October 9–13, 2005
Changsha, Hunan, China

The Sixth (2005) ISOPE Ocean Mining Symposium

ISOPE OMS-2005
Shenghua Auditorium, Central South University
Changsha, Hunan, China
October 9–13, 2005

Final Program
Invited and Peer-reviewed Papers

Environment  Mining Systems & Technology
Gas Hydrates  Deep-Ocean Water Upwelling
Exploration & Survey  Processing Technology

Organized by:
International Organizing Committee

Sponsored by:
International Society of Offshore and Polar Engineers (ISOPE)
with cooperating organizations (list inside)
COMRA and CSU

ISOPE OMS-2005 Local Secretariat
Attn.: Mrs. Zhang Yan, International Exchange Div
Central South University, Yuelushan,
Changsha, Hunan 410083, China
Fax +86-731-8710136; E-mail: zhangy@mail.csu.edu.cn

ISOPE
P.O. Box 189
Cupertino, Calif. 95015-0189, USA
Fax 1–650–254–2038: www.isope.org
Welcome to ISOPE OMS-2005

We greatly appreciate the excellent responses and help we have received from colleagues around the world in the successful organization of the 6th ISOPE Ocean Mining Symposium (ISOPE OMS-2005), Changsha, Hunan, China, October 9–13, 2005. The symposium features 13 sessions of 47 peer-reviewed papers and additional 6 presentations from 10 countries. This year the symposium continues to introduce gas hydrates and upwelling and utilization of deep-ocean water in addition to deep-ocean exploration and survey, environment, mining systems, and processing systems.

The 1st (1995) ISOPE Ocean Mining Symposium (ISOPE OMS-95) was held in Tsukuba. An informal organizational meeting of Ocean Mining Working Group (OMWG) was held in Tsukuba, Japan, on November 22, 1995. At the meeting, representatives from 7 countries desired to have a close international cooperation and more exchange of the individuals’ progress, and agreed to establish a non-governmental body, OMWG, which can also act as an informal channel among the governments: The OMWG concept got blessing from director generals of the participating governments: The U.S., Germany, Japan, IOM, Korea, India, and China (joined later).

The primary objectives of the OMWG are:

- to advance at an international level technological progress in the interdisciplinary field of ocean resources, environment and mining and related technologies, through international cooperation and participation;
- to disseminate scientific knowledge and provide timely exchange of technical knowledge and information;
- to provide opportunities through its programs for interested individuals to maintain and expand their knowledge in these fields for the benefit of engineering and scientific profession.

The 2nd OMS-97, 3rd OMS-99, 4th OMS-2001 and 5th OMS-2003 were successfully held in Seoul, Korea, Goa, India, Szczecin, Poland and Tsukuba, Japan, respectively, with participation from 13 countries.

On behalf of the International Organizing Committee, it is our pleasure to welcome all participants to the ISOPE OMS-2005 Symposium in Changsha.

Co-chairmen of the ISOPE OMS-2005 Symposium

<table>
<thead>
<tr>
<th>Jin S. Chung, USA</th>
<th>Shaojun Liu, China</th>
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<tbody>
<tr>
<td>Tetsuo Yamazaki, Japan</td>
<td></td>
</tr>
</tbody>
</table>

1
15:00  
OMS-2005 Executive Committee Meeting  
Grand Sun City Hotel

17:00  
Ocean Mining Working Group (OMWG) Meeting  
Grand Sun City Hotel

For Tour Information
(see the Bulletin board at Foyer)

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**MONDAY October 10**

Bus departs 08:30 from Hotel

07:30–08:30  
Symposium Registration  
Grand Sun City Hotel

09:00  
CSU  
Opening Address  
Shenghua Auditorium

09.15 -10.30  
1. OPENING SESSION  
Shenghua Auditorium

11.00-12.40  
2. DEEP OCEAN WATER UPWELLING  
Shenghua Auditorium

13.00-14.00  
OMS Lunch  
CSU Restaurant

14.00-16.30  
3. EXPLORATION AND SURVEY I  
Shenghua Auditorium

16.30-18.00  
4. EXPLORATION AND SURVEY II  
Shenghua Auditorium

18:00 Bus departs from CSU  
COMRA Reception  
Restaurant downtown

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**TUESDAY October 11**

Bus departs 08:00 from Hotel

08:30 –10:30  
5. MINING SYSTEMS & TECHNOLOGY I: General  
CSU  
Shenghua Auditorium

10:40-13:00  
6. MINING SYSTEMS & TECHNOLOGY II: Pipe Dynamics and Flows  
Shenghua Auditorium

