

International Union of Geological Sciences Recognized Big
Science Program

Deep-time Digital Earth (DDE)

**Forum on Deep-time Digital Earth (DDE)
Big Science Program**



Scientific Program

Deep-time Digital Earth (DDE)



Brief Introduction

The Deep-time Digital Earth (DDE) program is a new initiative proposed by several Adhering National Members and International Associations Affiliated Members of IUGS. The DDE program has been approved by IUGS EC as the first IUGS Recognized Big Science Program. DDE has been set as a 10-year program (2019-2028). DDE aims to establish linked earth big-data hubs that are interoperable with other databases including published data in the public domain and unpublished data in institutions and centers of expertise. Similar to OneGeology, which aims to provide a single map of world geology, DDE will be an international consortium that aims to provide “Geological Google” with harmonized data conveniently for science, industry, and the general public. However, unlike other existing databases, DDE will provide the geologies and geographies of deep time, as well as data on the properties of those geologies, and thus will provide insight into the distribution and value of earth’s resources and materials, as well as hazards – while also providing a glimpse of the Earth’s geological future. DDE serves as a new platform for facilitating efficient and additive international collaboration along with knowledge sharing. The program will run as an open program which encourages broad collaboration among geosciences as well as in transdisciplinary fields.

DDE Forum includes an opening session, plenary sessions, roundtable meetings, working group meetings, a closing session as well as a field excursion (Kunshan, Suzhou).

Sponsors



International Union of Geological Sciences (IUGS)



China Geological
Survey (CGS)



National Natural Science
Foundation of China (NSFC)

Local Organizers



Chinese Academy of
Geological Sciences (CAGS)



China University of
Geosciences (Beijing) (CUGB)

Organizing Committee

Chair

Chengshan WANG China University of Geosciences (Beijing), China

Co-chair

Zengqian HOU National Natural Science Foundation of China

Guangsheng YAN Chinese Academy of Geological Sciences, China

Roland OBERHANSLI University of Potsdam, Germany

Michael STEPHENSON British Geological Survey, UK

Member

Shuzhong SHEN Nanjing University, China

Chenghu ZHOU Institute of Geographic Sciences and Natural Resources Research (CAS), China

Junxuan FAN Nanjing University, China

Yongzheng MA China Geological Survey and IUGS Secretariat Office, China

Min CAI China University of Geosciences (Beijing), China

Wei LI China Academy of Geological Sciences and IUGS Secretariat Office, China

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Program at a Glance

DATE		PROGRAM		ROOM	
Monday Feb. 25th	19:00	20:00	Icebreaker and reception	Chinese Restaurant (2 nd floor)	
	20:00	22:00	Roundtable Business Meeting 1	No.1 Meeting Room (2 nd floor)	
Tuesday Feb. 26th	08:30	10:45	Opening Ceremony	Banquet Hall (1 st floor)	
	10:45	12:00	Plenary Session 1		
	14:00	17:40			
	18:40	20:00	Forum Banquet		
	20:00	22:00	Roundtable Business Meeting 2	No.2 Meeting Room (2 nd floor)	
Roundtable Business Meeting 3			No.3 Meeting Room (2 nd floor)		
Wednesday Feb. 27th*	08:30	12:10	Plenary Session 2	Kuangzhen Ge (2 nd floor)	
	13:30	18:00			
		20:00	22:00	Roundtable Business Meeting 4	No.2 Meeting Room (2 nd floor)
				Roundtable Business Meeting 5	No.3 Meeting Room (2 nd floor)
Thursday Feb. 28th*	08:30	12:00	Working Group and Task Group Business Meetings	No.1, No.2, No.3 Meeting Room (1 st floor) VIP Room A, B, C (2 nd floor)	
				14:00	16:50
		16:50	17:20	Closing Session	
Friday Mar. 1st	Post-Forum Excursion (Kunshan, Suzhou)				
Saturday Mar. 2nd					
Lunch and dinner (Buffet): Huawu Fang Restaurant (1st floor)					

* The 644th Session of the Xiangshan Science Conferences, “Deep-time Digital Earth: International Workshop on Paleogeography Reconstruction and Deep-time Big Data”

Conference Guides

● Airport Pickup

The meeting organizer will arrange free transportation from **Terminal 3** of Beijing Capital International Airport to the hotel on **Feb. 25**.

