

# Deep Volatiles, Energy & Environments Summit

March 13-14, 2018 | Shanghai, China

Sponsored by the Chinese Academy of Engineering and the Deep Carbon Observatory

论坛议程  
Program

**March 13, 2018**  
**08:30 – 18:30**

| <b>1. Opening Session</b><br><b>CHAIRS: SUN Chengwei 孙承伟</b>                        |   |
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| 08:30 – 08:35   | 1.1 大会主办单位：中国工程院领导 谢克昌院士致欢迎词 (in Chinese)<br>Welcome Speech by Leader of Chinese Academy of Engineering (CAE), XIE Kechang                          |
| 08:35 – 08:40   | 1.2 上海市领导致欢迎词 (in Chinese)<br>Welcome Speech by Leader of Shanghai Municipality   |
| 08:40 – 08:55   | 1.3 大会主办单位：美国 DCO 领导致词<br>HAZEN Robert M: Exciting new DCO science in data analytics and visualization  |
| 08:55 – 09:00   | 1.4 中国工程物理研究院代表致词 李华主任<br>Welcome Speech by Representative of Chinese Academy of Engineering Physics (CAEP), LI Hua                                 |
| 09:00 – 09:25   | 1.5 MAO Ho-Kwang 毛河光<br>Deep volatiles as the creator and terminator of the living planet   |
| 9:25 – 10:00<br>GROUP PHOTO & COFFEE BREAK 合影、茶歇                                    |   |
| <b>2. Deep Energy</b><br><b>CHAIR: CAI Meifeng 蔡美峰; DINGWELL Donald</b>             |   |
| 10:00 – 10:20   | 2.1 DANIEL Isabelle<br>Origin, forms, quantities and movements of reduced carbon in Earth   |
| 10:20 – 10:45   | 2.2 *DAI Jinxing 戴金星, *NI Yunyan 倪云燕<br>Discrimination of abiogenic and biogenic alkane gases   |
| 10:45 – 11:10   | 2.3 *GUO Xusheng 郭旭升, LI Yuping, DUAN Jinbao, ZHANG Qingfeng<br>Theoretical cognition progress and challenges of the ultra-deep oil-gas exploration |
| 11:10 – 12:00   | 2.4 Panel Discussion: Deep energy, environment, science, and engineering<br>Panelist: CAI Meifeng; DANIEL Isabelle; HAZEN Robert; MAO Ho-Kwang      |
| <b>3. Reservoirs and Fluxes</b><br><b>CHAIRS: ZHU Rixiang 朱日祥; SCHIFFRIES Craig</b> |   |
| 12:00 – 12:20   | 3.1 PLANK Terry<br>Overview of Reservoirs and Fluxes Research at DCO  |

12:20 – 13:20

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| 13:20 – 13:45 | 3.2 *LI Shuguang 李曙光, YANG Wei, KE Shan, MENG Xunan, TIAN Hengci, XU Lijuan, HE Yongsheng, HUANG Jian, WANG Xuan-Ce, XIA Qunke, SUN Weidong, YANG Xiaoyong, REN Zhong-Yuan, WEI Haiquan, LIU Yongsheng, MENG Fancong & YAN Jun<br>Deep carbon cycles constrained by a large-scale mantle Mg isotope anomaly in eastern China |
| 13:45 – 14:00 | 3.3 *TAO Renbiao 陶仁彪, *ZHANG Lifei 张立飞, XU Cheng, LIU Xi, FEI Yingwei<br>Petrological and experimental study of crust-mantle carbon exchange in subduction zone  |
| 14:00 – 14:15 | 3.4 *GUO Zhengfu 郭正府, ZHANG Maoliang, ZHANG Lihong, SUN Yutao, LEI Ming, ZHAO Wenbin, MA Lin<br>Fluxes and origin of greenhouse gases from typical volcanic-geothermal fields in China   |
| 14:15 – 14:30 | 3.5 KATSURA Tomoo<br>The MgAlO <sub>2.5</sub> contents in bridgmanite as a function of pressure and bulk composition based on defect chemistry and its applications to volatile storage capacity in the lower mantle   |

