ON THE OCCURRENCE OF ALKALI-OLIVINE BASALT FROM THE DECCAN TRAPS AROUND PRATAPGARH, RAJASTHAN

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THE area around Pratapgarh (24°N:74°45′E) forms part of the Malwa Plateau in the Deccan Basaltic Province and is characterized by isolated occurrences of subhorizontal flows. The total thickness of the basalt[1] pile is about 200 m.

The present work is confined to the basaltic flow from the horizons between 480 and 490 m above MSL around Pratapgarh town. Petrographically these are plagioclase-pyroxene phyric basalts with substantial glass and opaque minerals. In a few cases minute olivine grains of irregular shape are present in the groundmass. The plagioclase phenocrysts show compositional zoning and have corroded margins in contact with groundmass. Pyroxene phenocrysts are less abundant as compared to plagioclase. The pyroxenes are almost colourless to pale brown in thin sections. In a few cases the pyroxene phenocrysts show twining with (100) as the twin plane. $Z \wedge C$ in pyroxene varies from 32° to 45° and $N_z - N_x = 0.020$ to 0.027.

Seven samples have been chemically analysed. The average chemical analysis of these rocks is given in table 1. In the total alkali-silica diagram all these occur in the field of alkalic rocks[2]. The CIPW norms (calculated after fixing Fe_2O_3/FeO ratio as 0.10 to account for the post extrusion oxidation of lava) show that two samples are nepheline normative (normative nepheline < 5%) and the rest are olivine-hypersthene normative. These have been classified as alkali-olivine basalts.

A comparison of chemical behaviour of these rocks with the alkali basalts from different regions shows that these are quite similar (table 1). The K_2O content of the present alkali-olivine basalts is slightly lower than that of the alkali basalts of Bhuj[3] and Rajpipla[4] area. However, there is not much variation in the

Table 1 *Chemical composition of alkali basalts*

	a	b	c	d	e
SiO_2	48.77	45.58	47.48	48.50	47.00
TiO_2	2.40	3.60	3.51	2.20	2.50
Al_2O_3	15.48	14.62	13.45	16.30	15.80
Fe_2O_3	3.63	8.02	3.85	3.10	3.30
FeO	9.41	7.04	9.15	8.00	7.90
MnO	0.21	0.02	0.17	0.17	0.16
MgO	5.79	5.08	5.75	6.60	7.10
CaO	9.46	9.30	8.94	9.90	10.10
Na_2O	3.07	2.66	2.30	3.00	3.20
K_2O	1.14	1.83	2.61	1.00	1.40
P_2O_5	0.26	0.50	0.53	0.36	0.50
C.I.P.W. norms:					
Q	—	1.15	—	—	—
Or	6.73	10.84	15.46	5.89	8.28
Ab	25.94	22.48	19.46	25.36	22.64
An	25.08	22.49	18.63	28.02	24.60
Ne	—	—	—	—	2.39
Di	16.94	16.16	18.38	15.43	18.24
Hy	3.55	5.55	9.43	7.46	—
Ol	14.54	—	3.01	7.51	12.20
Mt	1.72	11.62	5.59	4.50	4.78
Ie :	4.56	6.84	6.67	4.18	4.76
Ap	0.60	1.18	1.24	0.84	1.18

a. Average of seven alkali olivine basalt from Pratapgarh; b. Alkali olivine basalt plug, Kutch[3]; c. Average of eleven alkali basalt from Rajpipla[4]; d. Olivine alkalic basalts, average of 247 samples[5]; e. All alkalic basalts, average of 661 samples[5].

total alkali contents of the basalts of these three areas which amounts to 4.21, 4.49 and 4.91% respectively. The MgO, CaO and Al_2O_3 values are also quite similar. The Na_2O and K_2O values are similar to those reported for alkali basalts of different regions[5].

The M' values ($100\ Mg^{2+}/Mg^{2+} + Fe^{2+}$, calculated with Fe^{3+}/Fe^{2+} ratio as 0.10) for the present alkali-olivine basalts are 47.23 indicating that the fractionation process has played an important role in the evolution of these basalts.

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FLUCTUATING MONSOONAL PRECIPITATION AS REVEALED BY FORAMINIFERAL VARIATIONS IN A CORE FROM SHELF REGIME OFF KARWAR (INDIA)

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Monsoons in India were poor in 1986 and similar reports for 1987 are now available. There was severe drought in various parts of the country affecting crops and in turn the economy and our economic plans. Drought years need not cause too much hardship if they can be anticipated. This requires long term weather forecasting—a very difficult and delicate task. In order to predict the future behaviour of monsoons with a fair degree of accuracy, the study of palaeomonsoons becomes very important.

Rivers are known to affect physical and chemical conditions and biological and geological processes of the continental shelf regions adjoining their mouths, giving rise to distinctive microenvironments in these areas. The areal extent of these microenvironments depends upon the amount of freshwater discharge from the rivers. Variation in the intensity of monsoons i.e. in the volume of precipitation, would cause fluctuations in the average discharge through the rivers. A transgression and regression of these microenvironments can therefore be expected in phase with pulsating monsoonal discharge.

