

**M.S.90. UNNIKRISHNAN, V.P.—Texture, mineralogy and provenance of the beach sands of South Kerala—1988—
Dr. Y.L. Dora.**

A detailed sedimentological study of the beach deposits of the area from Azhikode in the north to Manavalakurichi in the south is embodied in this thesis. The beach sands of Kerala are world famous for the occurrence of valuable placer minerals such as ilmenite, monazite, rutile, sillimanite, zircon, leucoxene etc.

The sedimentological studies on the 280 km long South Kerala beaches, subenvironments like backshore, berm, foreshore and low water mark and the fifteen westflowing South Kerala rivers were pursued with the following objectives.

This thesis consists of eight chapters. The general introduction to the area of study is given in the first chapter. Chapter II deals with sampling and laboratory techniques. The geology and geomorphology of South Kerala beaches and drainage basins of various rivers are discussed in Chapter III. The beach processes and sedimentary structures along the South Kerala Coast are presented in Chapter IV. The results and discussions of the texture, mineralogy and provenance of beach sands and river sands are given in detail in Chapters V, VI & VII respectively. The eighth Chapter gives, in brief, the summary and salient conclusions of the investigations.

The size analysis reveals that the phi mean (\bar{z}) and phi median (\bar{m}_d) size decreases (grain size increases) towards south, i.e. from Azhikode to Manavalakurichi for the four subenvironments of the beach, like backshore, foreshore, berm and low watermark. Majority of the sands are medium to fine in size. The standard deviation shows that its range is from 0.41 ϕ to 01.37 ϕ and no significant lateral variations are noticeable.

In general, the skewness (SKI) and Kurtosis (KG) show inverse relationship. Skewness ranges from positively skewed to negatively skewed and the majority are nearly symmetrical. The correlation among various statistical parameters

shows no marked interrelationship except that the standard deviation increases with the decrease in kurtosis in all subenvironments.

The phi mean, phi median and graphic skewness of river sands also slightly increase towards south. Majority of river sands are coarse-grained in size. The river sands are predominantly either moderately sorted or poorly sorted, positively or negatively skewed and mesokurtic in nature.

The roundness studies indicate that roundness values increase from Azhikode to Manavalakurichi for 3 size grades of the backshore, foreshore and river sediments. Zircon shows a slight increase in its roundness towards south both in beach and river deposits. The other minerals have no noticeable lateral variations. Opaques, hornblends, sillimanite, garnet etc. show an increase in their roundness with an increase in size. In general, the beach sands are more rounded than the river sands.

Regarding the mineralogy, the study of the variations of heavy and light minerals shows that the percentage of heavies sharply increases with a decrease in grain size. Among the heavy minerals, monazite and zircon show marked increase in percentage with decrease in size grade. Among the non-opaque heavy minerals; while hornblend is the most dominating mineral in the northern parts of the study area, sillimanite is abundant in the central and southern parts. It is also noted that pyrozone decrease towards south. The lateral variations observed in the other heavy minerals are less significant. In general the river sands show a decrease in the percentage of heavies from the source to the mouth.

Quartz is the predominant (average 97.7%) among the light minerals in beach sands.

In order to decipher the provenience of beach sands of South Kerala, the textural and mineralogical analyses were correlated with the results of textural and mineralogical analysis of samples from all the rivers of South Kerala. The correlation studies were carried out with the help of the mineralogical analysis of rock specimens collected from the drainage basins of various rivers.