PALAEOECOLOGICAL STUDIES IN THE SUB-HIMALAYAN REGION

INTRODUCTION

The ancient sediments of the Kashmir valley are generally called Karewas in the geological literature. These primeval lake sediments dating back to c.3.5 m.y. were analysed for diatoms and pollen grains to elucidate the palaeoclimatic changes in the valley of Kashmir. The main objective of the present study are two-fold, as there have been difference of opinions regarding the age of Karewas. They are,

1) to identify and characterize all fossil diatoms and pollen grains from Karewa beds,

ii) to determine, if the pattern of diatom and pollen succession would throw light on, to elucidate the age of geological strata and palaeoecological and palaeoclimatic conditions prevailing during the past ages.

The valley of Kashmir has a unique sediment profile going down to 3 km., and provides one of the deepest sediment records from a land situation to enable one to build up a palaeoclimatic sequence. Today all these sediments are exposed in the form of Karewas and available for sampling.
Determination of palaeoenvironment of a sedimentary succession requires interpretation of processes operating during deposition of its litho units, basically deduced by the physical parameters along with biological and chemical parameters. Thus these relict lake sediments of Kashmir have attracted geologists, palaeontologists, palaeobotanists and archaeologists for almost a century now towards a common goal. Here I have used diatoms and pollengrains as a biological parameter for palaeoecological studies of the Karewas of Kashmir. Diatoms and pollen remains are frequently studied as a part of the palaeoecological approach to the interpretation of past history from the fossil record found in lake sediments, as they have distinct ecological tolerances and are as useful palaeoecological indicators.

Earlier also, palynological investigations have been carried out in the Kashmir valley by various workers from many research institutes, universities etc., whereas diatomological investigations have not been carried out in the valley except for few exceptions. The advantage to my work was the availability of a master litholog for multiple sample collections. All the samples were keyed to master litholog which has been dated by palaeomagnetic, $^{14}$C and other techniques.
I have analysed many samples from different localities of Karewas and encountered various diatoms. Except Ara and Baltal sediments all the other samples proved sterile in diatoms. Only Ara samples are palynologically investigated as other sites have already been investigated palynologically by other workers.

The results obtained from this study are presented in five chapters including introduction and conclusions.

In Introduction (Chapter I) I have described briefly origin of the Kashmir valley, its physical layout, geology as well as geomorphology. I have also dealt with the relevance of diatomological and palynological sciences in palaeoecological studies. The multidisciplinary approach towards the common goal that is in constructing the palaeoclimate of Kashmir valley is discussed along with the location of the sampled sites for the present investigation.

Second Chapter reviewed the previous work done on the different fields namely stratigraphy, sedimentology, geochronology, diatomology, palynology and other palaeobotanical investigations in the Kashmir valley on the late Quaternary and late Cenozoic palaeoclimatic changes.

Chapter three is entirely given to the techniques used for the present investigations both in the field as well as in the laboratory. The laboratory techniques for diatom and pollen are separately discussed. Next comes
pollen analysis, which includes pollen counting, pollen percentage calculations, and drawing of pollen diagram. Pollen zonation is described separately which is based on peaks and depressions in the frequency percentages of the important pollen types and is used as to the diatom analysis. In this chapter I have also described the stratigraphy of the sediments from which diatoms and pollen grains are encountered.

In Chapter four I have discussed all the results of the diatomological and palynological investigations. I have also discussed briefly the chronology of the Karewa group. This chapter also describes some of the diatoms which are new records to India as well as to science.

Chapter five provides a general discussion on the results obtained and conclusions.