

THE FIRST CIRCULAR

**INTERNATIONAL WORKSHOP ON MULTI-WELL DEEP
UNDERGROUND LABORATORY IN EASTERN CHINA**

July 3-8, 2016

CHANGCHUN, CHINA





1. ANNOUNCEMENT

Our workshop proposal on **Multi-Well Deep Underground Laboratory (MW-DUL) in Songliao Basin** was approved by the ICDP in 2014. The Deep Carbon Observatory will also support this workshop. We thank all colleagues who have contributed to the previous and present Songliao drilling projects. Based on the discussion among the PIs and members of the project, the workshop will be held in Chuangchun of China, July 3-8, 2016. The preliminary information of the workshop is provided as below.

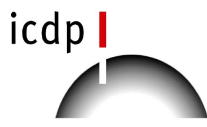
2. BACKGROUND

Many specialized earth observation stations have been established worldwide, mostly in space and on the land surface-sea surface or seafloor. Although these stations have specific objectives, they have greatly advanced our understanding of the earth system as a whole. With a rapid increase of the world population and the demand for more natural resources, energy, and clean environment, a deep underground laboratory would be tremendously valuable. A deep underground laboratory (DUL) is defined here as a facility and experimental platform designed specially for long-term, continuous, real-time, and in-situ detection and observation of various physical, chemical and biological processes that are important to sustainable development, of natural resources while maintaining a clean environment. A DUL can be constructed using existing underground space made available by mines, tunnels or deep boreholes (multi-boreholes) and equipped with various sophisticated instrumentation. Such deep underground laboratories provide a unique opportunity for astrophysical, petro-mechanical and geological research. To date, several tens of underground laboratories have been built and are in operation worldwide with volumes ranging from a few hundred cubic meters to more than a hundred thousand cubic meters and with depths ranging from hundreds to more than two thousand meters. Concerning some specific challenges, these DUL utilities can be used as test sites for earthquake and volcano monitoring, CO₂ sequestration, deep biosphere detection and experimentation, and even dark matter research.

We hope to build a deep underground laboratory, which will primarily be developed from existing wells in the Songliao Basin and nearby underground space. Some currently operating earthquake and volcano monitoring stations along the Tan-Lu fault zone could also be part of the laboratory. The first set of scientific objectives of this laboratory may focus on: 1) Detection and exploration of fluid and the deep biosphere; 2) Geological CO₂ emission and deep carbon cycle; 3) Earthquake and volcano activity monitoring; 4) Development of enhanced geothermal system (EGS). More importantly the long term variation of geophysical fields can be monitored within this laboratory. A major logistical goal is to provide a major research site for the global research community to conduct experiments that are otherwise impossible or too expensive to perform.

3. OBJECTIVES

The objective of this workshop is to develop a full proposal which includes scientific objectives of deep underground laboratory that will be submitted to ICDP. The workshop will define a specific



set of scientific objectives, and a detailed plan must be developed to show how the proposed underground observatory will help in achieving these scientific objectives in a cost-effectively manner. Technical challenges related to the MW-DUL construction and operation will be discussed, such as installation of various instruments, observation and experimentation related to the deep biosphere research, deep CO₂ sequestration, fluid displacement and recovery by injection of CO₂ and biogasification, and monitoring of volcano and earthquake hazards.

The workshop will discuss possible sites to drill in the Changbaishan Mountain area as a part of our proposed MW-DUL project. In order to obtain first hand information we will take a 3-days excursion in the Changbaishan mountain and its surroundings (see below).

4. SPONSORS AND ORGANIZERS

- **SPONSORS** International Continental Drilling Program (ICDP)
Deep Carbon Observatory (DCO)
Ministry of Land and Resources of China
International Union of Geological Science (IUGS)
China Geological Survey (CGS)
- **ORGANIZERS** Jilin University of China
Chinese Academy of Geological Sciences
China University of Geosciences at Beijing
SinoProbe

5. SCIENTIFIC COMMITTEES

- Prof. Chengshan Wang, China University of Geosciences at Beijing, China
- Prof. Hailiang Dong, Miami University, USA
- Prof. Steve Graham, Stanford University, USA
- Prof. Xueyu Lin, Jilin University, China
- Prof. Shuwen Dong, SinoProbe Center of Chinese Academy of Geological Sciences, China
- Prof. Axel Liebscher, GFZ, Germany
- Prof. Tullis C. Onstott, Princeton University, USA
- Prof. Zhiqin Xu, Chinese Academy of Geological Science, China
- Prof. Craig Schiffries, Geophysical Lab of Carnegie Institution, USA
- Prof. Wenzhi Zhao, Institute of Petroleum-Oil Exploration and Development of China
- Prof. Shuguang Li, China University of Geosciences at Beijing, China
- Prof. Jiaqi Liu, Institute of Geology and Geophysics, Chinese Academy of Science
- Prof. Rixiang Zhu, Institute of Geology and Geophysics, Chinese Academy of Science
- Prof. Jiyang Wang, Institute of Geology and Geophysics, Chinese Academy of Science
- Prof. Manchao He, China University of Mining and Technology at Beijing, China
- Prof. Yasufumi Iryu, Tohoku University, Japan
- Prof. Youn Soo Lee, University of Science and Technology, Korea
- Prof. Jun Lin, Jilin University, China
- Prof. Jinfa Li, China Geological Survey