14:30 – 16:30

Poster Presentations

#### 4. Deep Carbon

CHAIR: XU Yigang 徐义刚; ZHANG Li 张莉

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| 16:30 – 16:55 | 4.1 *YANG Jingsui 杨经绥, LIAN Dongyang, ROBINSON Paul T., WU Weiwei, XU Xiangzhen, XIONG Fahui, WIEDENBECK Michael<br>Diamond in ophiolitic mantle rocks: A new observation on deep mantle carbon  |
| 16:55 – 17:20 | 4.2 *SOBOLEV Nick, TOMILENKO A.A., BULBAK T.A., and LOGVINOVA A.M.<br>Composition of volatile components in Russian diamonds and associated minerals   |
| 17:20 – 17:45 | 4.3 *HE Yongsheng 何永胜, MENG Xunan, KE Shan, WU Hongjie, ZHU Chuanwei, TENG Fang-Zhen, HOEFS Jochen, HUANG Jian, YANG Wei, XU Lijuan, HOU Zhen-Hui, REN Zhong-Yuan, LI Shuguang<br>Oxygenation of the Paleo-atmosphere by deep carbon freezing of recycled carbonates |
| 17:45 – 18:00 | 4.4 *LIU Yongsheng 刘勇胜, HE Detao, FOLEY Stephen<br>Strong oxidization and ultra-reduction during the deep carbonate cycling  |
| 18:00 – 18:15 | 4.5 STAGNO Vincenzo<br>Fe speciation in ferropericlase and bridgmanite as indicator of diamond-forming processes in the Earth's lower mantle   |
| 18:15 – 18:30 | 4.6 ZHENG Haiyan 郑海燕<br>Chemical reactions of the carbon in volatile molecules under extreme pressure  |

**March 14, 2018**  
**08:30 – 18:30**

| <b>5. Extreme Physics and Chemistry</b><br><b>CHAIR: ZHANG Lifei 张立飞; LIN Jungfu 林俊孚</b> |  |
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| 08:30 – 08:50  | 5.1 MANNING Craig<br>Overview of Extreme Physics and Chemistry Research at DCO   |
| 08:50 – 09:15  | 5.2 *WALTER Michael J., DREWITT James W. E., McMAHON Sorcha C., ZHANG Hongluo, LORD Oliver T., HEINEN Benedict, & KLEPPE Annette K.<br>The Fate of Carbonate in Oceanic Crust Subducted into Earth's Deep Mantle                         |
| 09:15 – 09:40  | 5.3 NAVROTSKY Alex<br>Carbon, Calorimetry, Cataclysms, and Consequences  |
| 09:40 – 09:55  | 5.4 HWANG Huijeong, SEOUNG Donghoon, * <b>LEE Yongjae</b> , LIU Zhenxian, LIERMANN Hanns-Peter, CYNN Hyunchae, VOGT Thomas, KAO Chi-Chang, MAO Ho-Kwang<br>A role for subducted super-hydrated kaolinite in the Earth's deep-water cycle |
| 09:55 – 10:45<br>COFFEE BREAK 茶歇   |  |
| <b>6. Computation</b><br><b>CHAIRS: MA Yanming 马琰铭; LI Hua 李华</b>                        |  |
| 10:45 – 11:15  | 6.1 *TSE John, WU Min, YONG Xue, PAN Yuanming & CHEN Jiuchua<br>Structures, chemical reactivity and transport properties of carbon dioxide and carbonates under the mantle conditions  |
| 11:15 – 11:30  | 6.2 PAN Ding 潘鼎<br>First-principles study of dissolved carbon in high-pressure and high-temperature water  |
| 11:30 – 11:45  | 6.3 KIM Duckyoung<br>Computational study on novel oxidation state of iron, peroxide FeO <sub>2</sub> : understanding physical properties and implication to geoscience   |
| 11:45 – 12:00  | 6.4 *ZHANG Zhigang 张志刚, MAO Zhu, LIU Xi, ZHANG Yigang & BRODHOLT John<br>Stability of CaCO <sub>3</sub> under deep mantle conditions: constraints from first principles simulations  |
| <b>7. Deep Life</b><br><b>CHAIRS: WANG Fengping 王风平; HAZEN Robert</b>                    |  |
| 12:00 – 12:20  | 7.1 *SOGIN Mitchel & *HINRICHS Kai-uwe<br>DCO's Deep Life Community – major goals and recent discoveries   |