Shuttle Bus

Shuttle buses will depart every three hours at the following time: **9:00, 12:00, 15:00, 18:00**.

Our guide will meet you with a sign board “IUGS-DDE” at the arrival hall of Terminal 3.

Taxi

If you can't catch up the shuttle bus, you may take a taxi directly to the hotel. Our guide with a sign board “IUGS-DDE” will meet you at the arrival hall of Terminal 3 and guide you to the boarding area. Distance from the airport to the hotel: 42km and it takes about 50 min by taxi.

Contacting person:

Wenlei WANG, +86-13910092003, wenleiw@163.com



● Hotel

Fragrant Hill Hotel (香山饭店) is a four-star hotel integrating Chinese classical architecture and environmental art designed by the world-famous architect Mr. Leoh Ming Pei. The hotel is located in the Fragrant Hills (Xiang Shan) Park which belongs to Beijing's Xishan Scenic Area. The hotel is near the North of 5th Ring Road, 42 km from Beijing Capital International Airport, 30 km from Beijing South Train Station.

Address: 40 Maimai Street, Haidian District, Beijing (北京市海淀区买卖街 40 号)

Website: <http://www.xsfd.com/>; **Tel:** 010-51299843

Contacting person:

Yu SITU, +86-13488709275, dic@cags.ac.cn

● Registration & Service Desk

The Registration Service Center provides service related to the conference. It is responsible for the service of plenary session, Roundtable Business Meetings (RBM) & Working Group Business Meetings (WGBM), meeting registration, badge issue, copy and test presentation files, press, lost and found, WIFI, and other issues.

- Opening time: Feb. 25, 14:00-22:30
Feb. 26, 08:00-22:00
Feb. 27, 08:00-22:00
Feb. 28, 08:00-22:00

- Location: Lobby, Fragrant Hill Hotel

Contacting person:

Wei LI, +86-13811495912, secretariat@iugs.org

Yuan GAO, +86-13466721378, yuangao@cugb.edu.cn

● **Presentation**

Each session room is equipped with a Projector and a computer with Windows Operation System. Electronic files need to be saved as one of the following formats: ppt, pptx, pdf or mp4.

The presentations are in English. Speakers please send your slides to Dr. Laiming ZHANG (lzhang@cugb.edu.cn) or copy your slides at the Registration & Service Desk before Feb. 26.

Computers and technical assistance will be provided for speaker to test their files at the Registration & Service Desk. Speakers are not suggested to use their own laptop for the presentation. And the slides should be saved by widescreen (16:9 aspect ratio) for Plenary Session 1 and standard (4:3) for Plenary Session 2&3.

Be considerate of other speakers and the audience by staying within your allotted time. The individual presentation time includes 5 minutes for discussion and changeover to the next speaker. Session chairs will hold you to the allotted time, which is essential to ensure adequate time for questions and discussion.

Contacting person:

Laiming ZHANG, +86-15901007989, lzhang@cugb.edu.cn;

● **Chair**

Role as Chair:

- ◆ Use any reasonable means to stop a speaker who has exceeded the allotted time. The session must stay on schedule for both the audience and other speakers, as per the approved program.
- ◆ Only an author listed on a paper may be a presenter. No other substitutions are permitted.
- ◆ If a speaker does not appear, call for discussion of previous papers in that session or call a recess. Do not start the next paper until the time listed in the program.
- ◆ You may interrupt speakers in order to ask them to speak more audibly, slowly, or clearly, to face the audience, or to briefly explain the message of an illegible slide.
- ◆ Speakers cannot connect their laptops into computer projectors. Speakers have been instructed to load their presentation in advance.
- ◆ As Chair, you must keep the session on schedule. Do not go to the next presentation, and do not allow the session to overrun while a projectionist is trying to solve problems.

