The marine boundary layer plays a vital role in the energy exchange processes between ocean and atmosphere. Due to their large thermal inertia, the oceans control the overall weather and climate. The energy exchange at the air-sea interface influences the oceanic and atmospheric circulations through wind and current regimes.

The reversing monsoonal winds in the Indian Ocean cause considerable changes in the circulation and thermal conditions of the ocean mixed layer. The thickness and heat content of this layer vary seasonally due to vertical mixing and surface heat exchanges, thus modifying the oceanic and atmospheric circulations. Heat budget parameters also exhibit seasonal variations in association with the reversing winds.

Recent studies have revealed that most areas of north Indian Ocean, especially western Indian Ocean are warm enough for the development of onset vortex. Considerable lowering of the surface temperature occurs as a consequence of surface heat loss during the monsoon season.

The present study is an attempt to understand the upper ocean conditions in the northern Indian Ocean in relation to India monsoon on a seasonal and daily basis. It is also aimed at examining the relative role of ocean heat potential on the development of cyclonic storms. Variations of different energy exchange components in the northern Indian Ocean are studied during pre-onset, onset and break periods of monsoon. Heat
storage and heat advection of the mixed layer and 0-200m layer are also analysed with an aim of quantifying the heat export or import during the monsoon season.

The thesis is divided into five chapters. The general introduction, literature review, scope, area of study and the data and methodology employed in the present study are included in the first chapter.

The second chapter deals with the estimation of mixed layer depth (MLD) and the spatial variations of Sea Surface Temperature (SST) and MLD in the northern Indian Ocean on a seasonal and daily basis using climatological data and data during 1977-1986. Mixed layer slope variations in the equatorial Indian Ocean have also been discussed in this chapter.

Seasonal and daily variations of heat content of each 50m layer upto 200m have been presented in the third chapter. The role of cyclone heat potential on atmospheric disturbances have also been discussed.

The fourth chapter deals with the variations of different heat budget parameters in the north Indian Ocean during pre-onset, onset and break-monsoon periods. Heat storage and heat advection have also been presented for different latitude belts.

At the end of chapters II, III and IV, the discussions of the result obtained are included.

Last chapter provides the overall summary and conclusion of the present study.