PREFACE

The coastal sedimentary environment of Kerala is endowed with opulent estuarine complexes of a few major rivers (Bharathapuzha, Periyar, Kalladayar, Meenachilar, etc.), lagoons, lakes (Vembanad, Ashtamudy, Chaliyar, Beypore etc.) and backwaters (Cochin backwater). These lagoons, estuaries and backwaters are demarked from the Lakshadweep sea by the development of barrier spits and beaches. Hitherto the geochemistry and mineralogy of the sediments in these systems with particular reference to their environment of deposition have not been subjected to any detailed investigation. With the advances in environmental geology it is time that we should study the relationship between various geological aspects and the environment of deposition of sediments in these systems.

In this juncture, Dr.K.T.Damodaran's suggestion brooked my attention to take up the study entitled "Studies on the mineralogy, geochemistry and origin of the modern sediments of the Ashtamudy lake, Kerala". A textural analysis was accomplished to confer
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a nomenclature to the sediments and there upon the general sedimentary framework. The Ashtamudy lake, which is in fact an estuary lies between latitude 8°55'N to 9°N and longitude 76°33'E to 76°37'E. The Ashtamudy lake completely satisfies the definition of an estuary given by Pritchard (1960). Hence it is considered under estuarine system even though it is known by misnomer 'lake', the literary translation of the word 'kayal' in the local language.

This study enfolds the environment of deposition and the lateral variation in texture, mineralogy and geochemistry of the Ashtamudy lake sediments. While the heavy mineral and clay mineral investigations enable us to decipher the nature, texture and source of sediments; organic matter and carbonate contents and the geochemical analysis of major and minor elements help establish the distribution and concentration of the same in regard to the various physico-chemical processes operating in the lake. Study of trace elements holds prime importance in this work, since their concentrations can be used to outline the extent of contaminated bottom area, as well as the source and dispersal paths of discharged pollutants. In short, this study brings out a vivid picture of the
mineralogy and geochemistry of the lake sediments in different environments, viz., the freshwater, brackish water and marine environments that are confined to the eastern, central and western parts of the lake respectively. For the better understanding and expression of the results of the analysis, the lake has been divided into 3 zones namely: eastern part, central part and western part.

The whole work is presented in 6 Chapters.

Chapter 1 covers the introduction which narrates the location, climate of the area of study and geomorphology of the Kallada river. The available information on the geology of Kerala and specially of Quilon district is also reviewed. A cursory review of literature on all the studies of Kerala lakes which includes Ashtamudy lake and Kallada river basin, as well as on lakes in east and west coast of India is included in this Chapter. A brief review of studies on some important lakes in the world is also given. The scope of the present work and a field programme are given towards the end of this Chapter.

Chapter 2 presents the sand-silt-clay ratio, the organic matter and carbonate contents of the sediments.
Chapter 3 describes the mineralogy of the heavy and light minerals and the clays.

The geochemistry of the major elements in the lake sediments is given in Chapter 4.

Chapter 5 gives the geochemistry of the trace elements in the lake sediments. The chapter also contains discussions on the aspects of pollution in the lake sediments.

Chapter 6 gives a summary of the whole study and the conclusions drawn from the results thereof. Discussion on the origin of the lake sediments is also incorporated in this chapter. The chapter also highlights the significance of the present work carried out.

The pertinent literature furnished under references are given towards the end of the thesis.

A part of the present study has been published as below:


Concisely, this could be claimed as the first substantial and integrated study of the mineralogy, geochemistry and origin of the Ashtamudy lake sediments.

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