Contacting person:

Junxuan FAN, +86-13813931640, jxfan@nju.edu.cn

● **Medical Treatment**

There will be a resident doctor to provide temporary medical services. If you feel unwell, please contact the volunteers and the doctor at the first time.

Contacting person:

Dr. Ping LIU, +86-13681563163, and Dr. Hongyu ZHANG, +86-15001266276, Room 3214

Hotel Map



General Schedule

Opening Ceremony

Venue: Banquet Hall (1st floor)

Time: 08:30-10:45, 26 February, 2019

Dr. Roland OBERHANSLLI, Past-president of IUGS

Chair: **Dr. Zengqian HOU**, Vice-President of National Natural Science Foundation of China (NSFC)

Time	Topic	Speaker
8:30-8:50	Announcement of the launch of the DDE program	Qiuming CHENG
8:50-9:10	Framework and founding members of DDE program; Sign Accord	Michael STEPHENSON
9:10-10:10	Address by invited guests	
10:10-10:45	Coffee/Tea break and Group photo	

Plenary Session 1

Venue: Banquet Hall (1st floor)

Part 1

Time: 10:45-12:00, 26 February, 2019

Chair: **Dr. Stanley FINNEY**, Secretary General of IUGS

Time	Topic	Speaker
10:45-11:10	Scientific scope and plan of DDE program introduced by Executive Committee (EC)	Roland OBERHAENSLI Chengshan WANG
11:10-11:35	The uses and benefits of big data for geological surveys	Michael STEPHENSON
11:35-12:00	Establishing a high-resolution trajectory of Cambrian to Early Triassic marine invertebrate biodiversity	Shuzhong SHEN Junxuan FAN
12:00-13:30	Lunch	

Plenary Session 1

Part 2

Time: 14:00-16:00, 26 February, 2019

Dr. William CAVAZZA, Vice President of IUGS

Chair: **Dr. Hiroshi KITAZATO**, Treasurer of IUGS

Time	Topic	Speaker
14:00-14:25	Integration of Deep-time digital data for mapping clusters of porphyry copper mineral deposits	Qiuming CHENG
14:25-14:50	Deep time reconstructions of internal Earth structure with adjoint method	Hans-peter BUNGE
14:50-15:15	Data Strategies - Lessons and examples from the frontier lines of international oil and gas company	David LEARY
15:15-15:40	Application of advanced analytics and visualization in mineral systems	Shaunna MORRISON
15:40-16:00	Coffee/Tea break	

Part 3

Time: 16:00-17:40, 26 February, 2019

Dr. Kristine ASCH, Vice President of IUGS

Chair: **Dr. François ROBIDA**, Chair of Commission on the Management & Application of Geoscience Information (CGI)

Time	Topic	Speaker
16:00-16:25	Sedimentological/Palaeogeographic Data as fundamental building blocks of the DDE project: critical underpinning of reconstructing Deep-time Earth Systems	Isabel MONTAÑEZ
16:25-16:50	Disruption in biogeosciences: conceptual, methodological, digital, and technological	Peter FOX
16:50-17:15	Geo-Data Science: leveraging geoscience research with geoinformatics, semantics and open data	Xiaogang MA
17:15-17:40	FAIR Geoscientific Samples and Data Need International Collaboration	Kerstin LEHNERT

Plenary Session 2

香山科學會議



Venue: Kuangzhen Ge (2nd floor)

Part 1

Time: 08:30-10:30, 27 February, 2019

Dr. Ali ISMAIL-ZADE, Secretary General of International Union of Geodesy and Geophysics (IUGG), Secretary of International Science Council (ISC)

Chair:

Dr. Pubellier MANUEL, President of Commission for Geological Map of the World (CGMW)

Time	Topic	Speaker
8:30-8:55	The Golden Spike Still Glitters: the (re)construction of a global chronostratigraphy	David HARPER
8:55-9:20	Geochronology: constructing the 4th dimension of DDE program	Xianhua LI
9:20-9:45	DDE stratigraphy: from the Past to the Future	Junxuan FAN
9:45-10:10	Mikrotax: developing a genuinely effective platform for palaeontological geoinformatics	Jeremy YOUNG
10:10-10:30	Coffee/Tea break	

