

TEXTURAL ANALYSIS OF BEACH SANDS FROM SOUTH ANDAMAN.

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ABSTRACT

Textural Analysis of sand samples from South Andaman beach has been carried out. The sands are generally medium to fine grained, moderately sorted, negatively skewed and Meso Kurtic to very Lepto Kurtic.

The study indicates that the material was transported by saltation process and deposited in shallow marine near shore environment.

Key-words : Textural analysis, beach sands, Andaman.

INTRODUCTION

The importance of textural analysis of sediments in sedimentary petrology is well known. The grain size parameters are often used in interpreting the environments of deposition of ancient as well as modern sediments. Sand samples from the South Andaman beach were collected in the month of October, 1983 (During the port call of RV *Gaveshani* at Port Blair). This paper gives the textural analysis of these beach sands based on which the mechanism of transportation and the environment of deposition have been explained.

The Andaman islands are characterised by late Cretaceous or early Eocene igneous activity. Gabbros, serpentinites, enstatite peridotites and associated radiolarian cherts cover large areas (Geological Map of India, GSI, 1969).

The beach width range from 4 m at high tide level to as much as 50 m at low tide level. Dilute acid digestion of samples revealed the presence of CaCO_3 to the extent of 30-50%.

Fourteen samples were collected at 5 different profiles (Fig. 1) from back-shore along the length of the beach at 20 m interval. Samples represent the upper few cm (4 cm) column of the beach after removing the top few layers (lag deposit) of the sediment (Mason and Folk 1958).

The samples were washed, oven dried and sieved through ASTM sieves set at $1/2\phi$ interval. From the weight percentage cumulative curves were drawn. The parameters like graphic mean inclusive, graphic standard deviation, inclusive graphic skewness and graphic kurtosis were determined by using the formula of Folk and Wards (1957) and the results of the textural analysis are shown in Table I.

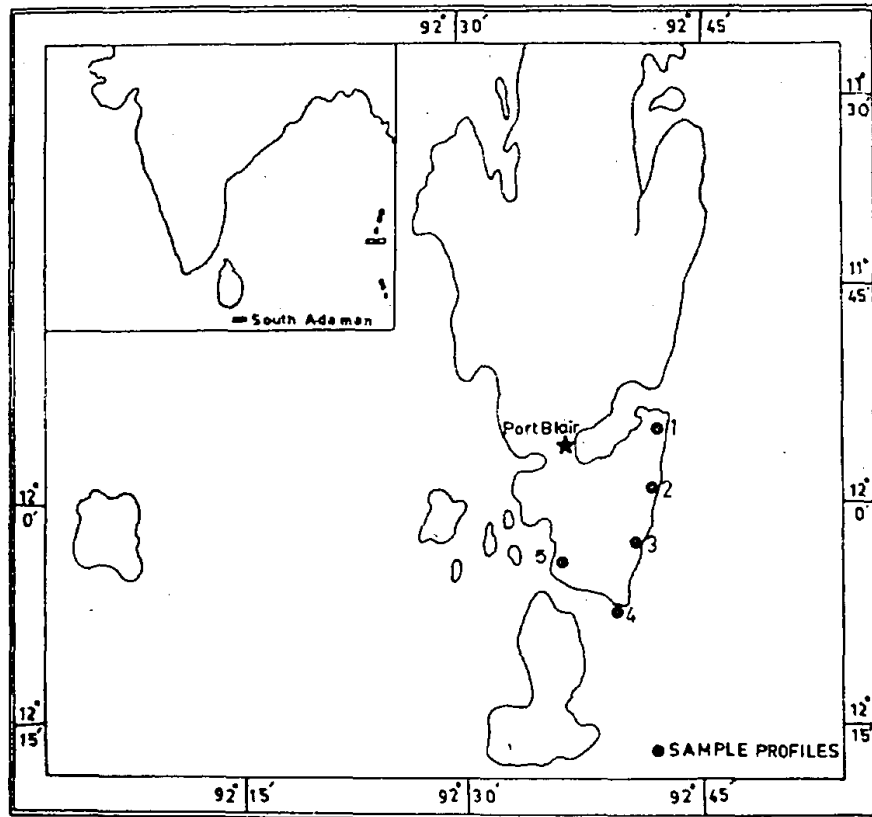


Fig. 1. Location map.

The graphic mean values of South Andaman beach sands range from 1.66 to 2.63 ϕ indicating that the sand particles are of medium to fine size. The inclusive graphic standard deviation values of these sands generally range from 0.560 to 0.80 ϕ suggesting that by and large the sands are moderately sorted except for the sample No. 12 which has a value 0.462 ϕ and falls in the range of well sorted sand. Likewise two samples 7 & 8 have the sorting values of 1.22 and 1.719 ϕ respectively and they are of poorly sorted nature. The inclusive graphic skewness values of the sands range from + 0.101 to -0.664. Most of the samples are negatively skewed and only three samples 6 9 & 12 have shown slight positive skewness. The graphic kurtosis values vary from 0.951 to 2.516 and show that these samples are meso kurtic to very leptokurtic.

The mean size of the samples from profile 5 is comparatively coarser than others and also better sorted. This may be explained, as the beach at profile 5 is comparatively protected in nature and hence the wave energy and mobility will be less compared to other profiles. A decrease in energy results in coarse grain size, and decreasing mobility reflects the limited inputs of sands from outside sources which results better sorted sediments (Nordstrom 1977).

Table I. Results of textural analysis.

	Sample	Mean Size Mz ϕ	Standard Deviation	Skewness SK ₁	Kurtosis K _G
Profile 1	1	2.18	0.780	-0.233	2.143
	2	2.23	0.762	-0.205	2.080
	3	2.21	0.792	-0.142	2.516
Profile 2	4	2.50	0.800	-0.664	1.325
	5	2.32	0.770	-0.596	1.210
	6	2.51	0.781	0.062	1.281
Profile 3	7	1.75	1.220	-0.535	1.650
	8	1.66	1.719	-0.510	1.210
	9	2.63	0.560	0.171	0.961
Profile 4	10	1.94	0.760	-0.416	1.485
	11	1.91	0.736	-0.470	0.960
	12	2.62	0.462	0.101	0.965
Profile 5	13	1.88	0.732	-0.443	1.282
	14	1.90	0.758	-0.398	0.951

Similarly the sorting values are also varying from poor sorted to well sorted nature. This may be due to the mixing of calcareous material in various proportions. Shepard (1964) has shown that for calcareous sand, sorting is worse in near shore zone and the sediments are more negatively skewed.

In the same way the other size parameters are also not uniform for all the samples. This can be explained as Visser (1969) stated that the grain size distribution are in reality mixtures of one or more log normal populations. Depending upon the mixing of size range the grain size distributions vary.

The values of graphic mean of the Andaman sands range between 1.66 and 2.62 ϕ suggesting that these sands were deposited by saltation processes. The standard deviation values of most of these samples range from 0.56 to 0.8 ϕ and indicate moderate sorting. The skewness values range from +0.101 to -0.664. The calcareous nature of the sand further contributed towards negative skewness. Thus the textural analysis of South Andaman beach sands is in conformity with the findings of Friedman (1962, 1967) and Shepard (1964).

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