

A SPATIAL BATHYMETRIC VARIATION OVER THE INNER SHELF OFF TRIVANDRUM, KERALA

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ABSTRACT

Systematic echosounding survey was carried out along 7 profiles over the inner shelf off the coast of Trivandrum district. A shoreward shift in the 40 m isobath is noticed all along the area. The gradient for the profiles has been calculated. The difference in the gradient between the northern and southern profiles of the study area suggest a southward movement of sediments in the innershelf.

Key-words : Echograms, monsoonal currents, sediment mobility.

Continuous echosounding survey was done over the innershelf region off the coast of Trivandrum district as part of marine geological investigations. This study was carried out during April/May 1981 using a Simrad's skipper echosounder with 200 kHz frequency. Navigation was aided by a pair of sextants and a station pointer which held good upto 8 km distance on a clear day. Tidal correction was applied to the recorded values. Timelag and range ratio with reference to Cochin tidal datum were found from cotidal chart of the Survey of India. Tidal curve for the survey area was drawn and necessary correction was applied to the recorded values. The results show a remarkable difference in bathymetry between the hydrographic chart (No. 222, 1971) and echosounding records of present survey. This was confirmed by further check on Profile PV3 along which the slope difference between the hydrographic chart and the echograms was first noticed.

Since the variation in bathymetry was more pronounced beyond 30 m on all profiles, slope was calculated for the region between shore and 30 m and between 30 and 50 m depths (Table I). Using the spot sounding values on chart and triangulation method one 40 m contour was drawn. By plotting the 40 m depth on profiles, another 40 m contour was drawn. Shoreward advancement of 40 m isobath (drawn using echogram values) was conspicuous (Fig. 1).

The difference between the slope values for the inshore region between 5 and 30 m depth, calculated from the hydrographic chart No. 222 (1971) and the echoprofiles of present study show a southward decreasing trend till the Kovalam point (Table I). Further south the difference tends to be less (PV2 and PV1). The area under investigation has been reported as a high energy regime (Gopinathan, Sathe and Rama Raju, 1979). The monsoonal waves which are of 8 to 14 seconds period and from W, WNW direction (Reddy and Varadachari, 1972; Swamy, Varma, Pylee, Rama Raju and

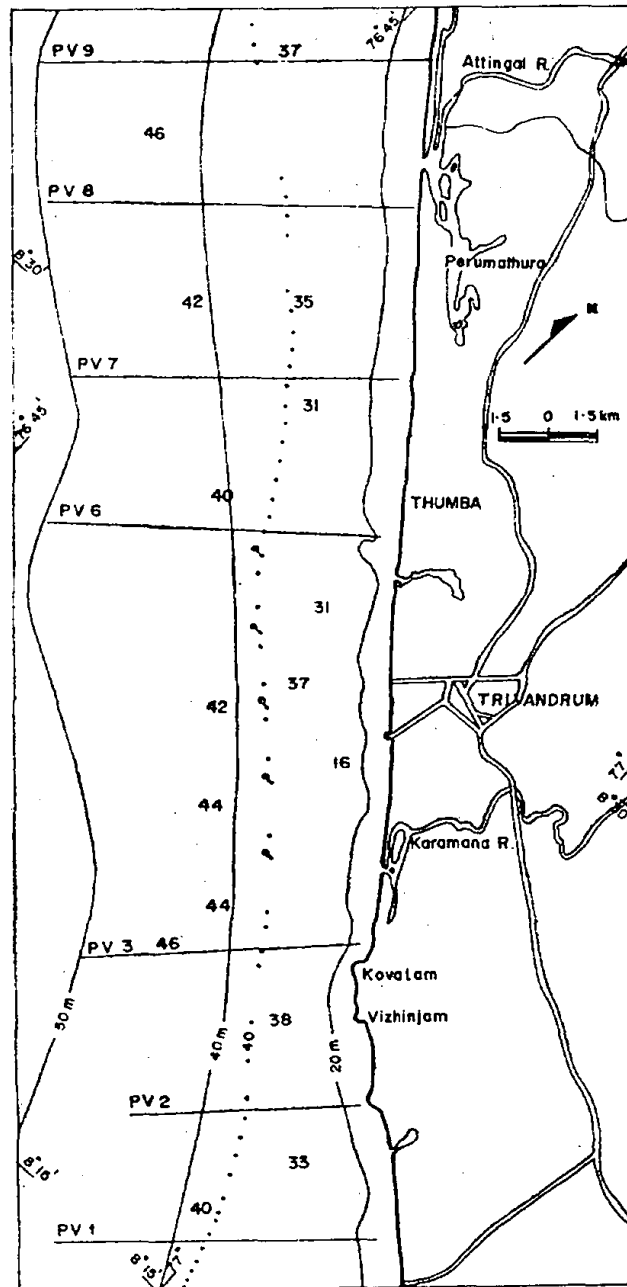


Fig. 1. Location and the shift in 40 m isobath. (Solid line isobath is according to the NHO chart and the dotted line is according to the echoprofiles.)

Chandramohan, 1979) are capable of feeling the bottom and disturb the sediments even deeper than 30 m (MacCork and Thiruvathakal, 1980), the resultant current can favour a southerly movement of sediments. Hashimi, Kidwai and Nair (1981) have reported fine sand fraction as the major constituent in the

Table 1. Shelf gradients calculated from the echoprofiles and Naval hydrographic chart No. 222 of 1971.

Shelf along		Present study 0 to 30 m	1971 chart 0 to 30 m	Present study 30 to 50 m	1971 chart 30 to 50 m
Proof	PV1	1 : 94	1 : 95	1 : 476	1 : 600
"	PV2	1 : 65	1 : 65	1 : 301	1 : 570
"	PV3	1 : 41	1 : 65	1 : 397	1 : 495
"	PV6	1 : 80	1 : 120	1 : 460	1 : 547.5
"	PV7	1 : 65	1 : 125	1 : 447	1 : 510
"	PV8	1 : 94.5	1 : 150	1 : 377	1 : 547
"	PV9	1 : 100	1 : 125	1 : 287	1 : 630

sediments of study area. Further Abele (1977) has observed that 'fine sand' size sediments are more easily disturbed (by 18-24 cm/sec. currents) and the sediments which are coarser or even finer need stronger currents to get disturbed. Sylvester (1962) while explaining the sediment movement around Indian peninsular, also suggested a tendency of dominant southeast movement of sediment along the western coast. The sediments of the study area could possibly, be easily disturbed by monsoonal near coastal currents which are generally towards southeast (Swamy, Varma, Pylee, Rama Raju and Chandramohan, 1979).

The lack of uniformity in slope between the shallower and deeper sectors, suggests that the expenditure of energy for slope modification is of different degree and mode. The deeper sector (30-50 m) is quite possibly outside the influence of near shore coastal currents. Since the existing chart No. 222 is updated more than 10 years ago and the area under discussion is of highly dynamic nature, a change in bathymetry due to sediment mobility could be possible. On the basis of the foregoing discussion it is observed that a periodic bathymetric and sediment facies study are necessary in understanding the general transportation pattern of sediments within such dynamically active innershelf regions.

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