Part 2

Time: 10:30-12:10, 27 February, 2019

Dr. Alexandru Mihai MICU, Secretary General of International Association of Geomorphologists (IAG)

Chair:

Dr. Oleg PETROV, Director-General, Russian Geological Research Institute (VSEGEI)

Time	Topic	Speaker
10:30-10:55	Space for sustainable development goals 2030	Orhan ALTAN
10:55-11:20	Global plate reconstructions and paleogeography: infrastructure and a case study on Asia	Sabin ZAHIROVIC
11:20-11:45	To understand the long-term evolution of the geomagnetic field requires synthesis of multi-disciplinary deep-time records	Shihong ZHANG
11:45-12:10	Database linkages: a necessity for effective interconnectivity of stratigraphic, geochemical, geochronological and other data	Bruce EGLINGTON
12:10-13:30	Lunch	

Plenary Session 2

香山科學會議



Part 3

Time: 13:30-15:55, 27 February, 2019

Dr. David LEARY, American Association of Petroleum Geologists (AAPG)

Chair: **Dr. Jingwen MAO**, Past President of International Association on the Genesis of Ore Deposits (IAGOD)

Time	Topic	Speaker
13:30-13:55	From global geotectonic database to the next generation of plate motion history and a new understanding of global geodynamics: IGCP 648	Zheng-Xiang LI
13:55-14:20	Towards a new understanding of the sedimentary isotope record	Graham SHIELDS
14:20-14:45	Geodynamics of Asia: a map prospective from CGMW projects	Manuel PUBELLIER
14:45-15:10	Four-dimensional geodynamics of plates and the mantle: current practice and future prospects	Michael GURNIS
15:10-15:35	A brief overview of developing plate reconstructions for geodynamics and data mining	Simon WILLIAMS
15:35-15:55	Coffee/Tea break	

Part 4

Time: 15:55-18:00, 27 February, 2019

Dr. Guangsheng YAN, Chief Geoscientist, China Geological Survey

Chair: **Dr. Jennifer MCKINLEY**, President of International Association for Mathematical Geosciences (IAMG)

Time	Topic	Speaker
15:55-16:20	The rise of atmospheric pO_2 after Snowball Earth meltdown	Huiming BAO
16:20-16:45	Deep-time climate simulations with comprehensive Earth System models	Yongyun HU
16:45-17:10	Artificial intelligence & machine learning in the Earth Sciences	Norman MacLEOD
17:10-17:35	Modern plate tectonic model of the Arctic and Northern Eurasia (based on results of CGMW subcommissions for Northern Eurasia, America, Tectonic maps activities)	Oleg PETROV
17:35-18:00	From the Geological Past to the Present: 4D data assimilation in geodynamic models	Ali ISMAIL-ZADE

Plenary Session 3

香山科學會議



Venue: Kuangzhen Ge (2nd floor)

Part 1

Time: 14:00-15:30, 28 February, 2019

Chair: **Dr. Chenghu ZHOU**, Past Vice President of International Geographical Union (IGU)
Dr. Hans THYBO, President of International Lithosphere Program (ILP)

Time	Topic	Speaker
14:00-14:30	Implementation plan of the Stratigraphy and Paleontology Working Groups How can we achieve the big data for the DDE program?	Junxuan FAN
14:30-14:50	Implementation plan of the Tectonics Working Group	Michael GURNIS
14:50-15:10	Implementation plan of the Petrology and Geochemistry Working Group	Bruce EGLINGTON
15:10-15:30	Coffee/Tea break	

Part 2

Time: 15:30-16:50, 28 February, 2019

Prof. Chengshan WANG, Vice president of International Association of Sedimentologists (IAS)

Chair: **Dr. Adrian IMMENHAUSER**, Past President of International Association of Sedimentologists (IAS)

Time	Topic	Speaker
15:30-15:50	Implementation plan of the Sedimentology and Paleogeography Working Group	Isabel MONTAÑEZ
15:50-16:10	Implementation plan of the Climate Simulation Working Group	Yongyun HU
16:10-16:50	Task Group reports	

