

MICROWAVE RADIOMETRY AND REMOTE SENSING OF THE ENVIRONMENT

EDITOR:

D. SOLIMINI

*Università Tor Vergata
Rome, Italy*

UNIVERSITÄTSBIBLIOTHEK
HANNOVER
TECHNISCHE
INFORMATIONSBIBLIOTHEK

///VSP///

Utrecht, The Netherlands, 1995

CONTENTS

Preface	v
1. RADIOMETRIC SENSING OF ATMOSPHERIC WATER VAPOR AND CLOUD LIQUID	
1.1 Water vapor	
Clear-air observations of water vapor by ground-based microwave radiometers and Raman lidar <i>Y. Han, J.B. Snider, E.R. Westwater, S.H. Melfi and R.A. Ferrare</i>	3
Observed and theoretical atmospheric emission at 20, 30, and 90 GHz: Recent results from land- and ocean-based locations <i>J.B. Snider</i>	13
Forward modelling for AMSU <i>P.J. Rayer</i>	23
Profiling of atmospheric water vapor with the millimeter-wave imaging radiometer <i>J.R. Wang, P. Racette and L.A. Chang</i>	33
Assimilation of satellite derived moisture fields for numerical weather prediction <i>G. Deblonde, L. Garand, P. Gauthier and C. Grassotti</i>	43
Estimation of errors in the two-beamwidth-antenna method for microwave measurement of atmospheric water vapor <i>S. Hashimoto</i>	53
Improved GPS vertical surveying & GPS sensing of atmospheric water vapor <i>R. Ware, F. Solheim, C. Rocken, T. van Hove and C. Alber</i>	65
Using microwave radiometry and space geodetic systems for studies of atmospheric water-vapor variations <i>G. Elgered, J.M. Johansson, and J.L. Davis</i>	69
Influence of tropospheric electrical path delay on interferometric observations in millimeter radioastronomy <i>L. Olmi</i>	79

1.2 Cloud liquid

The retrieval of tropospheric water vapor and cloud liquid with an iterative non-linear algorithm <i>R. Peter</i>	95
Observations of total column precipitable water vapor and cloud liquid water using a dual-frequency microwave radiometer <i>J.C. Liljegren</i>	107
Retrieval of atmospheric water vapour and liquid water using a single frequency microwave radiometer <i>P.O.J. Jarlemark</i>	119
Effectiveness of brightness temperature ratios as indicators of the atmospheric path conditions <i>A.V. Bosisio and C. Capsoni</i>	129
Spatial features of the sky brightness temperature at Roma <i>F. Barbaliscia, E. Fionda and P. Masullo</i>	139
Horizontal variability of water vapor and cloud liquid water as derived from space borne observations <i>S.A. Tjemkes and M. Visser</i>	147
Estimation of cloud liquid water contents from SSM/I and METEOSAT observations: Application to the SOFIA-ASTEX experiment <i>C. Prigent and G. Seze</i>	155
An improved total precipitable water algorithm for cloudy situations <i>R. Furhop and E. Ruprecht</i>	165
Spectral and temperature dependencies of the millimeter and centimeter wave absorption in clouds <i>B.G. Kutuza</i>	175

2. RADIOMETRIC SENSING OF RAIN

2.1 Models of precipitation

Effects of hydrometeor shape and orientation upon passive microwave brightness temperature measurements <i>J. Turk and J. Vivekanandan</i>	187
Influence on cloud and rainfall characteristics on brightness temperatures of the Earth measured by satellite <i>B.G. Kutuza, A. Hornbostel and A. Schroth</i>	197

