

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
Gas Hydrates
Exploration & Survey**

**Mining Systems & Technology
Deep-Ocean Water Upwelling
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
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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.

to facilitate opportunities or the members to interact with their governments. The International Society of Offshore and Polar Engineers (ISOPE) facilitates the OMWG activities.

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.

<i>Co-chairmen of the ISOPE OMS-2005 Symposium</i>	
Jin S. Chung, USA	Shaojun Liu, China
Tetsuo Yamazaki, Japan	

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.isoqe.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 KCORE)
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
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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
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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
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Dr. G. Schriever, BIOLAB Forschungsinstitut, Hohenwestedt, Germany
Dr. R. Sharma, National Institute of Oceanography, Goa, India
Dr. A. Usui, Kochi University, Kochi, Japan
Dr. Valcana 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 Smposium, 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, Huangzhou, China; Kang Ding, Univ of Minnesota, Minneapolis, USA; Ying, Chen, Ying Ye, Jian-Wei Cao, Lin-Yi Gu, Zhejiang Univ, Hangzhou, 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, VNIIOKeangeologia, 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 Sediements 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, Huawei Qin, Shilun Li, Ying Chen, Zhejiang Univ;
Guanghai 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

Restaurant downtown

TUESDAY 08:30

5. MINING SYSTEMS & TECHNOLOGY I: General

Tuesday 08.30 Shenghua Auditorium
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 1

Tuesday 10.40 Shenghua Auditorium
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 Solid-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, Wenliang 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, Universitat
Siegen, Siegen, Germany

Metamodel-based Multidisciplinary Design Optimization of Ocean-mining Vehicle System

Jae Jun Jung, Jung Hun Yoo, Tae Hee Lee, Hanyang Univ, Seoul; Sup Hong, Yung Woo Kim, Jong Su Choi, Korea Institute of Ships and Ocean Engineering, Daejeon, Korea

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; Tae Hee Lee, Hanyang Univ, Seoul, 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, Janshedpur, 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.isopec.org. You can also ask the form from meetings@isopec.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.isopec.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:

Category

Fee (US \$)*
received before **August 5**

<input type="checkbox"/>	Author, Co-authors	350	_____
<input type="checkbox"/>	Session or Symposium Chair, Co-Chair	350	_____
<input type="checkbox"/>	ISOPE Member	350	_____
<input type="checkbox"/>	ISOPE member with new application (incl. 2006 membership fee and 1-year journal issues)	440	_____
<input type="checkbox"/>	Non-Member	420	_____
<input type="checkbox"/>	Full-time Student with 2005 student ID Card	250	_____
<input type="checkbox"/>	COMRA Reception, Monday, October 10 evening	Free	
<input type="checkbox"/>	OMS Banquet, Tuesday, October 11 evening	Free	

TOTAL AMOUNT DUE

To reserve a seat for **Conference Tour, Oct. 13-16 (Thursday-Sunday): Zhangjiajie****, visit www.isopec.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.

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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

Changsha, Hunan Province, 410083, China
E-mail: zhangy@mail.csu.edu.cn; Fax 86-731-8710136

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

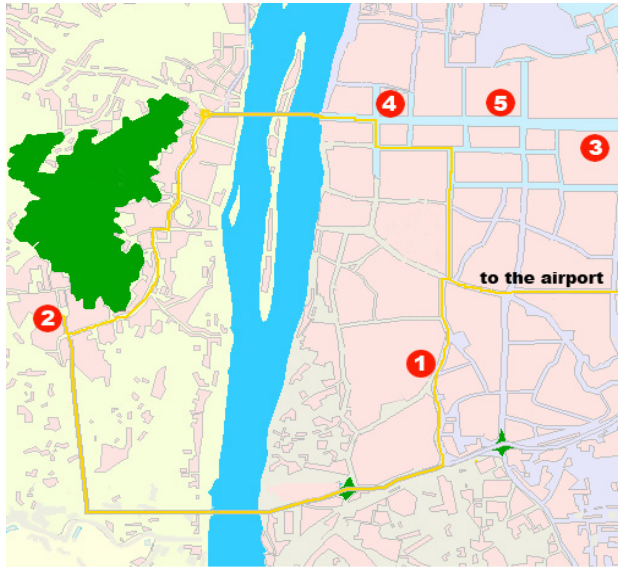
For more information, please visit www.gotravel.com.cn/eng/cities/hunan.

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



- ① **Grand Sun City Hotel**(神农大酒店)
- ② **Central South University**(中南大学)
- ③ **Civil Aviation Hotel**(民航大酒店)
- ④ **Pinghetang**(平和堂)
- ⑤ **Friendship Shop&Apollo Store** (友谊商店&阿波罗商城)

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**

First (Fore)
 Surname: _____ & Middle: _____
 Circle: Male Female; 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):

Hotel	Room Rates (US\$)
Grand Sun City Hotel	[] 1-person room – 44
Changsha	[] 2-person room – 44 (22/person)

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.isopec.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.isopec.org and submit an abstract to
PACOMS-2006, Fax +1–650–254–2038 USA

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

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

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



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