12:20 – 13:20  
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| 13:20 – 13:35 | 7.2 DONG Hailiang 董海良<br>Deep Biosphere Research in China: Opportunities and Challenges  |
| 13:35 – 13:50 | 7.3 LIU Juan 刘娟<br>Electron transfer between subsurface microorganisms and iron oxide minerals   |
| 13:50 – 14:05 | 7.4 LAU Maggie<br>Sequence the deep biosphere: the norm and time to go beyond?   |
| 14:05 – 14:20 | 7.5 *ZHANG Yu 张宇, WAMG Fengping, XIAO Xiang<br>From exploration to experimentation: applying high-pressure bioreactors to investigate marine microbial processes |
| 14:20 – 14:35 | 7.6 ZHANG Ray 张锐<br>Viruses in deep sub-seafloor biosphere   |

14:35 – 14:50  
COFFEE BREAK 茶歇

### 8. C & H under extreme pressures CHAIRS: GREGORYANZ Eugene; REDFERN Simon

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| 14:50 – 15:05 | 8.1 *DALLADAY-SIMPSON Philip, HOWIE Ross, BINNS Jack, LIU Xiao-Di, CHEN Xiao-Jia, and GREGORYANZ Eugene<br>Hydrogen at high densities   |
| 15:05 – 15:20 | 8.2 *LIU Xiaodi 刘晓迪, HOWIE Ross, ZHANG Hui-Chao, DALLADAY-SIMPSON Philip, CHEN Xiao-Jia, GREGORYANZ Eugene<br>Phase diagram of hydrogen, deuterium and hydrogen-deuterium mixtures at high pressures and low temperatures |
| 15:20 – 15:35 | 8.3 *PARK Sulgiye, LIU Jin, DAHL Jeremy, EWING Rodney C., MAO Wendy L., LIU Yu<br>Diamondoid to diamond phase transition  |
| 15:35 – 15:50 | 8.4 ZENG Zhidan 曾徵丹<br>Amorphous diamond: a new form of carbon synthesized under HPHT   |
| 15:50 – 16:05 | 8.5 YANG Liuxiang 杨留响<br>Unraveling the lonsdaleite enigma  |

### 9. Deep Lower Mantle CHAIRS: MAO Wendy; WALTER Michael

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| 16:05 – 16:20 | 9.1 ZHANG Li 张莉<br>Effects of major volatiles on deep mantle mineralogy                           |
| 16:20 – 16:45 | 9.2 OHTANI Eiji<br>Role of volatiles transported into the mantle transition zone and lower mantle |

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| 16:45 – 17:00 | 9.3 HU Qingyang 胡清扬<br>Hydrous iron superoxide   |
| 17:00 – 17:15 | 9.4 LIU Jin 刘锦<br>Hydrogen-bearing iron peroxide at the core-mantle boundary   |
| 17:15 – 18:15 | 9.5 Panel Discussion: Volatiles in the 4D Earth<br>Panelists: MAO Ho-Kwang 毛河光; ZHU Rixiang 朱日祥; XU Yigang 徐义刚; WALTER Michael |
| 18:15 – 18:30 | 闭幕式<br>CLOSING CEREMONY  |