13.00-14.00  
OMS Lunch  
CSU Restaurant

14:00-15:20
7. MINING SYSTEMS & TECHNOLOGY
   III: Pipe Dynamics and Flows
   Shenghua Auditorium
   15:40-18:00

8. MINING SYSTEMS & TECHNOLOGY
   IV: Seafloor Miner
   Shenghua Auditorium
   18:00 Bus departs from CSU

OMS SYMPOSIUM BANQUET
   Grand Sun City Hotel

Tuesday – Wednesday

Author Practice
   Shenghua Auditorium
On-site Registration
   Shenghua Auditorium

WEDNESDAY October 12

Bus departs 08:00 from Hotel.

08:30-10:30
9. MINING SYSTEMS & TECHNOLOGY
   V: Crust Mining and Miner Control
   CSU Shenghua Auditorium

11:10-13:00
10. GAS HYDRATES
    Shenghua Auditorium

13:00-14:00
OMS Lunch
   CSU Restaurant

14:00-15:30
11. PROCESSING TECHNOLOGY
    Shenghua Auditorium

15:30-16:10
12. ENVIRONMENT
    Shenghua Auditorium

17:00-17:40
13. CLOSING SESSION
    Shenghua Auditorium

THURSDAY, October 13

08:00–12:00
Local Technical Tour: Tickets available on site.
• Yuelu Academy
• Mawangdui Tomb

October 13–16
Conference Tour: ZHANGZIAJIE
Visit www.isope.org for details and reservation.
16:30 (Tentative) Depart Hotel
Cosponsored by:
International Society of Offshore and Polar Engineers (ISOPE)
China Ocean Mineral Resources R. & D. Association (COMRA)
Central South University (CSU)

Cooperated by:
International Society of Offshore and Polar Engineers (ISOPE)
U.S. National Science Foundation (NSF)
Mining and Materials Processing Institute of Japan (MMIJ)
Korea Association for Deep Ocean Minerals Development (KADOM)
Korea Society of Ocean Engineers (KSOE, formerly KORE)
National Institute of Oceanography (NIO, India)
Interoceanmetal Joint Organization (IOM, Poland)
Japan Society of Naval Architects and Ocean Engineers (JSNAOE)
China Ocean Mineral Resources R&D Association (COMRA)

Supported by:
China Ocean Mineral Resources R. & D. Association (COMRA)
Central South University (CSU)

Local Secretariat:
Mrs. Zhang Yan, Central South University, Changsha, Hunan, China

Technical Executive Committee:

ISOPE
P.O. Box 189
Cupertino, Calif. 95015-0189, USA
Fax 1–650–254–2038: www.isope.org
Prof. Jin S. Chung, ISOPE, Cupertino, California, USA
Prof. Shaojun Liu, Central South University, Changsha, Hunan, China
Dr. Tetsuo Yamazaki, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

International Organizing Committee

Prof. Jin S. Chung (Chairman), ISOPE, Cupertino, California, USA
Dr. R.P. Das, Regional Research Lab., Bhubaneswar, India
Dr. Sup Hong, Korea Research Inst. of Ship and Ocean Engineering, Daejeon, Korea
Dr. Takeshi Komai, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan
Dr. R. Kotlinski, IOM, Szczecin, Poland
Prof. S. Liu (Co-Chair), Central South University, China
Dr. K. Otsuka, Osaka Prefecture University, Osaka, Japan
Dr. G. Schriever, BILAB Forschungsinstitut, Hohenwestedt, Germany
Dr. R. Sharma, National Institute of Oceanography, Goa, India
Dr. A. Usui, Kochi University, Kochi, Japan
Dr. Vlada Stoyanova, ISBA, Kingston, Jamaica
Dr. T. Yamazaki (Co-chair), National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan
Dr. Ning Yang, Changsha Research Institute of Mining and Metallurgy, Changsha, China
Dr. C. H. Yoon, Korea Institute for Geosciences & Mineral Resources, Daejeon, Korea

Symposium Co-chairmen
Jin S. Chung, ISOPE, Cupertino, California, USA
Prof. Shaojun Liu, Central South University, Changsha, Hunan, China
Tetsuo Yamazaki, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan
**TECHNICAL PROGRAM**

**MONDAY 09:00**

**Opening Address**
Monday 09:00 Shenghua Auditorium

Jin S Chung, Chair, ISOPE OMS-2005 Symposium, ISOPE, Cupertino, California, USA

**Welcome Address**
Monday 09:05 Shenghua Auditorium

Mr. Bin Mao, Secretary General, China Ocean Mineral Resources R. & D. Association, Beijing
Dr. Huang Baiyun, President, Central South University, Changsha

