F O R E W O R D

An integrated geoscientific exploration strategy has been utilised to delineate the economically viable iron ore pockets in Goa. The present thesis details the exploration procedures, the data processing techniques, the development of relevant software together with the corroboration of these with that of actual drill data. Successful application of magnetic survey methods for iron ore exploration in Goa is of great significance in that present reserves of the ore do not last long and there is a need to assess the resources potential for continuation of the mining activity, a field in which lot of investments have been made and the necessary infrastructure is available.

The main contributions of the author are as follows :-

1. The geological details of Sigao and Advalpale area are investigated in great detail.
2. The magnetic susceptibility measurements have indicated that a susceptibility contrast exist between ore horizon and the surrounding rocks, and this has been utilised for the delineation of ore bodies concealed under thick laterite cover.
3. Magnetic survey has been conducted in a known deposit. Relevant software is developed to process the data. The depth of ore horizon computed from magnetic field data is compared with that of drilled data.

4. Similar survey are then conducted in a region suspected to contain the iron ore pockets though the size, shape and depth of concealed body are unknown. Using the magnetic methods, these pockets are delineated.

5. As a part of the data processing methods, spectral analysis of the magnetic survey data is done using the following procedures :

   (a) Interpolation of the data and study of autocorrelation and spectral estimates along with the development of computer software in FORTRAN IV for IBM 1620 and REYD EC 1030.

   (b) Application of these concepts to geo-exploration problems like proving the existence of the ore and determining the likeable depth of the ore.

The dissertation consists of eight chapters. The first chapter is an introduction of the work carried out. The second and third chapters describe general geology of Goa region and local geology of Sigao and Advalpale area respectively. The fourth chapter presents the geophysical studies carried out, while the fifth chapter deals with a review on spectral analysis. The sixth chapter presents the necessary write-ups for the computer programs developed. In the seventh chapter interpretation parts has been discussed. The eighth chapter deals with conclusion.

The following conventions are followed in the thesis :

a) The numbers for the figures and tables are given chapterwise.

b) Relevant figures and tables are given at the end of the chapters.

c) The geological maps, cross-sections, slice map and other figures which are relatively bigger in dimensions are folded and presented in volume-II of this thesis.

d) References are presented at the end of the last chapter.

C O N T E N T S