

The 28th Formation Evaluation Symposium of Japan

Special Session
“CCS/CCUS”

PROGRAM

Annual Symposium
September 13 & 14, 2023



- Sponsored by Japan Formation Evaluation Society – A Chapter of SPWLA
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Program

Wednesday, September 13

| Start time (JST) | Session | Chair |
|------------------|---|------------------|
| 9:00 | Opening | Yuki Maehara |
| 9:20 | Invited Talk 1: CCS/CCUS | Tetsuya Yamamoto |
| 10:25 | Invited Talk 2: CCS/CCUS | Yoshinori Sanada |
| 11:15 | Special Session 1: CCS/CCUS | Yoshinori Sanada |
| 11:40 | Lunch Break | |
| 12:40 | Special Session 2: CCS/CCUS | Yasuhiro Yamada |
| 14:10 | Carbonate/Fracture | Taisuke Mizunaga |
| 16:05 | Unconventional/Methane Hydrate/Scientific | Lingdan Xia |
| 17:20 | General Meeting | Yoshinori Sanada |
| 18:30 | Networking Dinner | |

Thursday, September 14

| Start time (JST) | Session | Chair |
|------------------|---|------------------|
| 9:00 | Opening | Tetsuya Yamamoto |
| 9:05 | Keynote Address | Kengo Tsuzuki |
| 9:30 | Invited Talk 3: CCS/CCUS | Kengo Tsuzuki |
| 10:35 | Advanced Mud Logging/Reservoir Mapping While Drilling | Tsuyoshi Fujii |
| 11:25 | Lunch Break | |
| 12:50 | Formation Testing | Takayuki Wada |
| 13:55 | Machine Learning/Artificial Intelligence | Chisato Konishi |
| 15:50 | Invited Talk 4: CCS/CCUS | Nishi Masatoshi |
| 16:40 | Closing | Yuki Maehara |

Technical Session: Wednesday, September 13

Opening

Chairperson: *Yuki Maehara*

- 9:00** **Opening and Safety Briefing**
- 9:05** **Opening Address**
Masatoshi Nishi (President of JFES; INPEX CORPORATION)

Invited Talk 1: CCS/CCUS

Chairperson: *Tetsuya Yamamoto*

- 9:20** [POTENTIAL FOR CCS IN THE US – A PROJECT MANAGER’S PERSPECTIVE](#)
Remote Ram Seetharam (Energex Consultants)
- 9:45** [PREDICTING AND MONITORING THE LONG-TERM BEHAVIOR OF CO₂ INJECTED IN A DEEP SALINE AQUIFER: A CASE STUDY AT THE NAGAOKA SITE, JAPAN](#)
Takahiro Nakajima (RITE)
- 10:10** **Break**

Invited Talk 2: CCS/CCUS

Chairperson: *Yoshinori Sanada*

- 10:25** [CCS PROJECT AND RESEARCH ACTIVITIES OF INPEX AND JAPT](#)
Tatsuo Shimamoto (INPEX / JAPT)
- 10:50** [TIDAL SIGNAL ANALYSIS TO MONITOR CARBON DIOXIDE MIGRATION](#)
Remote Kozo Sato (The University of Tokyo Frontier Research Center for Energy and Resources)

Special Session 1: CCS/CCUS

Chairperson: *Yoshinori Sanada*

- 11:15** **COUPLED ANALYSIS OF STRESS EVOLUTION IN AND AROUND RESERVOIRS DURING CO₂ INJECTION**
-A- [Koji Kashihara](#) (JAPEx), Yu Uchida (JAPEx)

11:40 Lunch Break

Special Session 2: CCS/CCUS

Chairperson: Yasuhiro Yamada

12:40 **WATER-ASSISTED CO₂ FRACTURING OF VOLCANIC ROCKS UNDER
-B- GEOTHERMAL CONDITIONS**
[Kohei Takuma](#) (Tohoku University), Yuto Watanabe (Tohoku University),
Kiyotoshi Sakaguchi (Tohoku University), Jiajie Wang (Tohoku University),
Kazumi Osato (GERD), Amane Terai (JOGMEC), Noriaki Watanabe (Tohoku
University)

13:05 **DISSOLUTION BEHAVIORS OF NATURALLY ALTERED BASALTS IN A BRINE
-C- AT 100 °C FOR IN-SITU CO₂ MINERALIZATION**
[Jiajie Wang](#) (Tohoku University), Noriaki Watanabe (Tohoku University),
Masahiko Yagi (JAPEx), Tetsuya Tamagawa (JAPEx), Hitomi Hirano (JAPEx)

13:30 **PERMEABILITY ENHANCEMENT AND VOID FORMATION IN PERIDOTITE BY
-D- DISSOLUTION OF OLIVINE USING CHELATING AGENTS**
[Luis Salalá](#) (Tohoku University), Noriaki Watanabe (Tohoku University), Jiajie
Wang (Tohoku University), Atsushi Okamoto (Tohoku University), Noriyoshi
Tsuchiya (Tohoku University)

13:55 Break

Carbonate/Fracture

Chairperson: Taisuke Mizunaga

14:10 **FLUID CHARACTERIZATION IN TIGHT CARBONATE RESERVOIRS ASSISTED
-E- BY NOVEL NON-ELECTRICAL LOGGING TECHNIQUES: CASE STUDIES OF
CENTRAL SICHUAN BASIN, CHINA.**
Remote Zuoan Zhao (PetroChina), Shi Fang (PetroChina), [Kaixuan Li](#) (SLB), Yue Wang
(SLB)

