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GARNET CONTENT IN THE BEACH SANDS OF GOPALPUR (BAY OF BENGAL)

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GARNET an industrially important heavy mineral, has been found to be enriched in the black sand and sand dunes of Gopalpur coast, Bay of Bengal. The average width of the beach is 45 m. The beach runs along the north-south direction and is fringed with ephemeral streams and riverlets. Dunes of various sizes occur all along the backshore region. Black sand concentrations are not uncommon on Gopalpur beach and its occurrence along the East coast of India is well known¹⁻⁶ as it is a potential source of rare-earth minerals. In the present investigation the distribution of garnet and its concentration, in relation to the prevailing hydrodynamical conditions and topography of the area along the beach, have been studied.

Sand samples were collected from three stations (Gopalpur, Arzipalleam, and mouth of Rushikulya river) along a 15 km length at 30 m intervals representing the backshore and foreshore zones of the beach (figure 1). Beach profiles were studied during the pre-monsoon (May 1987) and post-monsoon periods (December 1987). The samples were washed, dried and sieved by using ASTM sieves of 18, 60 and 230 mesh. Garnet minerals were examined using a petrological microscope (MEOPTA)⁷ and the percentage number of the mineral was counted for each fraction. The size analysis of the bulk samples was made following the Folk and Ward Method⁸ on $\frac{1}{2}\phi$ scale and the statistical parameters were calculated in relation to the distribution of the garnet sands.