1. **OPENING SESSION**

Monday 09:15 Shenghua Auditorium

Chair: Shaojun Liu, Central South University, Changsha, Hunan, China
Co-Chair: Valcana Stoyanova, Interoceanmetal Joing Organization, Szczecin, Poland

**International Seabed Authority Program Status** (Oral Presentation Only)
Nii A Odunton, Deputy to the Secretary-General of the International Seabed Authority, Kingston, Jamaica

**COMRA's Activities in the International Seabed** (Oral Presentation Only)
Bin Mao, China Ocean Mineral Resources R&D Association (COMRA), Beijing, China

**Deep-ocean Mining Technology: Developments II**
Jin S Chung, ISOPE, Cupertino, California, USA

**Recent Advance in Ocean Nutrient Enhancer “TAKUMI” Project**
Koji Otsuka, Osaka Prefecture University, Sakai, Japan

2. **DEEP-OCEAN WATER UPWELLING**

Monday 11:00 Shenghua Auditorium

Chair: Koji Otsuka, Osaka Prefecture University, Sakai, Japan

**Measured Results of Oceanographic Observation by Using “TAKUMI” – About Offshore Wind** (Oral Presentation Only)
Yutaka Okawa, Koyokazu Yago, Kenkichi Tamura, Katsuya Maeda, National Maritime Research Inst, Tokyo, Japan
Measured Results of Oceanographic Observation by Using “TAKUMI” – About Wave Condition
Katsuya, Maeda, Yutaka Okawa, Kenkichi, Tamura, National Maritime Research Inst, Tokyo, Japan

The Detection of the Deep Sea Water Discharged from Ocean Nutrient Enhancer “TAKUMI” (Oral Presentation Only)
Hisaaki Omura, Fuyo Ocean Development and Engineering Co, Tokyo; Kazuo Iseki, Hiroshima Univ, Higash-Hiroshima, Japan

3. EXPLORATION AND SURVEY I

Monday 14:00 Shenghua Auditorium
Chair: T. Yamazaki, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

Control Factors of Polymetallic Nodules Distribution within the Eastern Area of CCZ (Oral Presentation Only)
Ryszard Kotlinski and Valcana Stoyanova, Interoceanmetal Joint Organization, Szczecin, Poland

Innovation Technology and Equipments for Deep Sea Exploration and Survey
Mikhail Arkadievich Voronov, Gennady Ivanovich Ivanov, Viktor A. Ivanov, “SEVMORGEO”, St. Petersburg, Russia

Factors Controlling the Grade and Abundance of Ferromanganese Crusts: The Northwestern Pacific Ocean as Case Study
A. Usui, Kochi Univ, Kochi, Japan

A Novel Solid Ag/Ag2S Electrode for In-situ Sensors and Its Application at a Bio-cluster near TICA-vent, 9°50’N EPR
Ying Ye, Xia Huang, Canjun Yang, Ying Chen, Zhifei Chen, Zhejiang Univ, Hangzhou, China

Optimal Design of a Novel Hydrothermal Fluid Sampler
Wei Liu, Canjun Yang, Guoquan Shen, Ying Chen, Zhejiang Univ, Hangzhou, China

The Multi-channel Data Logger of In-situ Chemical Sensors for Seafloor Hydrothermal Vents
Can-Jun Yang, Zhejiang Univ, Huangzou, China; Kang Ding, Univ of Minnesota, Minneapolis, USA; Ying, Chen, Ying Ye, Jian-Wei Cao, Lin-Yi Gu, Zhejiang Univ, Hangzou, China

Electrical Survey in the Studies and Prospecting of Deep-sea Sulfide Ores in the MAR Region (10°N–40°N) (Proceedings Only)
S.I. Andreev, S.I. Petukhov, E.D. Lisitshin, L.F. Moskovskaja, VNIOKeangeologia, Sevmorgeo, St. Petersburg, Russia

4. EXPLORATION AND SURVEY II

Monday 16.30 Shenghua Auditorium
Chair: Ying Chen, The State Key Lab of Fluid Power Transmission and Control, Hangzhou, China
Co-chair: A. Usui, Kochi University, Kochi, Japan

