

PROCEEDINGS OF SPIE

***Atmospheric and Environmental  
Remote Sensing Data Processing  
and Utilization III: Readiness for  
GEOSS***

**Mitchell D. Goldberg**  
**Hal J. Bloom**  
**Allen H. Huang**  
**Philip E. Ardanuy**  
*Editors*

**27–28 and 30 August 2007**  
**San Diego, California, USA**

*Sponsored and Published by*  
SPIE

**Volume 6684**

Proceedings of SPIE, 0277-786X, v. 6684

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Atmospheric and Environmental Remote Sensing Data Processing and Utilization III: Readiness for GEOSS*, edited by Mitchell D. Goldberg, Hal J. Bloom, Allen H. Huang, Philip E. Ardanuy, Proceedings of SPIE Vol. 6684 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X  
ISBN 9780819468321

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA  
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445  
SPIE.org

Copyright © 2007, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at [copyright.com](http://copyright.com). Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/07/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE**   
Digital Library

[SPIDigitalLibrary.org](http://SPIDigitalLibrary.org)

---

**Paper Numbering:** Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

# Contents

ix *Conference Committee*

---

## PREPARING FOR GEOSS I

---

- 6684 02 **Global space-based inter-calibration system (GSICS) (Invited Paper)** [6684-01]  
M. D. Goldberg, NOAA/NESDIS (USA)
- 6684 03 **A 20-year MSU dataset for atmospheric temperature change studies** [6684-02]  
C.-Z. Zou, M. Gao, NOAA/NESDIS (USA)
- 6684 04 **Validation of the onboard radiometric calibration of the GOES I-M visible channel by reflectance-based vicarious methods** [6684-03]  
N. P. Leisso, K. J. Thome, J. S. Czaplá-Myers, College of Optical Sciences, Univ. of Arizona (USA)
- 6684 05 **Developing a solar channel calibration algorithm for the Korean geostationary satellite COMS (Invited Paper)** [6684-04]  
B.-J. Sohn, H.-W. Chun, Seoul National Univ. (South Korea)

---

## PREPARING FOR GEOSS II

---

- 6684 06 **Back to the future: transition from operations to research (Invited Paper)** [6684-05]  
P. E. Ardanuy, Raytheon Information Solutions (USA); D. A. Santek, Univ. of Wisconsin, Madison (USA); A. M. Tarro, Raytheon Information Solutions (USA); J. W. Wegiel, Raytheon Space Systems (USA)
- 6684 07 **Calibration of AVHRR sensors using the reflectance-based method** [6684-06]  
J. S. Czaplá-Myers, K. J. Thome, N. P. Leisso, College of Optical Sciences, Univ. of Arizona (USA)
- 6684 08 **Improving the SNO calibration accuracy for the reflective solar bands of AVHRR and MODIS** [6684-07]  
C. Cao, X. Wu, NOAA/NESDIS (USA); A. Wu, Science Systems and Applications, Inc. (USA); X. Xiong, NASA Goddard Space Flight Ctr. (USA)
- 6684 09 **The calibration of AVHRR visible dual gain using Meteosat-8 for NOAA-16 to 18** [6684-08]  
D. R. Doelling, Science Systems and Applications, Inc. (USA); D. P. Garber, NASA Langley Research Ctr. (USA); L. A. Avey, Science Systems and Applications, Inc. (USA); L. Nguyen, P. Minnis, NASA Langley Research Ctr. (USA)
- 6684 0A **Global space-based inter-calibration system (GSICS): a status report (Invited Paper)** [6684-09]  
X. Wu, M. Goldberg, NOAA/NESDIS (USA)

---

## REMOTE SENSING PROGRAM, SYSTEM, AND SENSOR II

---

- 6684 OE **The EUMETSAT Polar System: status and first results (Invited Paper)** [6684-14]  
K. D. Klaes, J. Schmetz, EUMETSAT (Germany)
- 6684 OF **Applications of IASI on MetOp-A: first results and illustration of potential use for meteorology, climate monitoring, and atmospheric chemistry (Invited Paper)** [6684-15]  
T. Phulpin, D. Blumstein, F. Prel, Ctr. National d'Études Spatiales (France); B. Tournier, P. Prunet, Noveltis (France); P. Schlüssel, EUMETSAT (Germany)
- 6684 OH **In-flight performance of the infrared atmospheric sounding interferometer (IASI) on METOP-A** [6684-17]  
D. Blumstein, CNES-CST (France); B. Tournier, Noveltis (France); F. R. Cayla, SISCLE (France); T. Phulpin, R. Fjortoft, C. Buil, G. Ponce, CNES-CST (France)