A quantitative comparison between 3-D and plane parallel microwave radiative transfer codes applied to horizontally and vertically structured precipitating clouds <i>L. Roberti and C. Kummerow</i>	209
3-D radiation transfer effects of a raining cloud <i>Q. Liu and C. Simmer</i>	219
A microwave radiometry characterization of precipitating clouds <i>P. Basili, P. Ciotti, G. d'Auria, F.S. Marzano and N. Pierdicca</i>	229
2.2 Retrieval of rain	
Polarimetric measurements and model calculations of downwelling rain brightness temperatures <i>A. Hornbostel, A. Schroth and B.G. Kutuza</i>	239
Precipitation profile retrieval from airborne microwave radiometers: A case study over ocean during CaPE <i>F.S. Marzano, A. Mugnai, N. Pierdicca, E.A. Smith, J. Turk and J. Vivekanandan</i>	253
Sensitivity of SSM/I rain rate algorithms to variations in water vapor and cloud liquid water: A modeling study <i>B.A. Burns and F. Flender</i>	265
Retrieval of liquid and ice water content in atmosphere using Special Sensor Microwave Imager (SSM/I) <i>F. Weng and N.C. Grody</i>	281
Review of the SSM/I-based algorithms submitted for the CPCP-AIP/2 <i>G.L. Liberti</i>	297
3. RADIOMETRIC SENSING OF THE EARTH'S SURFACE	
3.1 Snow and ice	
Identification of snowcover and precipitation using the Special Sensor Microwave Imager (SSM/I) <i>N.C. Grody, R.R. Ferraro and A.N. Basist</i>	309
Multi-temporal aspects in snow retrieval using spaceborne radiometers <i>J. Noll, J.P.V. Poiares Baptista, M. Borgeaud and A. Rognes</i>	321
Retrieval of snow and sea ice parameters from SSM/I data <i>J. Grandell, L. Kurvonen and M. Hallikainen</i>	333

Airborne microwave radiometer measurements of Baltic sea ice <i>L. Kurvonen and M. Hallikainen</i>	347
3.2 Ocean surface	
Validation of liquid water path and surface windspeed retrievals from an airborne microwave radiometer <i>S.J. English, D.C. Jones and R.W. Saunders</i>	357
How to describe the ocean roughened surface in microwave emissivity models? <i>C. Guillou, C. Prigent and S.J. English</i>	369
On the use of different ocean surface models in radiative transfer calculations <i>M. Schrader and Q. Liu</i>	379
3.3 Crops and forest	
Microwave dielectric models of leaves <i>C. Mätzler</i>	389
Potential of multifrequency techniques in microwave radiometry of crops <i>P. Ferrazzoli, L. Guerriero, S. Paloscia and P. Pampaloni</i>	391
A model and experiments for microwave radiometry of forests <i>L. Guerriero and C. Mätzler</i>	401
Microwave radiometry as a tool for forest fire detection: Model analysis and preliminary experiments <i>G. Luzzi, P. Coppo, P. Ferrazzoli, S. Gagliani and T. Mazzoni</i>	411
Polarimetric scattering and emission from a layer of random clusters of small spheroids and dense spheres <i>Y. Jin</i>	419
Microwave radiometry of vegetation: Recent advances <i>G. Macelloni, S. Paloscia, P. Pampaloni, R. Ruisi and C. Susini</i>	429
4. NEW RADIOMETRIC SYSTEMS	
4.1 Synthetic aperture radiometers	
Progress in remote sensing with thinned array radiometers <i>D.M. Le Vine, C.T. Swift, T.J. Jackson, A. Griffis, M. Kao and P. Gaiser</i>	441
The TUD synthetic aperture radiometer demonstration model <i>B. Laursen, H.M. Pedersen and N. Skou</i>	451

MIRAS: Preliminary concept of a two-dimensional L-band aperture synthesis radiometer <i>J.M. Goutoule, U. Kraft and M. Martin-Neira</i>	463
4.2 MIMR	
Multifrequency Imaging Microwave Radiometer: Design, calibration and expected performance <i>R. Bordi, M. L'Abbate and P. Spera</i>	469
Radiometer absolute calibration: The solution implemented in MIMR <i>E. Battistelli and R. Bordi</i>	485
Antenna electrical design for the Multifrequency Imaging Microwave Radiometer (MIMR) <i>S. Contu, F.M. Marinelli and P. Rinous</i>	499
4.3 AMSU	
AMSU-B antenna test results <i>T.J. Hewison</i>	509
The radiometric characterization of AMSU-B <i>R.W. Saunders, T.J. Hewison, S.J. Stringer and N.C. Atkinson</i>	519
4.4 Ground-based	
A Multi-frequency mm-wave Radiometer (MFR): instrument description and retrieval algorithm <i>E. Battistelli, C. Capitani, A. Culebras, F. Del Frate, G. Schiavon, B. Arbesser-Rastburg and J.P.V. Poiares Baptista</i>	529
New designs for portable microwave temperature profilers and for water vapor profilers <i>F. Solheim and S.J. Keihm</i>	537
Author index	547
Subject index	549