Geotechnical Properties of Deep-sea Sediments and the In-situ Measurement Techniques
T. Yamazaki, National Inst of AIST, Tsukuba; T. Komine, T. Kawakami, Nichiyu Giken Kogyo Co, Kawagoe, Japan
Research on Deep-sea Pressure Tight Multiple Coring Technique
Liang Zhu, Linyi Gu, Huaweiqin, Shilun Li, Ying Chen, Zhejiang Univ; Guanghui Wu, Second Inst of State Oceanic Administration, Hangzhou, China

Study of Compressive Strength Prediction of Cobalt-crust Substrate in Deep-sea Based on Distribution Characteristics and Frequency Design
Yingyong Bu, Central South Univ, Changsha; Changjun Qiu, Nanhua Univ, Hengyang; Haiming Zhao, Central South Univ, Changsha, China

18:00 Bus departs from CSU
COMRA Reception

TUESDAY 08:30

5. MINING SYSTEMS & TECHNOLOGY I: General

Chair: Yasuyuki Nabeshima, Osaka University, Suita, Japan
Co-chair: Chi Ho Yoon, Korea Inst of Geoscience and Mineral Resources, Daejeon, Korea

Economic Validation Analyses of Japan’s Nodule, Crust, and Kuroko-type SMS Mining in 2004
T. Yamazaki, National Inst of AIST, Tsukuba, Japan; S.-H. Park, Korea Ocean Research and Development Inst, Ansan, Korea

Design and Simulation Study on a Virtual Prototype of an Active Heave Compensation System for Deep-ocean Mining
Xiaoyan Tang, Shaojun Liu, Kai Huang, Central South Univ, Changsha, China

3-D Visualization Based on Measure Parameters of Running Condition Monitoring in Deep Seafloor Mining System (Oral Presentation Only)
Piang Liao, Central South Univ, Changsha, China

Research on the Two Lines Based Power Line Carrier Frequency Communication Network in Ocean
Bo Jin, Haikuo Shen, Ying Chen, Zhenxia Xu, Zhejiang Univ, Hangzhou, China

6. MINING SYSTEMS & TECHNOLOGY II: Pipe Dynamics and Flows I

Chair: Jerzy Sobota, Univ of Wroclaw, Poland
Co-chair: Weisheng Zou, Changsha Research Institute of Mining & Metallurgy, Changsha, China

Dynamic Analysis on 3-D Coupled Motion of Deep-ocean Mining Pipe System for 1000-m Sea Trial
Gang Wang, Shaojun Liu, Central South Univ, Changsha, China

Three-dimensional DEM Model for Deep-ocean Mining Pipe System
Yan Li, Shaojun Liu, Central South Univ, Changsha, China

Dynamic Response of Deep-ocean Mining Vertical Pipe
Hongyun Yu, Shaojun Liu, Central South Univ, Changsha, China
Flow Analysis of Soil-liquid Mixture in a Lifting Pump
Chi-Ho Yoon, Yong-Chan Park, Dong-Kil Lee, Seok-Ki Kwon, Korea Inst of Geoscience and Mineral Resources, Daejeon, Korea

Concentration Characteristics of Large-Size Particles in Vertical Pipes for Hydraulic Lifting
Long Jiang, Pengcheng Li, Long Tian, Wenliang Han, Tsinghua Univ, Beijing, China

7. MINING SYSTEMS & TECHNOLOGY III:
Pipe Dynamics and Flows 2
Tuesday 14.00 Shenghua Auditorium
Chair Yingyong Bu, Central South University, Changsha, China

Measurement of Velocity and Concentration of Nodules in Vertical Hydrotransport
Jerzy Sobota, Stanislaw Boczarski, Univ of Wroclaw; Leszek Petryka, Marcin Zych, Univ of Science and Technology, AGH, Krakow, Poland

Simulation for the Motion of Polymetallic Nodules in Hydraulic Hoist for Deep Sea Mining
Pengcheng Li, Long Jiang, Jianjun Zhou, Wenlian Han, Tsinghua Univ, Beijing, China

Experiment Study on Critical Velocity in Vertical Pipes for Hydraulic Lifting
Long Tian, Pengcheng Li, Long Jiang, Wenliang Han, Tsinghua Univ, Beijing, China

Design and Manufacture of a Hydrocyclone for Solid Separation
Yong-Chan Park, Chi-Ho Yoon, Dong-Kil Lee, Seok-Ki Kwon, Korea Inst of Geoscience and Mineral Resources, Daejeon, Korea

8. MINING SYSTEMS & TECHNOLOGY IV:
Seafloor Miner
Tuesday 15:40 Shenghua Auditorium
Chair: Li Li, Central South University, Changsha, Hunan, China
Co-chair: Enno Schulte, Universität Siegen, Siegen, Germany

