

CONTENTS

PART-I: WORKSHOP SUMMARY 1

Summary of the First International Workshop on Spaceborne Cloud Profiling Radar H. Kumagai, E. Raschke, S. Y. Matrosov, J. Testud, T. P. Ackerman, K. Aydin, Y. Sasano, G. L. Stephens, and A. Illingworth	3
--	---

PART-II: INDIVIDUAL CONTRIBUTIONS 11

Key Note Speeches

Do we need a cloud profiling radar in space? E. Raschke and M. Quante	15
On the science of a space- borne cloud radar G. L. Stephens	23
The use of ground-based cloud radar for continuous cloud observations T. P.Ackerman, R. T. Marchand, E. E. Clothiaux and M. Sengupta	29

Models and Simulations

Modeling of clouds and aerosols toward long-range forecasts of Asian summer monsoon T. Iwasaki and H.Kitagawa	37
Suggestion from analysis of TRMM Y. N. Takayabu	41
Numerical simulation of a cirrus cloud and its detectability by a cloud radar K. Maruyama, L. Levkov and Y. Fujiyoshi	47
Impact of rain assimilation on the ECMWF analysis and forecast V. Marecal and J.-F Mahfouf	53
Effects of low clouds and low-level water vapor in short-time variations of tropical convection A. Numaguti and H. Kubota	55
Global three-dimensional simulation and radiative forcing of various aerosol species T. Takemura, H. Okamoto , A. Numaguti, A. Higurashi and T. Nakajima	59

Passive Remote Sensing - Ground Base and Airborne

Measurement of microphysical and radiative properties of stratiform clouds in the Japanese Cloud-Climate Study (JACCS) program. S. Asano and JACCS/MRI Observation Team	69
--	----

Airborne measurement of the cloud radiation budget for stratocumulus in the Japanese Cloud-Climate Study(JACCS)	77
---	----

A. Uchiyama and JACCS/MRI Airborne Observation Team

Observation of polar clouds and aerosols for radiation budget and climate study	85
---	----

T. Yamanouchi

Passive Remote Sensing - Satellite

Evaluation of satellite remote sensing of cloud	95
---	----

T. Hayasaka, H. Iwabuchi and N. Kikuchi

Cirrus cloud remote sensing from split window and $6.7 \mu\text{m}$	99
---	----

T. Inoue and Y. Mano

Spectral aerosol optical thickness retrieval using polarization measurements from space	105
---	-----

K. Masuda, M. Sasaki, H. Ishimoto and T. Takashima

An estimation of the radiative forcing of indirect effects of anthropogenic aerosols from satellite remote sensing and climate modeling	111
---	-----

T. Nakajima, A. Higurashi, K. Kawamoto, J. E. Penner, T. Takemura and K. Suzuki

Active Remote Sensing - Radar

Cloud parameter retrieval from combined remote sensing observations	115
---	-----

J. Testud, C. Tiné, A. Guyot and K. Caillault

Retrievals of cloud content and particle characteristic size using NOAA ETL cloud radars	123
--	-----

S. Y. Matrosov, A. S. Frisch, R. A. Kropfli and T. Uttal

Millimeter wave radar scattering from cloud ice crystals	131
--	-----

K. Aydin and T. M. Walsh

Toward a suite of cloud property retrieval algorithms for CloudSat: philosophy and recent progress	139
--	-----

G. G. Mace, Z. Wang, K. Sassen, R. Marchand, G. Stephens, T. Ackerman and S. Matrosov

A potential of cloud profiling radar for measurements of cloud and precipitation	141
--	-----

T. Kobayashi, A. Adachi and K. Masuda

Preliminary results of the cloud observation with CRL airborne cloud profiling radar (SPIDER)	147
---	-----

H. Horie, H. Okamoto, T. Iguchi, S. Iwasaki, H. Kuroiwa and H. Kumagai

Preliminary field evaluation of a Ka-band Doppler radar for fog and cloud	155
---	-----

observations

K. Hamazu, T. Wakayama, H. Hashiguchi, T. Matsuda and S. Fukao

The NIED dual-frequency cloud radar system under development

161

K. Iwanami, M. Maki, R. Misumi, S. Watanabe and K. Hata

Active Sensors - Lidar

Remote sensing of aerosol by lidar at AIOFM, China

167

H. Hu, Y. Wu, T. Li, S. Hu and J. Zhou

Airborne backscatter lidar: LITE validation and co-located ground-based radar measurements during CLARE'98

171

H. Flentje, W. Renger, M. Wirth, G. Ehret, M. Quante, O. Danne, P. Francis

Arctic cloud and aerosol observations using a Micro-pulse Lidar in Svalbard

179

M. Shiobara

Statistical analysis of cloud distribution observed with a ground-based lidar

183

M. Takagiwa, K. Shimizu, I. Matsui and N. Sugimoto

Bidirectional radiative characteristics of finite clouds and Asian dust (Kosa)

189

K. Gotoh, T. Sakai, T. Shibata and Y. Iwasaka

Model calculations of the multiple scattering for the depolarization ratios by polarization lidar measurements

195

H. Ishimoto, K. Masuda and T. Kobayashi

Simulation study of cloud and aerosol measurements with ELISE

201

Z. Liu, P. Voelger and N. Sugimoto

Influence of multiple scattering on measurements with ELISE

205

P. Voelger, Z. Liu and N. Sugimoto

Synergy Use

Detection of ice clouds by radar and lidar and comparison with operational NWP models

213

A. J. Illingworth and R. Hogan

Sensor synergy algorithms: development and validation

219

A. van Lammeren, D. Donovan and H. Bloemink

Algorithm studies for radar and lidar systems

227

H. Okamoto, S. Iwasaki and H. Horie

Satellite Missions

The PICASSO-CENA mission D. M. Winker	235
The Earth Radiation Mission: the role of clouds and aerosols J. P. V. Baptista, A. Culoma, P. Ingmann, W. Leibrandt, C-C Lin and R. Meynart	243
CPR design and development status for the ESA Earth Radiation Explorer Mission C. C. Lin, W. Leibrandt, U. Mallow and R. Bordi	251
The CloudSat mission D. Vane and G. Stephens	257
ELISE (Experimental Lidar In Space Equipment): First Japanese Spaceborne lidar project K. Asai, Y. Sasano, N. Sugimoto, H. Kobayashi, Y. Kawamura, M. Ishizu and T. Imai	261
Conceptual design of CPR proposed to MDS-3 mission H. Kuroiwa, H. Kumagai, H. Horie and H. Okamoto	263
From TRMM experience T. Iguchi	269

APPENDICES

APPENDIX A	WORKSHOP PROGRAM	271
APPENDIX B	PARTICIPANTS AND THEIR AFFILIATIONS	281