Closing Ceremony

Venue: Kuangzhen Ge (2nd floor)

Time: 16:50-17:20, 28 February, 2019

Time	Topic	Speaker
16:50-17:20	Closing Ceremony	

Roundtable Business Meeting

RBM1. Founding member meetings

Coordinators:

Michael STEPHENSON, Roland OBERHANSLI, Chengshan WANG

Time:

February 25 (Monday), 20:00 – 22:00 (after Icebreaker)

Participants:

Founding members of DDE

Agenda:

- ♦ Election of GC & EC members
- ♦ Approval of Bylaws and Status

Location:

No.1 Meeting Room (2nd floor)

Contacting person:

Wei LI, +86-13811495912

English-Chinese Translation:

Wei LI

RBM2. Geological Surveys Meeting

Coordinators:

Michael STEPHENSON, Guangsheng YAN, Junxuan FAN

Time:

February 26 (Tuesday), 20:00 – 22:00 (after Banquet)

Participants:

China Geological Survey (CGS), British Geological Survey (BGS), All Russian Geological Institute (VSEGEI), Geological Survey of India (GSI), Geological Survey of Columbia, Association of Geological Survey and Minerals of Iberoamericanos (ASGMI), EuroGeoSurveys, Organization of Africa Geological Surveys (OAGS)

Agenda:

- ♦ What roles of geological surveys play in DDE?
- ♦ How can DDE serve geological surveys?

Location:

No. 2 Meeting Room (2nd floor)

Contacting person:

Wei LI, +86-13811495912

English-Chinese translation:

Wei LI

RBM3. ISC GeoUnions Meeting

Coordinators:

Qiuming CHENG, Chenghu ZHOU

Time:

February 26 (Tuesday), 20:00 – 22:00

Participants:

IUGS, IUGG, INQUA, ISPRS, IGU

Agenda:

GeoUnions' perspectives on Further development of DDE in context of ISC

Contacting person:

Yu SITU, +86-13488709275

English-Chinese translation:

Yu SITU

Location:

No. 3 Meeting Room (2nd floor)

RBM4. DDE for International Associations

Coordinators:

Roland OBERHANSLI, Shuzhong SHEN

Time:

February 27 (Wednesday), 20:00 – 22:00

Participants:

ICS, IPA, IAS, SEPM, IAMG, CGMW, CGI, IAG, AAPG, IAGOD, GSA, ILP, IUGS, IUGG, INQUA, ISPRS, IGU

Agenda:

- ♦ What roles of international associations play in DDE?
- ♦ How can DDE serve international associations?

Location:

No. 2 Meeting Room (2nd floor)

Contacting person:

Wei LI, +86-13811495912

English-Chinese translation:

Wei LI

RBM5. Energy and Mining Associations

Coordinators:

Michael STEPHENSON, Zhiqiang FENG, Guangsheng YAN,

Time:

February 27 (Wednesday), 20:00 – 22:00

Participants:

China Mining, China Gold Group, AAPG, ASGMI, EuroGeoSurveys, OAGS, Sinopec, PetroChina,
more to be confirmed

Agenda:

- ♦ What roles of Mining and Energy industry play in DDE?
- ♦ How can DDE serve Mining and Energy industry?

Location:

No. 3 Meeting Room (2nd floor)

Contacting person:

Yu SITU, +86-13488709275

English-Chinese translation:

Yu SITU

Working Group Business Meeting

WGBM1. Stratigraphy and Paleontology

Coordinators:

Shuzhong SHEN, David HARPER, Junxuan FAN and the DDE Stratigraphy and Paleontology Working Group

Time:

February 28 (Thursday), 8:30 – 12:00

Participants:

Open

Activities:

- ◆ Introduction: David HARPER , Shuzhong SHEN
- ◆ Open discussion on the Implementation Plan
- ◆ How can we achieve explosive growth of the data in DDE?
- ◆ What are the Big science questions the DDE- Stratigraphy and Paleontology hope to answer?