Research of China's Pilot Miner in the Mining System of Polymetallic Nodules
Li Li, Jue Zhong, Central South Univ, Changsha, China

Coupled Dynamic Analysis of Underwater Tracked Vehicle and Long Flexible Pipe
Sup Hong, Hyung-Woo Kim, Korea Institute of Ships and Ocean Engineering, Daejeon, Korea

Dynamic Analysis of Underwater Tracked Vehicle on Extremely Soft Soil by Using Euler Parameters
Hyung-Woo Kim, Sup Hong, JongSu Choi, Tae-kyeong Yeu, Korea Institute of Ships and Ocean Engineering, Daejeon, Korea

Correlation of the Dynamic Behaviour of Ground Operated Tracked Vehicles and Characteristic Soil Parameters
Henning Grebe, Bergrohr GmbH; Enno Sebastian Schulte, Universität Siegen, Siegen, Germany

Metamodel-based Multidisciplinary Design Optimization of Ocean-mining Vehicle System
Design Evaluation of a Deepsea Manganese Nodule Miner Based on Axiomatic Design
Jong-Su Choi, Sup Hong, Hyung-Woo Kim, Tae-kyeong Yeu, Korea Institute of Ships and Ocean Engineering, Daejeon, Korea

Path Tracking Control of Tracked Vehicle on Soft Cohesive Soil
Tae-Kyeong Yeu, Sup Hong, Hyung-Woo Kim And Jong-Su Choi, Korea Institute of Ships and Ocean Engineering, Daejeon, Korea

18:00 Bus departs from CSU
OMS SYMPOSIUM BANQUET Grand Sun City Hotel

WEDNESDAY 08:30

9. MINING SYSTEMS & TECHNOLOGY IV:
Crust Mining and Miner Control

Wednesday 08:30 Shenghua Auditorium
Chair: Sup Hong, Korea Research Inst. of Ship and Ocean Engineering, Daejeon, Korea
Co-chair: Suiping Wang, Central South University, Changsha, China

Development of an Extended Kalman Filter Algorithm for the Localization of Underwater Mining Vehicles
Moon-Chel Won, Hyuk-Sang Cha, Seung-Chul Shin, Chungnam National Univ; Sup Hong, Jong-Su Choi, Hyung-Woo Kim, Korea Institute of Ships and Ocean Engineering, Daejeon, Korea

Fuzzy and Predictive Control on the Deep-sea Vehicle
Suiping Wang, Weihua Gui, Tao Zhang, Central South Univ, Changsha; Changbin Wu, China Ocean Mineral Resource Research Association, Beijing, China

Research of Six-legged Walking Robot Used in Ocean Mining
Guiying Zeng, Shaojun Liu, Central South Univ, Changsha, China

A Cutting Model for Drum Cutter for Deep Ocean Cobalt Crust
Dexin Ding, Zhijun Zhang, Zhengwei Xion, Nanhua Univ, Hengyang, China

The Study on Distribution Law of Crushing Graininess for Roller-ming Head Cutting Cobalt Crust
Yiming Xia, Yingyong Bu, Haiming Zhao, Xuanyun Qin, Central South Univ, Changsha, China

10. GAS HYDRATES

Wednesday 10:50 Shenghua Auditorium
Chair: Takeshi Komai, National Inst of Advanced Industrial Science and Technology, Tsukuba, Japan
Co-chair: Ying YE, Zhejiang University, Hangzhou, China

Compressive Strength and Density of Methane Hydrate
Yasuyuki Nabeshima, Yusuke Takai, Osaka Univ, Osaka; Takeshi Komai, AIST, Tsukuba, Japan

Dissociation Rate of Methane Hydrates Occupied in Pore Space of Marine Sediments
Takeshi Komai, Taro Kawamura, Yasuhide Sakamoto, Yoshitaka Yamamoto, AIST, Tsukuba, Japan

Dissociation Experiment of Hydrate Core Sample Using Thermodynamic Inhibitors – Part 2
T. Kawamura, M. Ohtake, Y. Sakamoto, Y. Yamamoto, H. Haneda, AIST, Tsukuba, Japan

A Novel Pressure Piston Corer for Seafloor Sediments in Gas Hydrate Areas
Shi-lun Li, Yi Cheng, Hua-wei Qin, Lin-yi Gu, Ying Ye, Min-xiu Qiu, Zhejiang Univ, Hangzhou; Nengyou Wu, Jun Tao, Guangzhou Marine Geological Survey Bureau, Guangzhou, China

