STUDIES IN NIGHT AIRGLOW

PRESENTED

BY

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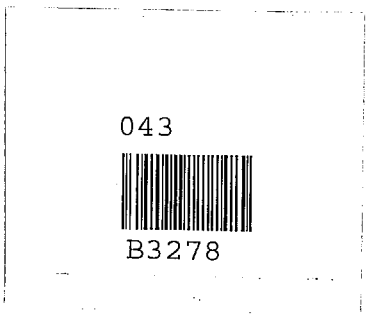
FOR

THE DEGREE OF

DOCTOR OF PHILOSOPHY

OF

THE GUJARAT UNIVERSITY



1968

PHYSICAL RESEARCH LABORATORY

AHMEDABAD.

वायुः अन्तरिक्षे दीप्यते। जैमिनि ब्राह्मण १।१९२।

THE AIR GLOWS IN SPACE.

— Jaimini Brahmana 1, 192.

The Jaimini Brahmana (research on Vedas) written by Jaimini Rishi the author of Mimansa Darshana is as old as seven thousand years.

INTRODUCTION

A good deal of work on night airglow and its dependence on other phenomena has been carried out in middle and high latitudes, but systematic studies of this phenomenon in low and equatorial latitudes have been few. Besides, there are some special features in the airglow of low latitudes.

The present work on night airglow was started in November 1964 at Mt.Abu (India) in the quiet phase of solar activity with improved equipment and due attention to regular calibration.

After a general discussion on the seasonal and nocturnal variations of 5577 A, 5893 A and 6300 A emissions, the special features observed in the course of the present work are presented and discussed in this thesis.

A reason for the maximum in 5577 A emission around midnight has been suggested. A regular feature over and above the post-midnight enhancement of 6300 A has been observed and it has been interpreted on the basis of the dynamics of the night-time ionosphere. Employing recent atmospheric models, the seasonal variation observed in post-twilight decay of 6300 A emission has been discussed.

The vertical luminosity profile of 6300 A emission has been discussed from a theoretical point of view and the

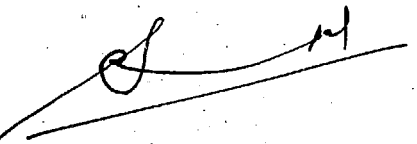
latitude distribution of intensity has been derived. The results are compared with the latitude distribution observed on board the Altanin ship.

There have been a few occasions when peak-to-peak covariation in 6300 A and 5577 A emissions has been observed along with enhancements in their intensities. A chapter has been devoted to discuss this.

Some peculiarities of the nocturnal variation of sodium glow in the upper atmosphere, have been found.

Towards the end of the thesis, isophote-maps of the three radiations in night airglow over the dome of the sky at Mt. Abu have been presented for a number of days showing the progress of nightglow activity in time and space.

Author



Countersigned

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(S.R.Pal)

CONTENTS

SECTION B

CHAPTER V

CHAPTER VI

CHAPTER VII

STUDIES OF 5890-96 A EMISSION IN NIGHTGLOW

CHAPTER VIII

RESULTS FROM THE ISOPHOTE-STUDIES OF THE NIGHT-SKY