Executive Summary

Remote sensing has promised to revolutionize land characterization by delivering spatial information critical of land surfaces. Numerous airborne and space-based sensors using multi-angle, multi-spectral and multi-polarisation radar techniques have been used to demonstrate the efficiency of a remote sensing/GIS approach to land characterization and management.

Scatterometers, in particular, have been very useful in determining global near surface winds over the ocean surface. However, lately, there have arisen other applications of scatterometry besides measuring wind. The exchange of energy between atmosphere and land surface depends on the characteristics of the land cover. Therefore land characterisation is one of the important inputs for weather/climate or environmental analysis.

Countries like India have wide varieties of soils and variation in rainfall and irrigation pattern from one part of the country to another. In addition to this, wide variation exists in the vegetation type and densities within the country.

Over the land surface, backscatter is related to surface roughness and dielectric properties as well as volume scattering from vegetation and snow cover. Due to such physical mechanism, it is possible to address some of the large-scale phenomena over the land surface biophysical variables retrieval.

The studies presented in the thesis are focussed on the characterization of land surface in terms of features like vegetation (forests, agriculture), desert, urban, water body, soil, etc. using multi-frequency and multi-temporal scatterometer data.