Location:

No. 1 Meeting Room

WGBM2. Tectonics

Coordinators:

Michael GURNIS, Shaofeng LIU, Simon WILLIAMS, and the DDE Tectonics Working Group

Time:

February 28 (Thursday), 8:30 – 12:00

Participants:

Open.

Activities:

- ◆ Introduction: Shaofeng LIU
- ◆ Open discussion on the Implementation Plan
- ◆ How can we achieve explosive growth of the data in DDE?
- ◆ What are the big science questions the DDE-Tectonics hope to answer?

Location:

No. 2 Meeting Room

WGBM3. Petrology and Geochemistry

Coordinators:

Bruce EGLINGTON, Tao WANG, Zheng-Xiang LI, Oleg PETROV and the DDE Petrology and Geochemistry Group

Time:

February 28 (Thursday), 8:30 – 12:00

Participants:

Open

Activities:

- ◆ Introduction: Bruce EGLINGTON, Tao WANG, Zheng-Xiang LI and Oleg PETROV
- ◆ Open discussion on the Implementation Plan
- ◆ How can we achieve explosive growth of the data in DDE?
- ◆ What are the big science questions the DDE- Petrology and Geochemistry hope to answer?

Location:

No. 3 Meeting Room

WGBM4. Sedimentology and Paleogeography

Coordinators:

Isabel MONTAÑEZ, Xiumian HU, Mingcai HOU, and the DDE Sedimentology and Paleogeography Working Groups

Time:

February 28 (Thursday), 8:30 – 12:00

Participants:

Open

Activities:

- ◆ Introduction: Xiumian HU, James Ogg, Mingcai HOU, Jitao CHEN etc.
- ◆ Open discussion on the Implementation Plan
- ◆ How can we achieve explosive growth of the data in DDE?
- ◆ What are the big science questions the DDE- Sedimentology and Paleogeography hope to answer?

Location:

VIP Room A

WGBM5. Climate Simulation

Coordinators:

Yongyun HU, Huiming BAO, and the DDE Climate Simulation Working Group

Time:

February 28 (Thursday), 8:30 – 12:00

Participants:

Open

Activities:

- ◆ Group meeting and discussion of participants
- ◆ Discussions on the 2019-2028 Implementation Plan
- ◆ How to carry out climate simulations, and what are the important climate events to simulate?
- ◆ What are the big science questions of the climate simulation group hope to answer?

Location:

VIP Room B

Post-Forum Excursion (Kunshan, Suzhou)

Coordinators Chenghu ZHOU

Time March 1-2, 2019

Brief Introduction

Kunshan is a city located in Jiangsu Province. It is known for its long culture history and beautiful natural environment. With its geographical advantage in China the city is highly developed economically and socially.

After the DDE Forum, relevant experts of interest will be invited to visit Kunshan, Suzhou, to visit those cultural sites as well as the venue for the International Research Centre of Excellence for DDE.

Agenda

Time	Schedule
March 1st (Friday) Morning	From Beijing To Kunshan (MU5104*, 09:00-10:59)
March 1st (Friday) 14:00-17:00	<ul style="list-style-type: none">◆ Visit Zhouzhuang— One of the earliest ancient town in China◆ Investigate Kun Opera — Intangible Cultural Heritage of Humanity of UNESCO
March 1st (Friday) 17:30-20:00	Banquet
March 2nd (Saturday) 09:00-11:00	<ul style="list-style-type: none">◆ Visit Duke Kunshan University◆ Visit Kunshan Intelligence Valley — A beautiful small town with local characteristics◆ Launching ceremony of International Research Centre of Excellence for DDE
March 2nd (Saturday) 11:30	Lunch
March 2nd (Saturday) 14:00-17:00	Discussion

Hotel information

Fairmont Yangcheng Lake

Address: No. 3668 West Ma'anshan Road, Kunshan, Jiangsu Province, China

TEL: + 86 512 5780 0888

FAX: + 86 512 5780 7255

Contact

Xiaoyan ZHOU, +86- 13182600780, zhouxy@geosts.ac.cn

*Air tickets and transportation will be provided by LOC

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