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STUDIES IN EQUATORIAL AERONOMY

A THESIS

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BY

SURENDRA PAL

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PHYSICAL RESEARCH LABORATORY

AHMEDABAD 380 009

INDIA

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D E D I C A T E D

TO

MY PARENTS

CERTIFICATE

I hereby declare that the work presented in this thesis is original and has not formed the basis for award of any degree or diploma by any University or Institution.

Surendra Pal

SURENDRA PAL

(Author)

Certified by

Satya Prakash

SATYA PRAKASH
(Professor-in-charge)

STATEMENT

This thesis is based on the studies of the equatorial ionosphere carried out by the author at Physical Research Laboratory, Ahmedabad, India under the guidance of Prof. Satya Prakash. The experimental measurements were made using rocket-borne probes flown from Thumba and SHAR, India.

The present investigations ~~were~~ aimed at studying the electric field and electron density irregularities in the equatorial electrojet and night-time equatorial spread-F.

The author has actively participated in designing, fabricating and testing of the payloads and microcomputer based data acquisition/processing systems for these studies. A new double-probe system was developed by the author for the vertical and horizontal electric field measurements, which is particularly suitable for these studies in the equatorial region.

This thesis has been divided into five chapters. The first chapter gives a brief introduction to the equatorial ionosphere and the plasma density irregularities observed in this region. The phenomenon of equatorial spread-F is also introduced.

The second chapter deals with the experimental techniques used for the above studies. A brief review of the techniques used earlier for electric field measurements, along with the details of a new double probe system developed for the present studies are given here. The last section describes the data processing system.

Results of the electric field and electron density measurements carried out in the equatorial E-region are described in the third chapter.

The fourth chapter describes results of the night-time studies conducted in the equatorial spread-F.

Chapter five summarises significant results and conclusions obtained from the studies presented in this thesis.

Surendra Pal
(Surendra Pal)

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