grouping is mainly based on their sectoral presence and pulsation's in eruptions – a gap probably marked by the presence of bole beds, intertrappean beds or zeolite zones These Members are equated or assigned to the already established formations given in the classifications proposed by Beane et al (1986)

Our work was aimed to give a map with flow boundaries, assimilating and adopting the widely accepted pre-existing stratigraphic nomenclature of the proposed by earlier workers (Fig 1) Presence of intertrappean beds for a considerable areal extent, boles, specific topographic manifestations, lateritisation and segmental confinements are used as important criteria for evolving this column thus make it more field oriented Parameters such as flow characters, petrographic and mineralogical properties are the other secondary characters considered

In Karnataka sector flows in general are tabular in form and sheet like bodies having a large areal extent (Fig 1), similar to the ones reported from the other Continental Igneous Provinces No off-set in flow continuity (barring

Table 1 Flow stratigraphy of Deccan basalts in Karnataka segment

Flow Nos	Marker horizon between Members	Members with thickness in m	Formation Equivalents
	Laterite cover		
26,27,28, 29, 30,31		Damne (120)	*Desur*
	Zeolite zones		
24,29		Belvatti (25)	
	Laterite tops		*Panhala*
19,20,21, 22,23		Nippani (110)	
	Red bole beds,		
15,16,17,18		Chikkodi (80)	
	Local red bole beds in Belgaum segment		*Mahabale shwar*
11,12,13,14		Bijapur (80)	
	Intertrappean beds in Bijapur segment, red bole in Belgaum segment		
7,8,9,10		Gulbarga (100)	
	Red bole & Fuller's earth in Gulbarga segment, red bole in Bijapur segment		*Ambaneli*
4 5,6		Bidar (70)	
	Green bole in Bidar and red bole in Gulbarga segment		
1,2,3		Auiad (45)	
	Ungrouped discrete basaltic flows in the lower levels		*Poladpur*
	Archaean crystalline and Proterozoic cover sediments		

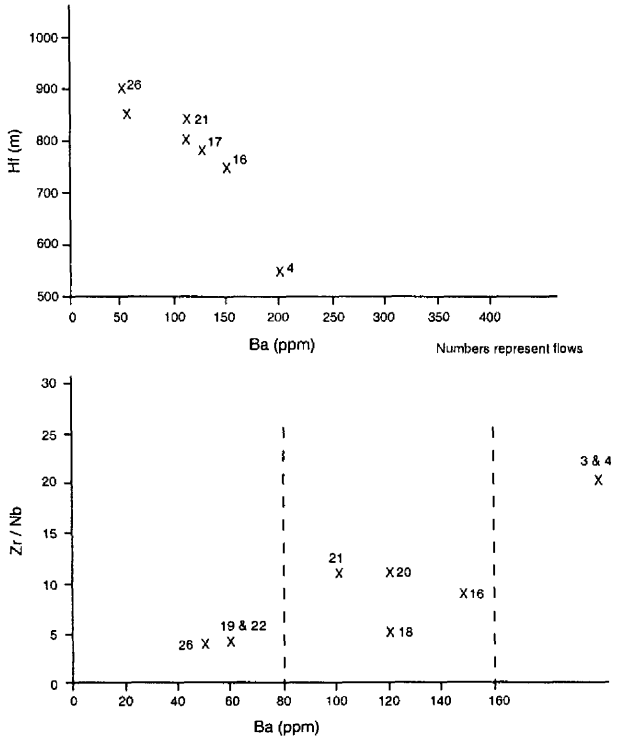

Fig.2. Geochemical characters of Deccan flows

the one along Mullamari River, north of Gulbarga due to dip slip faulting) has been noticed The Bidar plateau is the result of post-depositional tectonism that has given rise to 30 m vertical shift

Infra-trappean beds in their type areas of central and western India has certain specific chronostratigraphic connotation, that these are the sediments deposited before the advent of Deccan Volcanism as a whole They mark the end of great Gondwana sequence and ranges from Santonian to Maastrichtian of Late Cretaceous age Therefore caution need to be exercised before labeling any sedimentary beds of 'Deccan event' as infra-trappean and to be done with proper age correlation Since, it is well established that the flow units of Karnataka belong to the youngest Subgroup, it is imperative to call the interbedded sediments within them as intertrappean irrespective of the underlying units As such no infra-trappean beds are recorded in the Karnataka sector

Limited geochemical studies have been conducted on the samples collected during the course of mapping Plots of Ba in ppm vis-à-vis the flow numbers show a clear upwardly decrease of Ba Also the depletion of Ba shows a positive correlation with Zr/Nb ratio gradually in younger sequences (Fig 2) The younging sequence of the flows as mapped in the Karnataka sector, confirms the widely accepted current model of Plume theory (Richards et al, 1989)

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References

Amos Salvador (1994) International Stratigraphic Guide – Co-Pub – IUGS & The Geol Soc Amer Inc USA, pp 1-50

Beane, J E , Turner, C A , Hooper, P R , Subbarao, K V and Walsh, J N (1986) Stratigraphy, composition and form of the Deccan basalts, Western Ghats, India Bull Volcanology, v 48, pp 61-83

Mitchell, C and Cox, K G (1988) A Geological Sketch Map of the Southern part of the Deccan Province – in Deccan Flood Basalts Mem Geol Soc India no 10, pp 27-34

Richards, M A , Duncan, R A and Courtillot, V E (1989) Flood Basalts and hot spot tracks, Plume Heads and Tails Science, v 24, pp 103-107

Subbarao, K V and Hooper, P R (1988) Reconnaissance Map of the Deccan Basalt Group in the Western Ghats, India *In* Deccan Flood Basalts Geol Mem Soc India, no 10, map in pouch

Announcements

XVII NATIONAL CONFERENCE ON GEOCHEMISTRY

The XVII National Conference on Geochemistry (INAGEQ, Mexico) is being organised by the Department of Centro de Investigaciones en Ciencias de la Tierra, Universidad Autonoma del estado de Hidalgo (UAEH), Pachuca, Hidalgo, Mexico, during 1-6 October, 2007 For more details, please contact Dr J S Armstrong-Altrin, Convener, Centro de Investigaciones en Ciencias de la Tierra, UAEH, Mexico **Email:** altrina@uaeh reduaeh mx or john_arms@yahoo com **Phone:** 0052-771-7161263

NATIONAL SEMINAR ON MAGMATISM, TECTONISM AND MINERALIZATION

The Department of Geology, Kumaun University, Nainital will be organizing the above seminar in conjunction with Decennial Annual Convention of South Asian Association of Economic Geologists (SAEEG), India Chapter, during 29-31 October, 2007 For further details, please contact Prof Santosh Kumar, Convener, MTM-2007, Department of Geology, Kumaun University, Nainital - 263 001, Uttarkhand **Phone:** 05942-239596, 235114 (O), 239953 (R), 09411197714 (M) **Email:** mtm_ku2007@yahoo co in or skyadavan@yahoo com