---

## REMOTE SENSING ALGORITHM AND DATA ANALYSIS I

---

- 6684 OI **Simulation of atmospheric profile retrieval from hyperspectral infrared data under cloudy condition** [6684-18]  
L. Guan, Nanjing Univ. of Information Science and Technology (China); H. L. Huang, Univ. of Wisconsin, Madison (USA)
- 6684 OJ **A study on the accuracies of ozone data observed with ground-based and satellite-borne instruments (Invited Paper)** [6684-19]  
Z. Wang, J. Zhang, Nanjing Univ. of Information Science and Technology (China); H. Chen, Institute of Atmospheric Physics (China); Z. Zhang, Z. He, Nanjing Univ. of Information Science and Technology (China)
- 6684 OK **An improved atmospheric profile retrieval system for GOES sounder and SEVIRI data** [6684-20]  
X. Jin, J. Li, J. Nelson, C. Schmidt, Z. Li, Univ. of Wisconsin, Madison (USA); T. Schmit, M. Goldberg, NESDIS/NOAA (USA)
- 6684 OL **The simultaneous retrieval of hyperspectral IR emissivity spectrum along with temperature and moisture profiles from AIRS** [6684-21]  
J. Li, J. Li, E. Weisz, Univ. of Wisconsin, Madison (USA); T. Schmit, M. Goldberg, NOAA/NESDIS(USA); D. Zhou, NASA Langley Research Ctr. (USA)
- 6684 OM **Improved atmospheric soundings and error estimates from analysis of AIRS/AMSU data** [6684-22]  
J. Susskind, NASA Goddard Space Flight Ctr. (USA)

---

## REMOTE SENSING ALGORITHM AND DATA ANALYSIS II

---

- 6684 OO **All Sky soundings from hyperspectral infrared radiances alone (Invited Paper)** [6684-24]  
J. Li, E. Weisz, J. Li, X. Jin, C.-Y. Liu, Univ. of Wisconsin, Madison (USA); D. K. Zhou, Langley Research Ctr., NASA (USA); T. J. Schmit, NESDIS/NOAA (USA); A. Huang, Univ. of Wisconsin, Madison (USA); M. D. Goldberg, NESDIS/NOAA (USA)

- 6684 OP **Evaluation of data thinning for climate applications using the first four years of AIRS hyperspectral data** [6684-25]  
H. H. Aumann, E. Fishbein, J. Gohlke, Jet Propulsion Lab. (USA)
- 6684 OQ **Improved MODIS aerosol retrieval over urban scenes** [6684-26]  
M. M. Oo, E. Hernandez, M. Jerg, B. M. Gross, F. Moshary, S. A. Ahmed, City College of New York (USA)

---

#### REMOTE SENSING WEATHER: CLIMATE AND ENVIRONMENTAL APPLICATIONS I

---

- 6684 OR **The relationship between the interdecadal variability of East Asian summer monsoon's movement and the spatial distribution pattern of the summer rainfall in East China** [6684-27]  
X. Lū, Institute of Oceanology (China) and Graduate School of the Chinese Academy of Sciences (China); X. Zhang, Beijing Climate Ctr. (China); J. Chen, Institute of Oceanology (China)
- 6684 OT **Moisture structure of ISO in Western North Pacific revealed by AIRS** [6684-29]  
L. Tao, Nanjing Univ. of Information Sciences and Technology (China); X. Fu, B. Wang, Univ. of Hawaii at Manoa (USA)
- 6684 OU **Characteristics of Tibetan Plateau topographic trough and Bay of Bengal trough and their relationship with the South China Sea summer monsoon onset** [6684-30]  
J. Wei, J. He, S. Zhong, NUIST (China)
- 6684 OV **Possible mechanism of the south-born-south-persisting West Pacific subtropical high double ridges process** [6684-31]  
L. Qi, Nanjing Univ. of Information Science and Technology (China) and National Climate Ctr. (China); Z. Zhang, National Climate Ctr. (China); J. Hai, Z. Guan, Nanjing Univ. of Information Science and Technology (China)