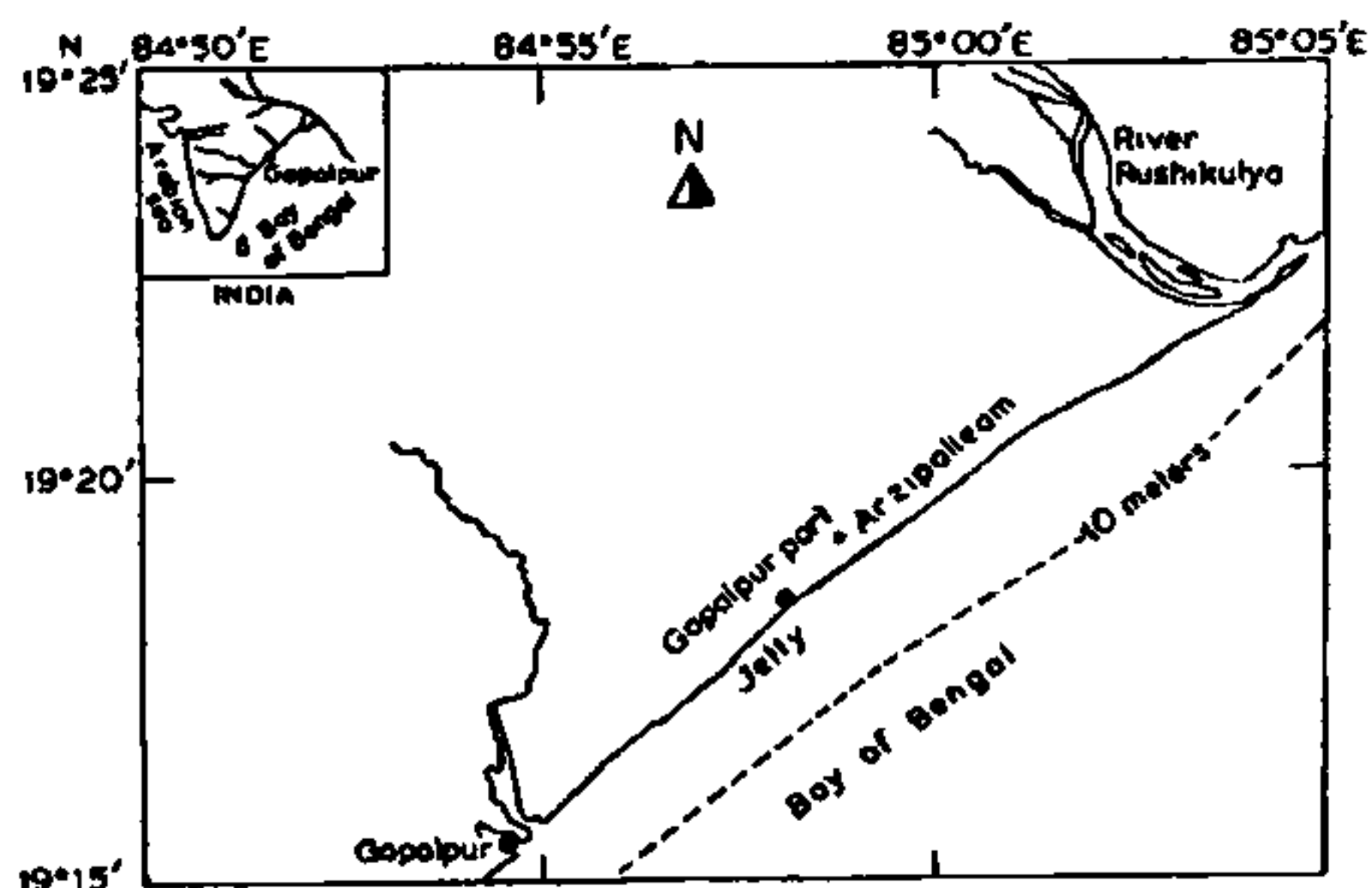


Figure 1. Location map.

Table 1 Size parameters and garnet content of beach sands of Gopalpur

Station	Month	Location	Mean	Sorting coefficient	Skewness	Kurtosis	Average number percentage of garnets
Gopalpur	May 1987	Backshore	0.65	0.8	-0.03	0.3	8.25
		Foreshore	0.8	0.3	-0.07	0.4	
	December 1987	Backshore	0.62	0.6	-0.06	0.8	
		Foreshore	1.05	0.4	0.09	0.7	
Arzipalleam	May 1987	Backshore	2.4	1.8	0.31	1.6	18.5
		Foreshore	1.9	1.3	0.12	1.4	
	December 1987	Backshore	2.3	1.9	0.45	1.2	
		Foreshore	1.75	1.3	0.3	0.2	
Mouth of Rushikulya river	May 1987	Backshore	2.1	1.2	0.01	0.6	12.72
		Foreshore	1.75	1.3	0.3	0.2	
	December 1987	Backshore	1.85	1.2	0.4	0.4	
		Foreshore	2.3	1.6	0.3	0.65	

Red garnet sands are abundant in the north Gopalpur coast near Arzipalleam. The size parameters and the percentage of garnet in beach sands during the period of study are presented in table 1. The garnet content in dune sands of the backshore zone varies from 8 to 48% in the coarser fraction. In the foreshore zone it varies from 20 to 30% in finer fractions and from 8 to 43% in the coarser fraction. The garnet percentage increases from the mouth of river Rushikulya to Arzipalleam and decreases to the south of Gopalpur. The maximum value was noted during the pre-monsoon and the minimum during the post-monsoon period. Fine garnet sands in river-borne sediments are deposited on the beach at the offset of monsoon and swell wave conditions in the sea.

Beach profile measurements and sediment budget study^{9,10} further reveal that the area is affected by alluvial sands. The beach in the north is very flat. The flatness favours progradation and deposition of black sands. The beach at Gopalpur was composed of very well sorted sands throughout the period of study and showed no monsoonal variation. This may be because the presence of the temporary jetties at 3 km to the north of Gopalpur might be obstructing sediment flow further southward during monsoon periods.

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A REPORT ON THE OCCURRENCE OF MICROVERTEBRATES IN THE SUBATHU FORMATION (MONTIAN-EARLY LUTETIAN) NEAR NILKANTH, GARHWAL HIMALAYA, UTTAR PRADESH, INDIA

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A reconnaissance survey of several sections of the Subathu Formation near Nilkanth in the Garhwal