11. PROCESSING TECHNOLOGY

Wednesday 14:00 Shenghua Auditorium
Chair: Kaixi Jiang, Beijing General Research Institute of Mining and Metallurgy, Beijing, China
Co-chair: Kyung Ho Park, Korea Inst of Geoscience and Mineral Resources, Daejeon, Korea

Pilot Tests of Processes Adopting Ammonia for Leaching Ocean Poly-metallic Nodules in Presence of a Reductive
Kaixi Jiang, Xunxiong Jiang, Shengdong Wang, Zhenyou Li, Yanqing Fan, Lei Zhao, Haibei Wang, Beijing General Research Inst of Mining and Metallurgy, Beijing, China

Electroleaching of Fe-Ni-Cu-Co Alloy
Min-Seuk Kim, Kyung-Ho Park, Hong-In Kim, Korea Inst of Geoscience and Mineral Resources, Daejeon, Korea

Studies on the Separation of Cobalt and Nickel in Solution from Hydrometallurgical Processing of Ocean Cobalt-rich Crust
Yanqing Fan, Xunxiong Jiang, Shengdong Wang, Kaixi Jiang, Beijing General Research Inst of Mining and Metallurgy, Beijing, China

Pulsed Power Desintegration and Breaking-up Technologies for Resistant Gold-containing Ores and Beneficiation Products: Theory and Technological Results (Proceedings Only)
V.A. Chanturiya, I.J. Bunin, Research Inst of Comprehensive Exploration of Mineral Resources, RAS, Moscow, Russia

12. ENVIRONMENT

Wednesday 15:30 Shenghua Auditorium
Chair: Ning Yang, Changsha Research Institute of Mining and Metallurgy, Changsha, China

Potential Pollution to Marine Environment – Study on Crushing and Pulverization of Nodules during Pump Lifting
Weisheng Zou, Jiazhen Huang, Changsha Research Inst of Mining & Metallurgy, Changsha, China

Design on the Concentration and Pressure Tight Sampler of Suspended Particulate Matter and Plankton
Haikuo Shen, Bo Jin, Ying Chen, Zhonghua Huang, Zhejiang University, Hangzhou, China
Detoxification of Cadmium from Industrial Effluents Using Solid Waste Generated after Sea Nodule Processing (Proceedings Only)
Archana Agrawal, K K Sahu, National Metallurgical Laboratory, Jamshedpur, India

13. CLOSING SESSION

Wednesday 17:00 Shenghua Auditorium
Chair: Jin S. Chung, ISOPE, Cupertino, California, USA
Co-chair: Li Li, Central South University, Changsha, Hunan, China

Summary reports from individual session chairs
Closing Notes

THURSDAY

Tour of Historical Sites
Depart for Conference Tour, October 14-16.

GENERAL INFORMATION

PLACE AND DATE: Changsha, Hunan, China; October 9–13, 2005
All sessions of ISOPE OMS-2005 symposium will take place at:

Central South University
Shenghua Auditorium
Yuelushan
Changsha, Hunan 410083, China
Phone: +86-731-8830540

Place for Accommodation and Symposium Banquet:

Grand Sun City Hotel (Use Reservation Form.)
Furong Middle Road 3rd Block 269,
Changsha, Hunan Province 410007, China
Phone: +86-731 521 8888 Fax: +86-731 521 8288
E-mail: service@grandsuncityhotel.net
Website: http://www.grandsuncityhotel.net

ACCESS TO CHANGSHA FROM AIRPORT
Changsha Huanghua International Airport is the closest to Changsha. OMS-2005 local secretariat arranges a bus at the airport to meet some regular-time arrived guests, e.g. 2 times in the morning or in the afternoon according to the flight’s schedule from Beijing/Shanghai on Oct. 9th, so for those who come over too early or too late (the local secretariat will receive all participants who arrive at Changsha airport between 10:00 to 22:00 on Oct. 9th), they’ll be hoped to go by themselves.

Other two ways from Airport to Grand Sun City Hotel:
• By taxi, cost about 120 Yuan RMB(approximately US$15), about 38 km from airport to hotel
• By airport bus, 15 Yuan RMB/ person from airport to Civil Aviation Hotel, then take a taxi to Grand Sun City Hotel (cost within 30 Yuan RMB)

PARKING
Hotel parking is free for guests.

LANGUAGE
The language for the symposium is English. No translation service will be arranged.

CURRENCY EXCHANGE
Currency can be exchanged either at the airport, banks or hotel for the most favorable rates. Exchange rate as of July 30, 2005 is: 1 USD = 8.11 Yuan.

