1.1 INTRODUCTION

The utilitarian value of the study of foraminifers of both live and dead assemblages in biostratigraphic subdivision, correlation and paleoclimatology is accepted the world over. The assemblage composition of Neogene planktonic forminifers and its relationship to different water masses has been the subject of various recent researches.

Parker (1962) gave a detailed systematic description of the two families: Globigerinidae and Globorotalidae within the framework of a modified classification, based on the study of recent sediments of the Pacific ocean. She reclassified the genera with a stress on the characteristic of the development of spines as a floating-mechanism.

The relative abundance data of planktonic foraminifers from Atlantic sediments were utilised by Imbrie and Kipp (1971) to quantitatively estimate the temperature and salinity of surface waters.

Recently, Be (1977) made on extensive review of ecological, zoogeographic and taxonomic aspects of the planktonic foraminifera from Indian ocean. He described and illustrated 37 recent species of planktonic foraminifera including a new subspecies Globorotalia menardii gibberula and grouped them into different faunal provinces.

From Andaman sea sediments, Frerichs (1971) described the distribution pattern of 17 different planktonic foraminiferal species and concluded that the species distribution was controlled by surface salinity, water depth, diagenesis and topography.

Similar to any other living faunal province , planktonic foraminifers choose to live in different oceanic environments depending upon their tolerances and responses to varying water conditions. Biological factors such as productivity, food-availability, predation, interspecific competition and physico-chemical factors like temperature, salinity, light etc., determine the differential distribution of living foraminifers in the ocean waters.

The geologic significance of planktonic foraminifers lies in their practice of immense reproduction and their ability to build calcareous shells. The constant and continuous fall of the shells upon the sea bed has resulted in the extensive deposition of what is called as calcareous or 'Globigerina ooze'. This phenomenon is occuring since Paleogene. It is believed that the layers of this ooze constitutes more than 45% of the total surface area of the ocean floor (Sverdrup, et al., 1942).

From this, one can make the inference that the study of these dead assemblages, preserved in deep sea sediments,

provides vital clues to an understanding of the different species lived, and the types of water conditions in which they persisted. Since more than 90% of the so called 'Globigerina ooze' is made up of planktonic foraminiferal tests, study of the variation in temporal abundance of these tests helps one to infer the rate of sedimentation in areas under study.

The close correlation that exists between faunal assemblages and environmental conditions leads one to the contention that the study of the stratified fossil remains of planktonic foraminifera in ocean sediments might reveal changes in the climatic conditions during the geologic past. To quote Be (1977), "Phillipi (1910) interpreted the foraminifer-rich sediments overlying the red clays in Indian ocean as having been deposited after the last glacial period. On the basis of materials collected by the 'Meteor Expedition' Schott (1935) was able to determine the differences and similarities in the distribution pattern of live and dead assemblages".

With both taxonomy and paleoclimatology in view, a systematic study of the various planktonic foraminifera encountered in the top 9 m of cores from DSDP sites 214, 237 and 238 (Fig. 1.1), belonging to Late Pleistocene was underta The systematics of the foraminifera are presented with suitab illustrations in Chapter 2.

The variation in the temporal abundance distribution of major planktonic forms is graphically represented. The faunal provinces are discussed in the light of Ericson Zones constructed on the basis of Globorotalia menardii abundance curves for the three sites. The results are discussed in Chapter 3.

The absolute abundance data obtained for total planktonic foraminifers were subjected to time series analysis to decipher any periodic/cyclic element in the abundance series, so that the results can be favourably related to paleoclimatic fluctuations. Furthermore, the data on two abundant climate-sensitive species Orbulina universa (D'Orbigny) and Globigerina conglomerata (Schwager) were analysed using time series analysis to help arrive at reasonable interpretations on paleoclimatic variation during the upper part of Late Pleistocene. The results of the analysis are presented in Chapter 4.

1.2 LOCATION OF THE SITES

Three DSDP sites 214, 237 & 238, all situated in the Northern Indian ocean were selected for the study. Their locations are shown in Fig. 1.1. The site 214 ($11^{\circ}S$, $89^{\circ}E$) is located on the crest of the Ninetyeast Ridge; Site 237 ($7^{\circ}S$, $58^{\circ}E$) is on the Mascarene plateau whereas the site 238 ($11^{\circ}S$, $70^{\circ}E$) is roughly located in between the sites 214 & 237