

7. ELISEワークショップ報告

7.1 ワークショップの概要

ELISEに関するワークショップ (The Workshop on Experimental Lidar In Space Equipment (ELISE)) を、「第1回雲レーダーワークショップ (The First International Workshop on Spaceborne Cloud Profiling Radar)」(平成12年1月24日~26日)と連携して、平成12年1月26日につくば国際会議場において開催した。今後の大気放射ミッションにおいては、雲レーダーとライダーの同時観測による雲のパラメータの導出が期待され、米国のライダー衛星PICASSOと雲レーダー衛星CLOUDSATのフォーメーションフライトや同一の衛星へのライダーと雲レーダーの搭載が話題となっている。そのため、衛星ライダー全般に関する研究発表は雲レーダーワークショップの中で行われた。

ELISEに関するワークショップはMDS-2搭載ELISEミッションについて、進捗状況や実証計画について議論することを意図して計画された。残念ながら開催日の直前にMDS-2の打ち上げ中止が決まったが、ELISE搭載機器の開発状況、データ利用手法、データ利用システムの検討状況が報告された。また、ELISEの地上試験など今後の研究計画が報告され、将来の地球観測衛星への搭載を目指したライダーの開発について討論が行われた。

7.2 ワークショップにおける主な論文

ELISEワークショップおよび雲レーダーワークショップのプログラムと、衛星搭載ライダーに関する主な論文(プログラム中に太字で示した論文)のプロシーディングを以下に掲げる。

The First International Workshop on Spaceborne Cloud Profiling Radar Tsukuba, Japan 24 January - 26 January 2000

Communications Research Laboratory,
GKSS Research Center,
Laser Radar Sub-group, Cloud Profiling Radar Sub-group,
ATMOS-B1 Team/ESTO, STA

Monday 24 January 2000

9:00 Welcome address Hiroshi Kumagai (CRL)

Key note speeches Chairperson: H. Kumagai

9:10 Do we need a cloud profiling radar in a satellite?

E. Raschke (GKSS, invited) and M. Quante

9:40 On the science of a space borne radar

G. L. Stephens (Colorado State Univ. , invited)

10:10 The use of ground-based cloud radar for continuous cloud observations

T. Ackerman (Pacific Northwest National Laboratory, invited)

Session 1: Models & Simulations Chairperson: E. Raschke

10:55 Modeling of clouds and aerosols toward long-range forecasts of Asian summer monsoon

T. Iwasaki (Tohoku Univ., invited)

11:25 Suggestion from analysis of TRMM

Y. Takayabu (NIES, invited)

11:45 Numerical Simulation of a Cirrus Cloud and its Detectability by a Cloud Radar

K. Maruyama (Frontier Research System for Global Change), L. Levkov and Y. Fujiyoshi

13:30 Impact of Rain Assimilation on the ECMWF Analysis and Forecasts

V. Marecal and J. Mahfouf (ECMWF) (by Ilgworth , invited)

14:00 Effect of low clouds and low level water vapor in the diurnal cycle of tropical convection

A. Numaguti (Hokkaido Univ., invited) and H. Kubota

14:20 Global Three-dimensional Simulation and Radiative Forcing of Various Aerosol Species

T. Takemura (CCSR, Univ. of Tokyo, invited), H. Okamoto, A. Numaguti, A. Higurashi and T. Nakajima

Session 2: Passive Remote Sensing - Ground Base and Airborne Chairperson: S. Matrosov

- 14:40 Measurement of microphysical and radiative properties of stratiform clouds in the Japanese Cloud-Climate Study (JACCS) program.
S. Asano (Tohoku Univ., invited) and JACCS/MRI Observation Team
- 15:10 Airborne measurement of the cloud radiation budget for stratocumulus in the Japanese Cloud-Climate Study (JACCS)
A. Uchiyama (MRI, invited) and JACCS/MRI Observation Team
- 15:30 Observation of polar clouds and aerosols for radiation budget and climate study
T. Yamanouchi (NIPR, invited)

Session 3: Passive Remote Sensing - Satellite Chairperson: J. Testud

- 16:15 Evaluation of satellite remote sensing of cloud
T. Hayasaka (Tohoku Univ., invited), H. Iwabuchi and N. Kikuchi
- 16:40 Cirrus cloud remote sensing using the split window and 6.7 micro-m
T. Inoue (MRI, invited)
- 17:00 Spectral aerosol optical thickness retrieval using polarization measurements from space
K. Masuda (MRI, invited), M. Sasaki, H. Ishimoto and T. Takashima

Session 4: Active Remote Sensing - Radar Chairperson: T. Ackerman

- 17:2 Radiative parameters from cloud profing radar
K. Caillault and J. Testud (Univ. de Velizy, invited)
- 17:45 Retrievals of cloud content and particle characteristic sizes using NOAA ETL cloud radars
S. Y. Matrosov (NOAA, invited)
- 18:10 Millimeter wave scattering from cloud ice crystals
K. Aydin (Pen State Univ., invited)
- 18:35 Toward a suite of cloud property retrieval algorithms for CloudSat: philosophy + recent progress
G. Mace (Univ. of Utah, invited), Z. Wang, K. Sassen, R. Marchand, G. Stephens, T. Ackerman and S. Matrosov