HOTEL ACCOMMODATION:
To get the OMS-2005 discount rate, use the Reservation Form in this program or posted on www.isope.org. You can also ask the form from meetings@isope.org. Write ISOPE OMS-2005 on Subject line. Only a limited number of rooms at ISOPE OMS-2005 rates are available. Guaranteed reservation by September 5.

Electric Voltage: The voltage for electrical power supply is 220 V, 50 Hz, but also power supply of 110V is provided for per room of the Hotel.

BUS TRANSPORTATION BETWEEN HOTEL AND CSU SHENGHUA AUDITORIUM
During the symposium, the OMS local secretariat will provide bus services in the morning and evening between the hotel and CSU Shenghua auditorium.

CITY TRANSPORTATION
City bus service and taxi service are available.

LOCAL TECHNICAL TOUR : 8:00–12:00; Tickets available on site.
• Yuelu Academy
• Mawangdui Tomb

CONFERENCE TOUR: ZHANGZIAJIE
OCTOBER 13–16
• Visit www.isope.org for detail itinerary and reservation.
• 16:30 (Tentative) Depart Hotel

ADVANCE SYMPOSIUM REGISTRATION BY MAIL OR FAX (use the Registration Form)
All persons attending the symposium are required to register, pay the appropriate fee, and get a symposium badge. Remember to send via airmail or Fax the Advance Registration (and Invoice) Form in this Program or a copy to reach before:
August 5 for one author per paper and September 5 for non-authors from outside China:

ISOPE OMS-2005 Secretariat, 1674 North Shoreline Blvd, Suite 146, Mountain View, California 94043, USA: Fax+1-650-254-2038.

In case one charges to a credit card via FAX, the card number should be typed in bold face or written clearly to be readable in the transmitted fax copy. Use the Advance Registration Form in this program or a copy. Registration fees (note: US$50 surcharge after September 1 for on-site registration) are as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Fee (US $)</th>
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<tbody>
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<td>received before August 5</td>
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12
TOTAL AMOUNT DUE
To reserve a seat for Conference Tour, Oct. 13-16 (Thursday-Sunday): Zhangjiajie**, visit www.isope.org

* The registration fee includes a symposium proceeding CD-ROM, COMRA Reception, OMS Banquet, 3 lunches and coffee/tea breaks.

** One author per paper is required to advance-register by August 5.

REGISTRATION CANCELLATIONS
Request for cancellation of registration must be received in writing by September 12, 2005 to be granted a refund minus US$50 processing charge. No refund for an author after whose paper is already included in the proceedings.

REGISTRATION BADGE
Registration badges are required for admittance to all the symposium activities, including the banquet and lunch.

ON-SITE SYMPOSIUM REGISTRATION
Participants who miss the advance registration may register at the Symposium Registration Desk, but there is a US$50 surcharge. The registration desk will be open during 08:30-16:00

ISOPE PUBLICATION ORDER
The ISOPE OMS-2005 Symposium Proceedings (ISBN 1-880653-65-6) is included in the symposium registration fees: CD-ROM and Hard Copy. The proceedings volumes (300 pp. est.) can be ordered by mail at the rates of:

Mail order at $100 (ISOPE Member $80) including shipping charge.

All ISOPE PUBLICATIONS (listed on www.isope.org) can be ordered from ISOPE, P.O. Box 189, Cupertino, California 95015-0189, USA: Fax 1-650–254–2038. Advance payment is required. MasterCard or VISA card, international money order or U.S. bank checks in US dollars payable to ISOPE will be accepted. Shipping (surface-mail) and handling charges are included (also see the ISOPE Publication Order Information.)

PRESS - The press is invited to register at: Registration Desk

SYMPOSIUM HEADQUARTERS
Registration Desk

SYMPOSIUM BANQUET
October 11, 18:30–20:30 Grand Sun City Hotel

LCD Test ROOM
Session Room

LCD projector, PC and screen (and an overhead projector,) will be set up from 08:00-17:00, Monday–Wednesday in the session room. For any specific requirements for presentations, participants should write in ISOPE form “Author/Projector Information” or may contact:

Mrs. Zhang Yan, OMS-2005 Local Secretariat
International Exchange Division
Central South University
Yuelushan
INTERNATIONAL PARTICIPANTS AND VISA APPLICATION

International authors, participants or attendees who need help (except financial) can contact: Mrs. Zhang Yan, OMS-2005 Local Secretariat.

