The scientific study of the coast in India is only three decades old. The studies on the coasts were initiated only in early 60’s when Oil and Natural Gas Commission (ONGC) and Geological Survey of India (GSI) started exploration of petroleum along the coastal sedimentary basins. Only then, studies were conducted along the coast of Tamilnadu, as two of the sedimentary basins namely the Palar and the Cauvery occur in this part of the coast. Even then, scientific studies on coastal geomorphology of northern Tamilnadu are very few.

The present study is a type of reconnaissance study and the purpose is to identify regional patterns of coastal morphology and sedimentation. This type of study forms an essential part of environmental planning and coastal management especially for third world countries like India where population is concentrated along the coastal belt.

The study area is a part of Coromandal coast that encompasses the coast of Andhra Pradesh and Tamilnadu and extend to a length of 285 km along the northern Tamilnadu coast between Coleroon in the south and Pulicat in the north. The coast comprises varieties of landforms and most of them were inherited from the Quaternary episodes of sea-level oscillations. Hence, landforms were observed for sea-level indications and the geomorphic guides were supplemented with lithologic and archaeologic evidences. With the help of these data the Quaternary sea-level history and the impact of sea-level
oscillations on coastal evolution have been traced. Since, feed
back operates on all geomorphological systems, the interpretation
of landforms generates information on past processes that were
involved in the genesis of landforms. Besides the morphologic
characters, the characteristics of sediments of depositional
landforms like cheniers, beach ridges, paleo-barriers and beaches
were analysed for understanding the environment of deposition.

As fluvial processes are also involved in sculpturing
the coastal landscape, the fluvial and fluvio-marine landforms
occurring along the coast of the study area were interpreted.
The results of the study bring to light that the sea-level
oscillations have induced the shifting of the domain of fluvial
sedimentation by shifting the river courses.

It is increasingly regarded worldwide that no part of
the earth is stable. The effects of neotectonism are being
noticed in many parts of the so called 'Shield' areas. The
pattern of disposition of present and abandoned river channels of
the study area discloses a crustal flexure in the form of
downwarping - a neotectonic effect on the coastal landscape.

The geomorphic evidences of the neotectonism are
corroborated with Bouguer Gravity anomalies.

The present day beach processes are not in harmony with
the coastal landforms in many parts of the world. To understand
the relation between the modern beach processes and the beach
dynamics, wave refraction patterns were developed using numerical
models. The results of the study suggest that the erosive coast
observed near Ennore does exhibit harmonious relation with the
modern beach processes while the coast of Pondicherry is in contradiction.

The successful application of satellite data interpretation on geoscientific studies have been demonstrated at large in the past two decades, many who were opposing the technique at the beginning have started appreciating it. Understanding the importance, an attempt has been made in the present study on the digital analysis of satellite data for coastal landform delineation.

The details of the above said factors and phenomena have been discussed in this thesis. The thesis comprises five chapters.

Chapter 1 deals with scope, objectives, method of study, location, geology and other physiographic details of the study area.

Coastal geomorphology is dealt in chapter 2. The distribution and description of coastal landforms have been discussed with suitable maps and illustrations. Interpretation of satellite images and aerial photographs and detailed field observations form the basis for the preparation of geomorphic maps. Morphometric characters have also been discussed. The method and results of digital interpretation of satellite data can be found at the end of the chapter.

Chapter 3 discusses the grain size analysis of sediments of different landforms. The details of historical background, field and laboratory procedure adopted for granulometric studies can be found at the beginning of the
chapter. The grain size data has been utilised through statistical parameters, frequency curves, bivariant plots, CM pattern and Visher’s diagram to infer the nature of the depositional environment prevailed along the studied coast.

Coastal evolution is dealt in chapter 4. Quaternary sea-level studies, fluvial processes, tectonism, wave refraction study and coastal classification are the important sub-divisions of this chapter. Under the section of the Quaternary sea-level studies, historical background covering the important sea-level studies of the world and indicators of sea-level in the study area that include geomorphic, lithologic and archaeologic evidences are discussed. The stages of coastal evolution as an impact of the Quaternary sea-level oscillations have been brought out with illustrations.

A study on fluvial processes has brought to light the inherent relation between sea-level oscillations and channel shifting. The evolutionary stages of the landforms associated with the rivers of the study area have also been traced and discussed with suitable illustrations.

Neotectonic effect on the coastal landforms, method and results of wave refraction study and coastal classification form the later part of the chapter.

Chapter 5 summarises the work and presents the salient results of the study.