

M.S.104. SAJAN, K.—Studies of the Mineralogy Geochemistry and Origin of the Modern sediments of the Ashtamudy Lake, Kerala – 1989—Dr. K.T. Damodaran

The Ashtamudy Lake, which is in fact an estuary is the 2nd largest estuary in Kerala, lies between Lat. 8°55' N to 9°N and Long. 76°33' E to 76°37' E. The surficial sediments of the lake were studied for their mineralogy, geochemistry and their origin. The whole work is laid out in 6 chapters.

For the better understanding and expression of the results of the analyses, the lake has been divided into 3 zones namely the eastern central and western parts.

Besides to the mineralogy and geochemistry of the sediments a textural analysis was accomplished to confer a nomenclature to the lake sediments and then to obtain the general sedimentary framework. The study also unfolds the environment of deposition and the lateral variation in texture and mineralogy. The heavy and clay mineral investigations enabled us to decipher the nature, texture, and source of sediments; organic matter and carbonate contents and the geochemical analysis of major and minor elements helped to establish the distribution and concentration of the same in regard to the various physicochemical processes operating in the lake. Study of trace elements holds prime importance in this work since their concentration can be used to outline the extent of contaminated bottom area, as well as the source and dispersal paths of the discharged pollutants. This study could bring out a vivid picture of the mineralogy and geochemistry of the lake sediments in different environments viz. fresh water, brackish water and marine environments that are confined to the eastern, central and western parts of the lake respectively.

From the general sedimentary framework, it is observed a general decrease in grain size from eastern to central part and then an increase towards the western part. The organic matter content is high at eastern and central parts where as at the western part it is low. The direct relationship between the texture of the sediment and the organic matter content is brought out here. Also the role of texture and organic matter content to demarcate the zones of different energy level in the lake. From the carbonate content and its distribution, it is concluded that carbonates are of biogenic in origin.

The variations in the mineralogy of the heavy, light and clay minerals directly reflects the variation in their respective sources. The progressive depletion of feldspars and corresponding enrichment of quartz from the eastern through central to western part, is attributed to selective abrasion and chemical weathering. The dual source of sediments to the lake is also brought out from the mineralogical studies.

The results of the geochemical analysis for the bulk sediments and clay fractions shown that most of the elements are concentrated in finer fractions

and the variation in their content is mainly due to the different geochemical environment in the lake.

For monitoring the pollution aspects of the lake sediments, the values obtained for the trace elements were compared with values obtained for the unpolluted sediments of the other lakes. It is found that the anthropogenic disturbance is high and the sediment is polluted with Cu, Ni, Cr, Zn, Pb and As, but unpolluted with Co.

The importance of the study is that the variations in texture, mineralogy and geochemistry of the sediments could delineate the sediments of different environments.