Any variations and/or cyclicity in the monsoons during the last few centuries could be deduced by examination of the see-saw movements of river-mouth microenvironments using foraminiferal data from sediment cores taken from the adjoining continental shelf. Such an attempt has been made by the present author and preliminary results are presented here.

Based on the foraminiferal distribution in surface sediments from the Dabhol Bhatkal sector of the west coast of India[1–7], Nigam[8] selected the species, *Cavarotalia annectens*[9,10] (Parker and Jones) to monitor the effect of freshwater discharge (through estuaries) on inner shelf foraminiferal fauna. It was observed[8] that this species was absent/rare in front of river mouths and the abundance of this single species from closely spaced sub-samples of a sediment core at any river-mouth would be helpful in the study of palaeomonsoons.

A box core (cross-section 15 × 15 cm, length 1.16 m) was collected on board *R. V. Gaveshani* during its 156th cruise on 17 November 1985 (figure 1) from a water depth of 25 m, in the shelf region off Karwar, in front of the mouth of the Kalinadi river. The core site was selected as Kalinadi is by far the largest river (length 69 km; average annual discharge 207 m^3/s) in the central west coast of India. Subsamples at every 2 cm for the top 10 cm and at

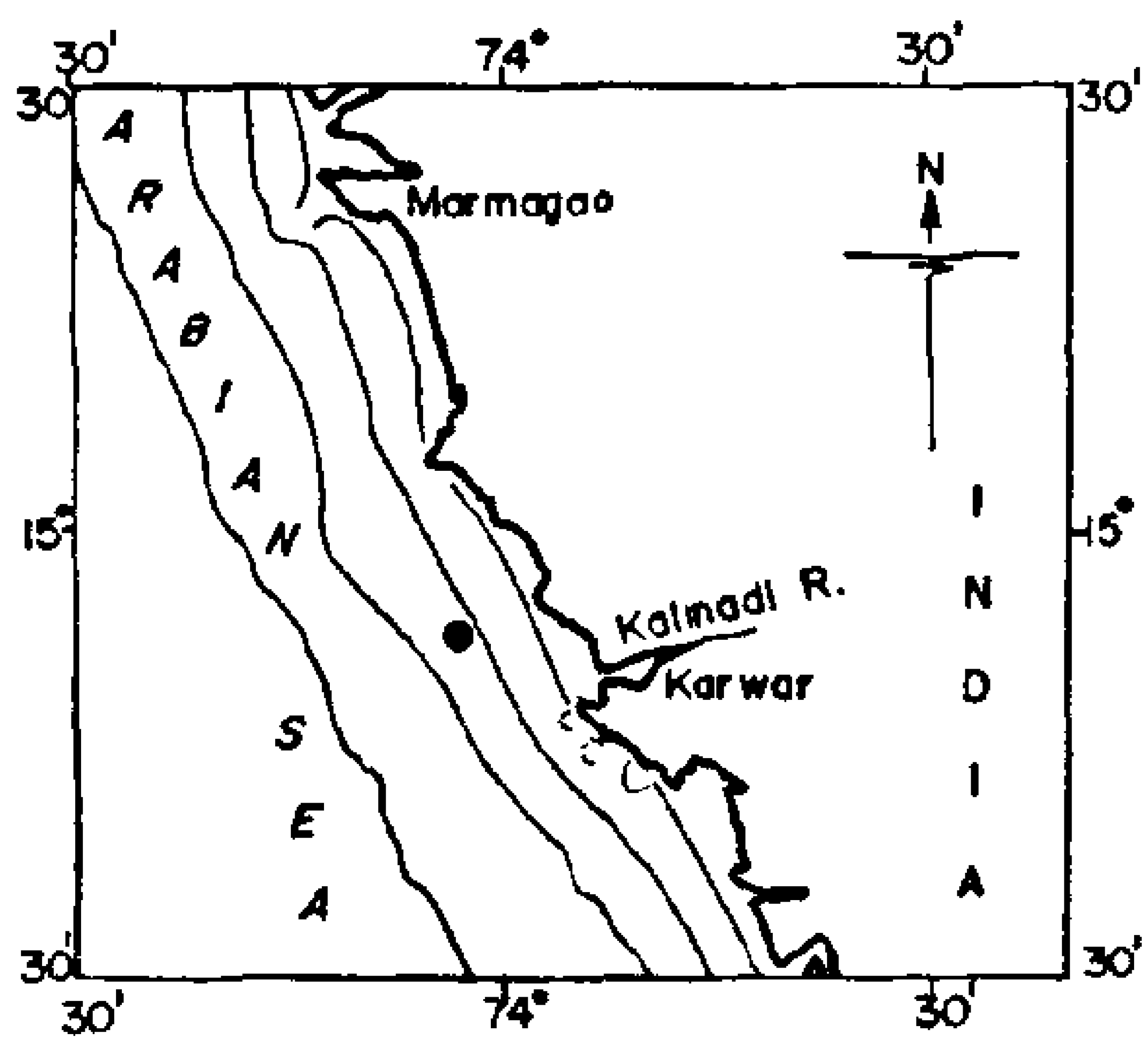

Figure 1. Map of the study area showing core location.