Tuesday 25 January 2000

Session 4: Active Remote Sensing Radar (continued) Chairperson: K. Aydin

- 8:30 An estimation of the radiative forcing of indirect effects of anthropogenic aerosols from satellite remote sensing and climate model
T. Nakajima (CCSR Univ. of Tokyo, invited), A. Higurashi, K. Kawamoto, J. E. Penner, T. Takemura and K. Suzuki
- 8:55 A potential of cloud profing radar for measurements of cloud and precipitation
T. Kobayashi (MRI, invited), A. Adachi and K. Masuda
- 9:15 Preliminary results of the cloud observation with CRL airborne cloud profing radar (SPIDER)
H. Horie (CRL), H. Okamoto, S. Iwasaki, H. Kuroiwa and H. Kumagai
- 9:35 Preliminary Field Evaluation of a Ka-band Doppler Radar for Fog and Cloud Observations
K. Hamazu (Mitsubishi Electric co. Ltd), T. Wakayama, H. Hashiguchi, T. Matsuda and S. Fukao
- 9:55 The NIED Dual-frequency Cloud Radar System under Development
K. Iwanami (NIED, Japan), M. Maki, R. Misum, S. Watanabe and K. Hata

Session 5: Active Sensors - Lidar Chairperson: Y. Sasano

- 10:25 **Remote Sensing of Aerosol by Lidar at AIOFM, China**
H. Hu (Anhui Institute of Optics & Fine Mechanics, invited), Y. Wu, T. Li, S. Hu, Y. Zhang and J. Zhou
- 10:50 **Airborne Backscatter Lidar: LITE Validation and Co-located Ground-Based Radar Measurements During CLARE'98**
H. Flentje, W. Renger and G. Ehret (DLR, invited)
- 11:10 Arctic cloud and aerosol observations using a Micro-pulse Lidar in Svalbard
M. Shiobara (NIPR, Japan)
- 11:30 **Statistical Analysis of Cloud Distribution Observed with a Ground-Based Lidar**
M. Takagiwa (Keio Univ.), K. Shimizu, I. Matsui and N. Sugimoto
- 11:50 Bidirectional Radiative Characteristics of Finite Clouds and Asian Dust (Kosa)
K. Gotoh (Nagoya Univ.), T. Sakai, S. A. Kwon, T. Shibata and Y. Iwasaka
- 12:10 Model calculation of multiple scattering for an incident pencil beam and the effect of non-spherical particles
H. Ishimoto (MRI) and K. Masuda

Session 6: Synergy Use Chairperson G. L. Stephens

- 13:55 Detection of Ice Clouds by Radar and Lidar and Comparison with Operational NWP Models
A. Ilgworth (Univ. Reading, invited) and R. Hogan
- 14:25 The Picasso-Cena mission and synergism from lidar, radiometry and radar measurements to better assess cloud forcing as studied from ground-based and airborne observations
J. Pelon (Universite Pierre et Marie Curie, invited)

- 14:50 Sensor Synergy Algorithms: Development and Validation
A. v. Lammeren (Royal Netherlands Meteorological Institute), D. Donovan and H. Bloemink
- 15:15 Synergy in ice clouds between airborne nadir pointing radar and lidar
C. Tinel and J. Testud (Univ. de Velizy, invited)
- 15:40 Algorithm studies for radar and lidar systems
H. Okamoto (CRL), S. Iwasaki and H. Horie

Wed. 26 January 2000

Session 7: Satellite Mission Chairperson: A. Ilgworth

- 8:30 **PICASSO-CENA**
D. Winker (NASA Langley, invited)
- 8:55 The Earth Radiation Mission: the role of clouds and aerosols
J. P. V. Baptista (ESA, invited), A. Culoma, P. Ingmann, W. Leibrandt, C-C Lin and R. Meynart
- 9:20 CPR Design and Development Status for the ESA Earth Radiation Explorer Mission
C.C. Lin (ESA), W. Leibrandt, U. Mallow and R. Bordi
- 9:45 Cloud ice radiometry at submillimeter wavelengths
S. Walter (JPL)
- 10:10 **ELISE (Experimental LIDAR in Space Environment): First Japanese spaceborne lidar project**
K. Asai (Tohoku Institute of Technology, invited), Y. Sasano, N. Sugimoto, H. Kobayashi, Y. Kawamura, M. Ishizu and T. Imai
- 10:30 Conceptual design of CPR proposed to MDS-3 mission
H. Kuroiwa (CRL), H. Kumagai, H. Horie and H. Okamoto
- 10:50 From TRMM experience
T. Iguchi (CRL)

Session: 8 Summary

- 11:20 Discussions Chairperson: H. Kumagai
- 11:50 Closing remarks H. Masuko (CRL)

The Workshop on Experimental Lidar In Space Equipment (ELISE)
Tsukuba, January 26, 2000

National Institute for Environmental Studies and
National Space Development Agency of Japan

- 13:00 Welcome NASDA
- 13:05 Opening remarks and introduction Y. Sasano (NIES/NASDA)
- 13:15 Recent status of MDS-2/ELISE program
S. Yamamoto (NASDA)
- 13:35 ELISE development status
Y. Kawamura (NASDA)
- 14:25 Overview of MDS-2/ELISE science plan
N. Sugimoto (NIES)
- 15:00 **Simulation study of cloud and aerosol measurements with ELISE**
Z. Liu (NIES), P. Voelger and N. Sugimoto
- 15:25 **Influence of multiple scattering on measurements with ELISE**
P. Voelger (NIES), Z. Liu and N. Sugimoto
- 15:50 Proposal of MDS-2/ELISE science data processing system
N. Sugimoto (NIES)
- 16:20 Future prospects of space-borne lidar
T. Moriyama (NASDA)
- 16:50 Concluding remarks
- 17:00 workshop ends