CHAPTER 1
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INTRODUCTION

Gather a shell from the strewn beach,
And listen at its lips they sigh,
The same desire and mystery,
The echo of the whole seas speech,
And all mankind is thus at heart,
Not anything but what thou art,
And earth, sea, man are all in each

-The sea limits
(Dante, Gabriel Rossetti)

1.1 GENERAL INTRODUCTION

A general interest in oceanography stemmed largely due to the fact that ocean is the ancestral home of all creatures on land. Life on earth began in the ocean and its greatest diversity is still found out in the sea. There are secrets on the surface as well as within the bosom of the ocean, which lie shrouded from human observations and approaches. It is believed that where, there is a mystery there will always be interest, and the greater the one, the more intense the other. Indeed, the ocean appears to be composed of an endless bewildering array of creatures. These marine animals (nanno-, micro-, macro-, mega organisms) would be the subject of a wide variety of research. Therefore, in recent years scientific community elicit a genuine interest in the study of these marine organisms.

Among all marine microorganisms, the foraminifera are extremely diverse and widely distributed group of organisms in the marine realm.

The importance of these organisms in paleooceanographic assessment was inherent in Murray’s (1897) early recognition that the pattern of these shell bearing groups on
the sea floor reflects their living distribution. Recent years have seen reinforcement of extent on and evolution of these early insights and a number of attempts have been made to reconstruct paleoclimate using these microorganisms as proxy.

In order to reconstruct paleoclimatic condition based on the foraminiferal studies using foraminifera as a tool over any region, it is of great importance to know the recent distribution pattern of foraminifera and the environmental factors controlling various dimensions of their population in the same region.

Inspite of the prolific presence of foraminifera along the Indian coast, the sector wise distribution profile is still fragmentary. Only few earlier attempts have been made to study their distribution, e.g., areas off Vizhingam-Cannanore and Vengurla-Mangalore sectors.

In view of this, a detailed study of foraminiferal content has been undertaken off Mangalore-Cochin sector between 13 to 10°N latitude on the central west coast of India. The micropaleontological analyses are focussed on benthic and planktonic foraminiferal association with the aim to emphasize on their distributional profile and effect of environmental factors over their population.

1.2 OBJECTIVES OF THE STUDY

The present problem is formulated with the following objectives:

1. Identification, illustration and taxonomy of the foraminiferal fauna upto species level.
2. Quantitative distribution of foraminifera in surficial sediments.
3. To classify benthic foraminiferal populations into morpho-groups on the basis of external test morphology.
4. To identify the influence of depth over the morpho-groups of benthic foraminifera along with their relationship with oxygen minima zone in the Arabian Sea occurring from 150 to 1,500 metres.

5. To exploit modern statistical tools like cluster analysis to study ecology of benthic foraminifers.

6. To study the response of planktonic foraminiferal species with salinity due to south-west and north-east monsoons.

7. To highlight the implications of distributional pattern of planktonic/benthic foraminifers from the study area in reconstruction of paleoclimates over this region.

1.3 SCOPE OF THE PRESENT STUDY

In the prevailing perspective of global warming due to greenhouse effect, the concern for the future of our planet adds a sense of urgency towards scientific investigation. Although the consequences of global change are not very well anticipated nevertheless, reasonable predictions include altered precipitation pattern and a rise in sea level. To understand, describe and predict accurately the behaviour of the earth's climatic system and a bid to prevent eventualities, predictive models are the need of the hour. Knowledge of climatic fluctuations prior to the era of instrumental records is needed for the development of these predictive models. Such data can easily be extracted from multifarious natural archives utilizing proxies. Among archives, marine sediments and biota therein (specially foraminifera) which are deposited continuously, hold promising secrets of the past changes.

To utilize these microorganisms efficiently, adequate knowledge of their distribution pattern in modern marine environment and the factors controlling them is of utmost importance. In view of this, the surficial sediment off Mangalore-Cochin sector have been studied for foraminiferal content and their response to changing marine
environment in the modern marine realm. The main thrust of this work is to evaluate the role of depth over the external morphology of benthic foraminifera, emphasizing the influence of dissolved oxygen content. Understanding thus obtained about the cause effect relationship between foraminifers and environment can provide clues for variations in environmental conditions including sea level changes in the past.

Besides the above, this study also explores the association of different species of planktonic foraminifera to different water masses. It is hoped that the relationship thus deciphered can be applied to study fluctuation in the relative intensities of south-west and north-east monsoons.