- Prof. Zhenmin Jin, China University of Geosciences at Wuhan, China

6. AGENDA

Day 1: Scientific Sessions

- Introduction to the Multi-Well Deep Underground Laboratory (MW-DUL);
- Detection and exploration of fluid and the deep biosphere;
- Geological CO₂ emission and deep carbon cycle;
- Earthquake and volcano activity monitoring;
- Development of enhanced geothermal system (EGS);

Day 2: Technical Sessions

- Introduction to the subsurface instrumentation of MW-DUL;
- Subsurface instrumentation for detection and exploration of fluid and the deep biosphere;
- Subsurface instrumentation for geological CO₂ emission and deep carbon cycle;
- Subsurface instrumentation for earthquake and volcanic activity monitoring;
- Subsurface instrumentation for development of enhanced geothermal system ;

Day 3: Discussion Sessions

- Discussion of plans for MW-DUL construction and operation in the Songliao Basin;
- Formation of an international science team to prepare a full ICDP proposal for MW-DUL;

Day 4 to 6: Field excursion

7. LANGUAGE

The official language of the workshop will be English.

8. POST-WORKSHOP ACTIVITIES AND FIELD EXCURSION

A 3-day post-workshop field excursion will be organized (See the figure below).

First day: Expedition to the Northern slope Changbaishan Mountain region, including the U-shaped Quaternary glacial lava-pyroclastic deposits, Tianchi Lake on the top of the mountain, and a composite volcano architecture.

Second and third day: Visit to some volcano stratigraphic outcrops and available boreholes.

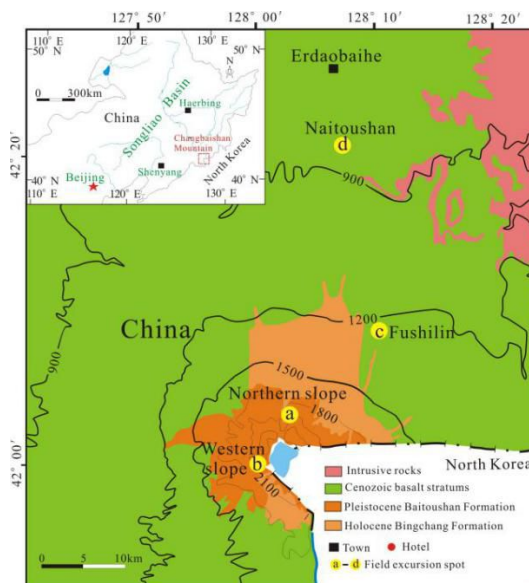


Fig.1 The sites of the field excursion

9. REGISTRATION

The deadline for registration of the workshop

and field trip is April 15, 2016. The registration fee for the workshop is \$350. The workshop fee includes registration, abstract volume, all meals, and transportation during the workshop. The



registration fee for the field trip is \$300 which includes field guidebook, meals, transportation during the field trip. Student fee is \$200 for workshop registration and \$200 for the field trip in order to encourage the participation of young scientists. It is noted that accommodation is not included in the registration fee. Early bird registration is encouraged and the registration fee for the workshop is \$300 before March 15 of 2016. The payment information is as follows:

BANK NAME: AGRICULTURAL BANK OF CHINA UNIVERSITY OF GEOSCIENCES OFFICE, BEIJING BRANCH

ADDRESS: NO 29 XUEYUAN ROAD HAIDIAN DISTRICT BEIJING CHINA

SWIFT CODE: ABOCCNBJ010

ACCOUNT NUMBER: 11250901040000016

10. TIME FOR SECOND CIRCULAR

The second circular will be sent no later than May 15, 2016.

11. CORRESPONDENCE

Any questions or suggestion / comments should be directed to:

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July 3-8, 2016

CHANGCHUN, CHINA

REGISTRATION FORM

Family Name		First Name		Sex	
Title				Nationality	
Institution					
Postal address					
E-mail				Fax No.	
Title of presentation				Oral or poster	
Field trip	Yes	No			
Hotel room reservation	Single	Double			

Please return the completed form before April 15, 2016 along with your abstract to:
Dr. Yongjian Huang at 599029271@qq.com or Ms. Qi Zhou at 1437922567@qq.com