---

#### REMOTE SENSING WEATHER: CLIMATE AND ENVIRONMENTAL APPLICATIONS II

---

- 6684 OW **Zonal thermal difference between East Asia and West Pacific and its relationship with East Asian subtropical southerly onset** [6684-32]  
J. He, Nanjing Univ. of Information Science and Technology (China); L. Qi, Nanjing Univ. of Information Science and Technology (China) and National Climate Ctr. (China); Z. Zhang, National Climate Ctr. (China)
- 6684 OX **Techniques for comprehensive risk assessment of climatic drought in winter wheat production in Northern China** [6684-33]  
R. Liu, Z. Zhu, W. Fang, Y. Wang, Z. Ma, P. Xu, Henan Institute of Meteorological Sciences (China)
- 6684 OY **Mechanisms of droughts and their patterns during winter wheat growing season in Henan Province of China** [6684-34]  
S. Shen, L. Cheng, Nanjing Univ. of Information Science and Technology (China); R. Liu, W. Kang, S. Li, Henan Institute of Meteorology (China)

- 6684 0Z **Climatic characteristics of QTP atmospheric heat source in 1961–2001** [6684-35]  
S. Zhong, J. He, Z. Guan, X. Liu, Nanjing Univ. of Information Science and Technology (China); S. Yuan, Agricultural Univ. of Hebei (China)
- 6684 10 **Observations of deep convective clouds as stable reflected light standard for climate research: AIRS evaluation** [6684-36]  
H. H. Aumann, T. Pagano, M. Hofstadter, Jet Propulsion Lab. (USA)

---

#### REMOTE SENSING DATA ARCHIVING, MANAGEMENT, AND DISTRIBUTION

---

- 6684 11 **The telesupervised adaptive ocean sensor fleet** [6684-37]  
A. Elfes, Jet Propulsion Lab. (USA); G. W. Podnar, J. M. Dolan, S. Stancliff, E. Lin, Carnegie Mellon Univ. (USA); J. C. Hosler, T. J. Ames, NASA Goddard Space Flight Facility (USA); J. Moisan, T. A. Moisan, NASA Wallops Flight Facility (USA); J. Higinbotham, Emergent Space Technologies (USA); E. A. Kulczycki, Jet Propulsion Lab. (USA)
- 6684 12 **Sensor networks and netcentric perspectives of civil government (Invited Paper)** [6684-38]  
D. R. Jones, National Oceanic and Atmospheric Administration, National Weather Service (USA); T. G. Howard, National Oceanic and Atmospheric Administration, National Weather Service (USA) and American Institute of Aeronautics and Astronautics (USA)
- 6684 13 **Simulation for the design of next-generation global Earth observing systems (Invited Paper)** [6684-39]  
M. S. Seablom, S. J. Talabac, NASA Goddard Space Flight Ctr. (USA); G. J. Higgins, B. T. Womack, Northrop Grumman IT TASC (USA)
- 6684 14 **Sensor webs with a service-oriented architecture for on-demand science products (Invited Paper)** [6684-40]  
D. Mandl, NASA Goddard Space Flight Ctr. (USA); R. Sohlberg, C. Justice, Univ. of Maryland, College Park (USA); S. Ungar, T. Ames, NASA Goddard Space Flight Ctr. (USA); S. Frye, Noblis (USA); S. Chien, D. Tran, Jet Propulsion Lab. (USA); P. Cappelaere, Vigtel (USA); L. Derezinski, Innovative Solutions (USA); G. Paules, Kelly, Anderson & Associates (USA); D. Sullivan, NASA/ARC (USA); L. Di, George Mason Univ. (USA); S. Kolitz, Draper Lab. (USA)
- 6684 15 **A prototype of land information sensor web (LISW)** [6684-41]  
H. Su, Ctr. for Research on Environment and Water (USA); P. R. Houser, Ctr. for Research on Environment and Water (USA) and George Mason Univ. (USA); Y. Tian, Univ. of Maryland, Baltimore County (USA) and NASA Goddard Space Flight Ctr. (USA); J. V. Geiger, NASA Goddard Space Flight Ctr. (USA); S. V. Kuma, Univ. of Maryland, Baltimore County (USA) and NASA Goddard Space Flight Ctr. (USA); D. R. Belvedere, Ctr. for Research on Environment and Water (USA)

---

#### POSTER SESSION

---

- 6684 17 **Radiance comparison of IASI and AVHRR on MetOp-A** [6684-43]  
L. Wang, QSS Group, Inc. (USA); C. Cao, NOAA/NESDIS/STAR (USA)

