Contents

Preface v

G.X. Ai

Section I. Solar Surface Magnetism

Magnetic Reconnection in the Solar Lower Atmosphere
C. Fang, P.F. Chen, and M.D. Ding 3

Small-Scale Magnetic Structure in the Photosphere: Relevance to Space Weather Phenomena
V. Martinez Pillet 9

Sunspot Dynamics and Coronal Heating
N. Hurlburt and D. Alexander 19

Solar Coronal Activity and Evolution of the Magnetic Field
E.E. Benevolenskaya, A.G. Kosovichev and P.H. Scherrer 27

The Sun-as-a-Star Magnetic Field: Results of Stokesmeter Measurements in Different Spectral Lines
M.L. Demidov, V.Y. Zhigalov, V.S. Peshcherov, and V.M. Grigoryev 33

Useful Aspects of Chromospheric Magnetic Field Data
T. Sakurai, D.P. Choudhary, and P. Venkatakrishnan 37

Configurations of Magnetic Fields in Solar Active Regions
H.Q. Zhang 41

Reversed Polarity Structures and Powerful X5.7/3B Flare on July 14, 2000
W. Li, Y. Deng, Y.H. Yan, and X.M. Bao 45

Properties of Twist of Solar Bipolar Magnetic Fields
L.R. Tian and H.Q. Zhang 51

Helicity Evolution of a Spot
Y. Liu and H. Zhang 55

The Distribution of Magnetic Shear of Active Regions From 1995 to 2000
J. Dun, H. Zhang, B. Zhang, and R. Li 59

The Evolution Rate of Small Solar Active Regions and Its Temporal and Spatial Variations
A.A. Golovko 63

Correcting the Projection Effects of Solar Vector Magnetogram
H. Li 67

Applications of Magnetic Line Ratio Method to Magnetographic Observations of Large-Scale Solar Magnetic Fields
R.M. Veretsky and M.L. Demidov 71

The Primary Design of A 1-Meter Infrared Solar Telescope
W.D. Cao, Z. Liu, and B.X. Ye 75

Huairou Data On Line
G. H. Lin 79

Section II. Solar Magnetic Activity

Lower Energy Cutoff of Nonthermal Electrons Derived From Batse/CGRO Hard X-Ray
W.Q. Gan, Y.P. Li, and J. Chang 85

Non-LTE Inversion of an Hα Flaring Loop
M.D. Ding, Y. Liu, P.F. Chen, and C. Fang 89

Magnetic Flux Cancellation Associated with Coronal Mass Ejections
J.X. Wang, J. Zhang, and Y.Y. Deng 93

Dip-Like Magnetic Field Structure Seen in Solar Prominences

Common Characteristics of CMEs and Blobs: a New View of Their Possible Origin
V.G. Eselevich and M.V. Eselevich 109
Contents

Statistical Studies of Filament Disappearances and CMEs
G. Yang and H. Wang
113
Catastrophic Behavior of Coronal Magnetic Flux Ropes in Partially Open Magnetic Fields
Y.Q. Hu
117
Coronal Response to the Emergence of New Magnetic Flux
M. Zhang
125
Initiation of Coronal Mass Ejections
N.V. Nitta
129
What Can We Learn From Constructing CME Models
J. Lin and J.X. Wang
137
A Dual-Loop Initiation Model for Coronal Mass Ejections
A.M. Uralov, S.V. Lesovoi, and V.G. Zandanov
145
Coronal Mass Ejections From the Corona to the Interplanetary Medium
M. Pick
149
Relation Between Coronal Mass Ejections and their Interplanetary Counterparts
N. Gopalswamy
157
A Manifestation of Magnetic Fluxes in Microwave Emission of the Solar Corona
165
Statistical Properties of Radio-Rich Coronal Mass Ejections
169
The Broadening Cause of the CaXIX Resonance Line in Solar Flares
Y.P. Li and W.Q. Gan
173
Dynamical Features of the Dipole Magnetic Fields Generated Two X-Ray Coronal Mass Ejections and Type IV\mu Burst
S.C. Ji
175
S-Shaped Magnetic Field Generated an Extra Large Type IV\mu Burst and Coronal Mass Ejection
S.C. Ji
179
Solar Centimetric Type N and Type M Bursts
M. Wang, Q.J. Fu, and R.X. Xie
183
Role of Hydrogen and Deuterium in Energy Release From the Solar Flare: Comment on Neupert Effect
R.B. Lu
189
Analysis of the January 6-11, 1997, CME Event
193
Section III. Dynamical Response of the Heliosphere
Analysis of Lasco Observations of Streamer Blowout Events
A. Vourlidas, R.A. Howard, J.S. Morrill, and S. Munz
201
The Geoeffectiveness of Frontside Full Halo Coronal Mass Ejections
X.P. Zhao
209
The Heliospheric Magnetic Field Probed with Fast Charged Particles
J. Giacalone
217
Evolution of the Bastille Day High-Speed Stream
Y.C. Whang and L.F. Burlaga
225
Ensemble and Time Averages: the Missing Diamagnetic Effect
R. Steinitz
233
The Global Significance of the CEP Events
J.S. Chen and T.A. Fritz
239
Effects of Electron Pressure Gradient in Magnetic Reconnection
J.B. Cao, Z.W. Ma, G.C. Zhou, and Z.X. Liu
251
The Effect of Geomagnetic Disturbances on Ecosystem
C.Y. Fan
255
Relationship Between the Cumulative AL and Dst Indices During Magnetic Storms and the UT Variations of the Dst Index
B.-H. Ahn, G.H. Moon, W. Sun, Y.D. Park, and G.X. Chen
259
Contents

