

Developments in Atmospheric Science 9

ALAIN L. FYMAT and VLADIMIR E. ZUEV (editors)

Remote Sensing of the Atmosphere: Inversion Methods and Applications



Developments in Atmospheric Science, 9

Remote Sensing of the Atmosphere: Inversion Methods and Applications

Edited by

ALAIN L. FYMAT

*Jet Propulsion Laboratory
California Institute of Technology
and*

*The Fymat Research Foundation
Pasadena, California, USA*

and

VLADIMIR E. ZUEV

*Institute of Atmospheric Optics
USSR Academy of Sciences (Siberian Branch)
Tomsk, USSR*



ELSEVIER SCIENTIFIC PUBLISHING COMPANY
Amsterdam — Oxford — New York 1978

CONTENTS

	Page
<i>Preface</i>	v
CONFERENCE SUMMARY	xi
<i>A. L. Fymat</i>	
TEMPERATURE SOUNDING	
INVERSION METHODS AND THE OBSOLESCENCE OF DIFFERENTIAL EQUATIONS FOR SPECIFYING PHYSICAL OBSERVABLES.	1
<i>J. I. F. King</i>	
SOME EXPERIMENTS ON THE EFFECT OF REMOTE SOUNDING TEMPERATURES UPON WEATHER FORECASTING	9
<i>M. Halem, M. Ghil and R. Atlas</i>	
NONLINEAR INVERSION: THEORY AND PRAXIS	35
<i>J. I. F. King</i>	
A NEW TREATMENT OF THE BOUNDARY TERM IN THE INVERSION OF THE RADIATIVE TRANSFER EQUATION	43
<i>H. E. Fleming and D. S. Crosby</i>	
EVALUATION OF ERRORS IN DERIVED CLEAR COLUMN RADIANCES	55
<i>L. McMillin</i>	
RECURSIVE FILTERING OF RADIANCE DATA FROM NIMBUS-E SATELLITE	65
<i>I. A. Ismail</i>	
DEPENDENCE OF THE TEMPERATURE DEVIATION OF THE OCEAN SURFACE AS MEASURED BY SATELLITE ON THE SIZE DISTRIBUTION OF AEROSOLS	79
<i>T. Takashima</i>	
THE DETERMINATION OF ATMOSPHERIC TEMPERATURE PROFILES FROM INFRARED INTERFEROMETER MEASUREMENTS ON BOARD OF METEOR-25	91
<i>V. A. Golovko and D. Spänkuch</i>	

COMPOSITION SOUNDING

GLOBAL TOTAL OZONE DETERMINATION FROM NIMBUS 4 BU SPACECRAFT DATA.	97
<i>A. J. Fleig, R. S. Fraser, B. W. Guenther, D. F. Heath, E. Hilsenrath, L. V. Novak V. G. Kaveeshwar, R. D. McPeters, C. L. Mateer and A. G. Miller</i>	
INFORMATION CONTENT AND RESULTS OF NON-LINEAR INVERSION OF NIMBUS 6 LIMB RADIANCE INVERSION RADIOMETER DATA	107
<i>J. C. Gille and P. L. Bailey</i>	
AN APPROXIMATE METHOD FOR NONLINEAR INVERSION OF LIMB RADIANCE OBSERVATIONS.	115
<i>P. L. Bailey and J. C. Gille</i>	
A NONLINEAR TECHNIQUE FOR INVERTING LIMB ABSORPTION PROFILES	123
<i>J. D. Mill and S. R. Drayson</i>	
SENSITIVITY OF THE INVERSION OF LIMB RADIANCE MEASUREMENTS IN THE 6.3 μm WATER VAPOR BAND.	137
<i>H. Fischer</i>	
AN ANALYSIS OF NIMBUS-V THIR 6-7 μm OBSERVATIONS OVER THE MEDITERRANEAN SEA.	149
<i>M. Roulleau</i>	
MICROWAVE GROUND-BASED DETERMINATION OF ATMOSPHERIC TOTAL WATER CONTENT.	161
<i>G. G. Shchukin and L. P. Bobylev</i>	
A SOLAR HETERODYNE RADIOMETER FOR THE DETERMINATION OF THE ALTITUDINAL PROFILES OF ATMOSPHERIC GASES	169
<i>V. I. Astakhov, N. V. Vanin, V. V. Galaktionov, V. M. Dorokhov, V. M. Zakharov and V. U. Khattatov</i>	
PASSIVE REMOTE SENSING IN THE PRESENCE OF MULTIPLE SCATTERING: A NUMERICAL INVERSION METHOD	175
<i>B. R. Barkstrom</i>	

PARTICULATE SOUNDING

RECONSTRUCTING THE SIZE DISTRIBUTION OF SPHERICAL PARTICLES FROM ANGULAR FORWARD SCATTERING DATA	195
<i>A. L. Fymat and K. D. Mease</i>	

	Page
COMPLEX REFRACTIVE INDEX OF ATMOSPHERIC AEROSOLS: A SIZE DISTRIBUTION INDEPENDENT RETRIEVAL APPROACH USING MULTI- SPECTRAL TRANSMISSION RATIOS	233
<i>A. L. Fymat and K. D. Mease</i>	
THE METHOD OF MULTIFREQUENCY LASER SOUNDING OF ATMOSPHERIC AEROSOL MICROSTRUCTURE	257
<i>V. E. Zuev and I. E. Naats</i>	
LASER SOUNDING OF THE ATMOSPHERE USING AEROSOL SCATTERING	265
<i>V. E. Zuev</i>	
STRATOSPHERIC AEROSOL LAYERS MONITORED BY LIDAR	277
<i>R. Reiter, H. Jaeger, W. Carnuth and M. Littfass</i>	
LIDAR DETECTION OF ATMOSPHERIC CONTAMINANTS BY RAMAN SCATTERING AND FLUORESCENCE SPECTRA	287
<i>V. M. Zakharov and V. A. Torgovichev</i>	
REMOTE SENSING OF CLOUD PROPERTIES FROM NIMBUS 5	295
<i>D. J. McCleese</i>	
THE ATMOSPHERIC BLURRING EFFECT OF REMOTELY SENSED EARTH IMAGERY	305
<i>S. Ueno, Y. Haba, Y. Kawata, T. Kusaka and Y. Terashita</i>	
<i>Author Index</i>	321
<i>Subject Index</i>	325