- 6684 19 **Analysis of interannual features of tropical cyclones originating from the monsoon trough in the western North Pacific** [6684-46]  
J. Gao, Provincial Climate Ctr. of Fujian (China); X. Zhang, National Climate Ctr. of China (China); Z. Jiang, Nanjing Univ. of Information Science and Technology (China); X. Lū, Institute of Oceanology (China)
- 6684 1A **Study on impacts of an exceptionally intense sandstorm upon Gansu region in summer** [6684-47]  
X. Wang, Lanzhou Institute of Arid Meteorology (China) and Lanzhou Central Meteorological Observatory (China); Y. Huang, Z. Liu, Lanzhou Institute of Arid Meteorology (China); F. Wei, Dingxi City Meteorological Bureau (China); T. Zhang, Lanzhou Institute of Arid Meteorology (China)
- 6684 1B **Characteristic of surface water resources and response to climate change in northwest of China** [6684-49]  
J. Feng, Institute of Arid Meteorology (China); L. Sun, Lanzhou Regional Climate Ctr. (China); H. Guo, Institute of Arid Meteorology (China)
- 6684 1C **The trends of water vapor and methane in the stratosphere** [6684-51]  
C. Shi, Nanjing Univ. of Information Science and Technology (China); Y. Chen, Univ. of Science and Technology of China (China); S. Zhong, Nanjing Univ. of Information Science and Technology (China)
- 6684 1D **HYDRA** [6684-52]  
T. Rink, P. Menzel, T. Achtor, T. Whitaker, Univ. of Wisconsin, Madison (USA)
- 6684 1E **Improved processing of multi-filter rotating shadowband radiometer network for distributed monitoring** [6684-53]  
M. Bustamante, B. Gross, F. Moshary, S. Ahmed, The City College of the Univ. of New York (USA)
- 6684 1F **A new concept: double ridges process of West Pacific subtropical high** [6684-54]  
J. He, L. Qi, Nanjing Univ. of Information Science and Technology (China); Z. Zhang, National Climate Ctr. (China)
- 6684 1H **Intercalibrating geostationary imagers via polar orbiting high spectral resolution data** [6684-56]  
M. M. Gunshor, Cooperative Institute for Meteorological Satellite Studies (USA); T. J. Schmit, NOAA/NESDIS/STAR/ASPB (USA); W. P. Menzel, D. Tobin, Cooperative Institute for Meteorological Satellite Studies (USA)
- 6684 1I **Lidar measurements for the short-term forecast of meteorological stability** [6684-57]  
Y. Polkanov, B.I. Stepanov Institute of Physics (Belarus)

*Author Index*





# Conference Committee

## *Conference Chairs*

**Mitchell D. Goldberg**, Center for Satellite Applications and Research,  
National Environmental Satellite Data and Information Service,  
NOAA (USA)  
**Hal J. Bloom**, NOAA, NPOESS Integrated Program Office (USA)  
**Allen H. Huang**, University of Wisconsin, Madison (USA)  
**Philip E. Ardanuy**, Raytheon Information Solutions (USA)

## *Program Committee*

**John J. Bates**, NOAA (USA)  
**James J. Butler**, NASA Goddard Space Flight Center (USA)  
**Changyong Cao**, National Environmental Satellite Data and  
Information Service, NOAA (USA)  
**Gerald J. Dittberner**, NOAA (USA)  
**Wei Gao**, Colorado State University (USA)  
**John F. Le Marshall**, Bureau of Meteorology (USA)  
**Stephen A. Mango**, NOAA, NPOESS Integrated Program Office (USA)  
**Johannes Schmetz**, EUMETSAT (Germany)  
**William L. Smith, Jr.**, NASA Langley Research Center (USA)

## *Session Chairs*

- 1 Preparing for GEOSS I  
**Thomas H. Achtor**, University of Wisconsin, Madison (USA)
- 2 Preparing for GEOSS II  
**Xiangqian Wu**, Center for Satellite Applications and Research,  
National Environmental Satellite Data and Information Service,  
NOAA (USA)
- 3 Remote Sensing Program, System, and Sensor I  
**Thierry Phulpin**, Centre National d'Études Spatiales (France)
- 4 Remote Sensing Program, System, and Sensor II  
**Dieter Klaes**, EUMETSAT (Germany)
- 5 Remote Sensing Algorithm and Data Analysis I  
**Jun Li**, University of Wisconsin, Madison (USA)

- 6 Remote Sensing Algorithm and Data Analysis II  
**Hal J. Bloom**, NOAA, NPOESS Integrated Program Office (USA)
- 7 Remote Sensing Weather: Climate and Environmental Applications I  
**Zhenhui Wang**, Nanjing University of Information Science and  
Technology (China)
- 8 Remote Sensing Weather: Climate and Environmental Applications II  
**Byung-Ju Sohn**, Seoul National University of Technology (South Korea)
- 9 Remote Sensing Data Archiving, Management, and Distribution  
**Philip E. Ardanuy**, Raytheon Information Solutions (USA)  
**Valliappa Lakshmanan**, University of Oklahoma (USA)