Solar Wind Density and the Auroral Electrojets During Geomagnetic Storms 263
Y. Kamide, J.-H. Shue, and M. Brittnacher

A Cone Model for Coronal Mass Ejections 267
W. Liu, S.P. Plunkett, and X.P. Zhao

Injection of Intense Storm Ring Currentions 271
L. Xie, Z.Y. Pu, B. Yu, S.Y. Fu, Q.G. Zong, and J.N. Tu

Heliospheric Magnetic Fields and Particle Transport 275
Y.Q. Lou

Geomagnetic Disturbances as Probabilistic Nonlinear Processes 281
X. Watanabe, H. Shirai, and Y. Kamide

Fine Structure of Sprites and Proposed Global Observations 287
E.A. Gerken, and U.S. Inan

Night-Time Behavior of 630 Nm Emission in Mid-Latitude Auroras during Strong Magnetic Storms 295
A.V. Mikhailov

Doppler Effects in the High-Latitude Ionosphere during Observations Geomagnetic Pulsations 299
Yu. V. Lipko, A. Yu. Pashinin, and R.A. Rakhmatulin

Time-Variation of Periodic Components of Yearly Sunspot Numbers 307
Y.B. Han, Y.G. Han

A New Model for Evaluation of the Electromagnetic Energy Flux into an Open Night side Magnetosphere 311
V.V. Shelomentsev

Numerical Modeling the High-Latitude Ionosphere 315
A.V. Tashchilin and E.B. Romanova

Basic Cause of Solar Magnetic Activity Solar Motion or Gyromagnetic Effect 327
S.L. Dong

Section IV. Space Exploration and Environment

Some Implications of the Interball Studies for Space Weather 333
L. Zelenyi, G. Zastenker, A. Petrukovich, L. Chesalin, P. dalin, M. Riazantseva, E. Ryazanova,
and E. Lakutina

Solar Radio Bursts and Fine Structures in the Range of 1.0-7.6 GHz on 14 July 2000 345
S.J. Wang, Y.H. Yan, and Q.J. Fu

On the Solar Radio Spectro-Interferometry at Low Frequency 349
Y.H. Yan, Q.G Huang, Z.H. Qin, and J. Zhan

Drift Shell Tracing and Secular Variation of inner Radiation Environment in the Saa Region 353
Z.Y. Fu, L. Xie, X.H. Fang, W.X. Jiao, S.Y. Fu, and Q.G. Zong

Energetic ions in the High Latitude Magnetosphere During the Leading Phase of Acme 359
Q.G. Zong and T.A. Fritz, S.-Y. Fu, Z.-Y. Fu, and P. Daly

Space Environment Data Acquisition Equipment - Attached Payload on the International Space Station 365
K. Koga, T. Goka, H. Matsumoto, H. Koshishi, Y. Kimoto, T. Kanamori, C. Kamakura, M. Ito,
and M. Endo

Space Environment Data Acquisition Equipment on Board Mission Demonstration Test Satellite-1 369
H. Koshishi, H. Matsumoto, Y. Kimoto, H. Liu, and T. Goka

Section V. Space Weather Prediction

Space Weather: The Scientific Forecast 375
H. Wang, P. T. Gallagher, and V. Yurchyshyn

Space Weather Effects and how Soho has Improved the Warnings 385
P. Brekke

Implementation and Verification of the Chen Prediction Technique for Forecasting Large Nonrecurring Storms 393
C. Arge, S. Wahl, J. Chen and S. Slinker, and V. Pizzo
## Contents

An Applicable Method for Long-Term Solar Cycle Predictions  
**J.L. Wang, Y.B. Han, J.-C. Gong, S.-Q. Liu, G.M. Le, and J.L. Sun**  
397

Real-Time Space Weather Forecasting Driven by Solar Observations  
**C.D. Fry, W. Sun, C. Deehr, M. Dryer, Z. Smith and S. -I. Akasofu**  
401

A New Mechanism for Auroral Electron Acceleration by Nonlinear KAW  
**D.J. Wu, J.K. Chao, L.C. Lee, and X.S. Feng**  
409

Geomagnetic Activity and Solar-Cycle Dependence of the Ring Current Ions  
**S.Y. Fu, Q.G. Zong, Z.Y. Pu, and L. Xie**  
421

The Application of Non-Linear Filtering Methods to the Forecast of Geomagnetic Indices  
**R.F. Harrison and P.M. Drezet**  
427

Prediction of Relativistic Electron Fluence Using Magnetic Observatory Data  
**H.-L. Lam**  
439

Space Weather Aspects of the ESA Solar Orbiter Mission  
**R.G. Marsden and B. Fleck**  
443

Effects of Hysteresis in Solar Cycle Variations Between Flare Index and some Solar Activity Indicators  
**A. Özgüç and T. Ataç**  
447

Author Index  
453

List of Participants  
457

List of Unpublished Papers  
459