

## CONTENTS

Foreword .....	<i>Masaki EJIRI</i> . . . . .	i
Auroral images and particle precipitations observed by the sounding rocket experiment at Syowa Station .....	<i>Masaki EJIRI, Takeo HIRASAWA, Takayuki ONO and Takasi OGUTI</i> . . . . .	1
Attitude detection by horizon aspect sensor on board rockets launched at Antarctic Syowa Station .....	<i>Masahiro ISHIDOU, Motoo TANAKA, Hideo KASHIWAGI and Tooru OOHII</i> . . . . .	22
Nonlinear effect for the Omega signals in the auroral ionosphere by rocket observations .....	<i>Masanori NISHINO and Egil UNGSTRUP</i> . . . . .	26
Preliminary results from the auroral zone ionosphere observations during the AZCO balloon campaign in 1985 .....	<i>I. B. IVERSEN, Hiroshi MIYAOKA, Natsuo SATO, S. ULLALAND and Ryoichi FUJII</i> . . . . .	36
A balloon observation of auroral X-ray images in the northern auroral zone .....	<i>Yo HIRASIMA, Hiroyuki MURAKAMI, Atsushi NAKAMOTO, Kiyoaki OKUDAIRA, Hiromu SUZUKI, Takamasa YAMAGAMI, Shigeo OHTA, Michiyoshi NAMIKI, Jun NISHIMURA, Hiroshi MIYAOKA, Natsuo SATO, Ryoichi FUJII and Masahiro KODAMA</i> . . . . .	44
Lidar measurements of Antarctic stratospheric aerosols during 1983, 1984 and 1985: Effect of volcanic eruption of El Chichón .....	<i>Yasunobu IWASAKA, Takayuki ONO and Akio NOMURA</i> . . . . .	56
Lidar observation of the mesospheric sodium layer in Antarctica: Preliminary result .....	<i>Akio NOMURA, Yasunobu IWASAKA, Hiroshi FUKUNISHI, Takeo HIRASAWA, Sadao KAWAGUCHI and Tetsuo KANO</i> . . . . .	62
Numerical model of the sodium layer in the mesosphere: Seasonal and diurnal variation .....	<i>Michihiro UCHIUMI and Motowo FUJIWARA</i> . . . . .	67
Geomagnetic sudden commencements observed at the Syowa-Iceland conjugate stations .....	<i>Hiroshi NAGANO, Tohru ARAKI, Toshihiko IYEMORI, Hiroshi FUKUNISHI, Natsuo SATO and Masaru AYUKAWA</i> . . . . .	78

Pi 1 pulsations associated with substorms and their conjugate behavior	<i>Yoshio KATO and Yutaka TONEGAWA...</i>	92
Relationship between power line radiation and VLF wave activities observed in Iceland	<i>Iwane KIMURA, Hiroshi HIGUCHI, Kozo HASHIMOTO, Natsuo SATO and Takashi MATSUDO...</i>	97
Phase and amplitude of VLF Omega signals observed simultaneously at three stations in Iceland in association with magnetospheric substorms	<i>Takashi ARAKI, Natsuo SATO, Ryoichi FUJII and Takashi KIKUCHI...</i>	109
SAR arc and its relationship to polar substorm	<i>Shoichi OKANO and Jai SOO KIM...</i>	117
Structure of large amplitude abrupt magnetic variations observed by the MAGSAT	<i>Toshihiko IYEMORI, Akinari NAKAGAWA and Tatsuya IKEDA...</i>	130
Pc 3 magnetic pulsations observed at low latitudes: A possible model	<i>Kiyohumi YUMOTO, Takao SAITO and Yoshihito TANAKA...</i>	139
Preliminary studies on the whistler observation at Great Wall Station of China, Antarctica	<i>HE Changming and TSCHU Kangkun...</i>	148
The wave distribution functions of plasmaspheric ELF hiss: GEOS 1 observation in the equatorial region	<i>Masashi HAYAKAWA, M. PARROT and F. LEFEUVRE...</i>	157
The generation mechanism of ELF hiss in detached plasma regions of the magnetosphere, as based on the direction finding results	<i>Masashi HAYAKAWA...</i>	173
Propagation characteristics in the earth-ionosphere waveguide for VLF waves emitted from trapping cones at high latitudes	<i>Isamu NAGANO, Masayoshi MAMBO, Tetsuya SHIMBO and Iwane KIMURA...</i>	183
3-D electrostatic and electromagnetic ray tracing in the magnetosphere	<i>Kimiya YAMAASHI, Kozo HASHIMOTO and Iwane KIMURA...</i>	192
Defining a geoelectric index	<i>I. B. IVERSEN...</i>	214
A new multimode FM/CW ionosonde	<i>Kenrou NOZAKI and Takashi KIKUCHI...</i>	217