Entry Visa. Most non-Chinese participants may be required to apply for an entry visa. Please get an application form at the Consulate of People’s Republic of China in your country. Mrs. Zhang Yan, OMS-2005 Local Secretariat may assist, if filled visa-forms received by Secretariat by early August.

ABOUT CHANGSHA

Located at Hunan Province, Changsha City is the provincial capital. Its area is 11.8 thousand square km., with a population of 5.56 million. Changsha City is the famous city of historical culture in China. Its Yuelu Academy of classical learning was established in the Song Dynasty, being the first government run university in China. Besides, there are picturesque Yuelu Mountain and Juzizhou (tangerine land) etc. scenic spots. Famous specialties of tradition are Xiangxiu (Hunan embroidery), brass or copper wares, tea set, orange and tangerine, etc.

Shopping spots:
- Pinghetang Commercial Building, Huangxing Middle Road
- Wangfujing Department Store, Huangxing Middle Road
- Changsha Friendship Shop, Huangxing Middle Road
- Apollo Commercial Building, Shaoshan North Road, Yuanjialing
- Apollo Commercial Square, Bayi West Road, Railway Station

For more information, please visit www.gotravel.com.cn/eng/cities/hunan.

Climate and Clothes

Weather in Changsha during October is warm: 20°C–30°C. It may rain a few days a week. It is recommended to carry an umbrella.

Central South University (CSU) Campus
Changsha, and Location of CSU and Venue Hotel
HOTEL RESERVATION FORM (must use this form)  
Grand Sun City Hotel, Changsha, Hunan, China

ISOPE OMS-2005 Symposium, October 9–13, 2005

Grand Sun City Hotel is the official hotel for the Symposium. For guaranteed reservation and discount room rate, (1) this form must be received via either fax or airmail only and no later than September 5:

Mrs. Zhang Yan, OMS-2005 Local Secretariat  
International Exchange Division  
Central South University  
Yuelushan  
Changsha, Hunan Province, 410083, China  
E-mail: zhangy@mail.csu.edu.cn; Fax 86-731-8710136

Surname: _____________________ & Middle: _____________________  
First (Fore) Name: _____________________  
Title: Mr. Ms. Mrs. Prof. Dr.

Company: _____________________________________________
Address  ______________________________________________
_______________________________________________
Country ___________________ Postal (ZIP) Code ____________
Fax ______________________: E-mail _____________________

Arrival: October __ Time _____;  
Depart.: October __, Time _____

Please, circle or mark [ X ] the room you reserve):

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Room Rates (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Sun City Hotel</td>
<td>1-person room – 44</td>
</tr>
<tr>
<td>Changsha</td>
<td>2-person room – 44 (22/person)</td>
</tr>
</tbody>
</table>

Note: Room rate includes tax and 15% service charge, but do not include meals. US$4/person for breakfast.

Local Symposium Secretariat has already reserved at special OMS-discount rate for all the participants and guests necessary number of rooms at Grand Sun City Hotel Changsha.

CANCELLATION: Email or fax room cancellation to Local OMS-2005 Secretariat, **15 days or earlier** before your arrival date in the reservation.

Mrs. Zhang Yan. Local OMS-2005 Secretariat will notify you of the reservation confirmation.

Email or Fax This Form to Mrs. Zhang Yan
TECHNICAL PROGRAM

ISOPE OMS-2005 Changsha
Changsha, Hunan, China
October 9–13, 2005

Find Forms for the Hotel Reservation and Advance Registration inside this program.

ISOPE OMS-2005 Venue Address:
Central South University
Shenghua Auditorium
Yuelushan
Changsha, Hunan 410083, China
Phone: +86-731-8830540

Accommodation and Symposium Banquet:
Grand Sun City Hotel (Use Reservation Form.)
Furong Middle Road 3rd Block 269,
Changsha, Hunan Province 410007, China
Phone: +86-731 521 8888  Fax: +86-731 521 8288
E-mail: service@grandsuncityhotel.net
Website: http://www.grandsuncityhotel.net

Plan to Attend Other ISOPE Meetings

ISOPE–2006 San Francisco, California, USA
May 28–June 2, 2006
Abstract Deadline: October 1, 2005
For Call For Papers, visit www.isope.org and submit online or fax an abstract to Fax +1–650–254–2038 USA

ISOPE PACOMS-2006 Dalian, China, September 17–20:
Update on www.isope.org and submit an abstract to PACOMS-2006, Fax +1–650–254–2038 USA

ISOPE–2007 Europe ; Update on www.isope.org

ISOPE OMS–2007: Update on www.isope.org

Venues and date to be announced on www.isope.org

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WebSite www.isope.org