14:35 **APPLICATION OF NEW TECHNOLOGY ON EFFECTIVE SECONDARY PORE
-F- AND FRACTURE EVALUATION IN SINIAN DENGYING DOLOMITE
FORMATION, SICHUAN BASIN**
Remote Xiaoxin Wang (PetroChina), Juzheng Li (PetroChina), [Jing Mo](#) (SLB), Xiaolin
Ma (PetroChina), Ke Yan (PetroChina), Dali Wang (SLB), Yue Wang (SLB)

- 15:00** **EVALUATE NATURAL FRACTURED DEEP RESERVOIR THROUGH A NEW
-G- GENERATION, HIGH-DEFINITION LWD NMR TOOL**
Peichun Wang (CNOOC), Yunjiang Cui (CNOOC), Lei Xiong (CNOOC), Renfeng Zhang (CNOOC), [Xin Zhou](#) (SLB), Fangfang Wu (SLB), Lei Zhang (SLB) and Jiejing Gong (SLB)
- 15:25** **CUSTOMED FORMATION EVALUATION WORKFLOW IN LACUSTRINE
-H- CARBONATE RESERVOIR – A CASE STUDY IN QAIDAM BASIN**
Remote [Daiguo Yu](#) (SLB), Shenqin Zhang (PetroChina), Jinlong Wu (SLB), Shenzhuan Li (SLB), Xianran Zhao (SLB)
- 15:50** **Break**

Unconventional/Methane Hydrate/Scientific

Chairperson: *Lingdan Xia*

- 16:05** **ADDITIONAL DATA ACQUISITION AFTER SECOND OFFSHORE GAS
-I- PRODUCTION TEST, EASTERN NANKAI TROUGH, JAPAN**
[Kazuya Naito](#) (JOGMEC), Than Tin Aung (JOGMEC), Kiyofumi Suzuki (AIST), Tetsuya Fujii (JOGMEC), Jun Yoneda (AIST), Koji Yamamoto (JOGMEC)
- 16:30** **AI-BOOSTED GEOLOGICAL FACIES ANALYSIS IN CRUST-MANTLE
-J- TRANSITION ZONE**
[Chiaki Morelli](#) (SLB), Yang Shiduo (SLB), Yuki Maehara (SLB), Huimin Cai (SLB), Kyaw Moe (JAMSTEC), Yasuhiro Yamada (Kyushu University), Juerg Matter (University of Southampton)
- 16:55** **RELEASE THE UNCONVENTIONAL RESERVOIR POTENTIAL WITH 3D
-K- RESERVOIR CHARACTERIZATION METHOD IN HORIZONTAL WELLS**
Wei Xu (Sinopec), Donggen Yang (Sinopec), [Shenzhuan Li](#) (SLB), Xiao Gu (SLB), Bo Sun (Sinopec), Daohan Zhao (Sinopec), Zhongbin Xin (Sinopec), Meng Zhao (SLB), Fangfang Wu (SLB), Jinlong Wu (SLB), Xianran Zhao (SLB)
- 17:20** **General Meeting**
- 18:30** [Networking Dinner](#)

Technical Session: Thursday, September 14

Opening

Chairperson: *Yuki Maehara*

9:00 **Opening and Safety Briefing**

Keynote Address

Chairperson: *Kengo Tsuzuki*

9:05 [THE EMERGING ROLE OF PETROPHYSICS IN CARBON CAPTURE AND UNDERGROUND STORAGE](#)
Jennifer Market (SPWLA)

Invited Talk 3: CCS/CCUS

Chairperson: *Kengo Tsuzuki*

9:30 [GEOMECHANICAL CHALLENGES ASSOCIATED WITH MASSIVE STORAGE OF CO₂](#)
Remote Mark Zoback (Stanford University)

9:55 [WORLDWIDE PERSPECTIVE OF CCS/CCUS SITE CHARACTERIZATION: THE BEST PRACTICES AND LESSONS LEARNED](#)
Kaibin Qiu (SLB)

10:20 **Break**

Advanced Mud Logging/Reservoir Mapping While Drilling

Chairperson: *Tsuyoshi Fujii*

10:35 **MONETIZING HYDROCARBON RESERVES IN A NON-UNIFORM PRESSURE DEPLETED AND STRUCTURALLY COMPLEX RESERVOIRS THROUGH STRATEGIC HYDROCARBON MAPPING AT MULTIPLE SCALES**
-M- [Siti Najmi Farhan Zulkipli \(PETRONAS\)](#)

11:00 **NEW APPLICATION TERRITORY OF ULTRA-DEEP AZIMUTHAL RESISTIVITY TECHNOLOGY IN PUSHING A STRATEGIC REDEVELOPMENT OF DEEPWATER RESERVOIR BY AVOIDING UNCERTAIN ENGINEERING AND RESERVOIR RISKS**
-N-

Yongming Gao (CNOOC), Lipeng He (CNOOC), [Botao Chang](#) (SLB), Chao Wang (SLB), Fei Wang (SLB), Zhong Hu (SLB), Shuzhong Li (SLB)

11:25 Lunch Break

Formation Testing

Chairperson: Takayuki Wada

12:50 -O- INTEGRATED WORKFLOW ON SINGLE WELL PRODUCTIVITY ESTIMATION IN A LAMINATED RESERVOIR OF SOUTH CHINA SEA

Shu Sheng Guo (CNOOC), Shi Yue Wang (CNOOC), [Lei Zhang](#) (SLB), Zhao Ya Fan (SLB), Aldrick Garcia Mayans (SLB), Xin Zhou (SLB), Hong Liang Zhang (SLB), Bo Nan Ren (SLB), Guang Rao (SLB)

13:15 -P- INTELLIGENT WIRELINE FORMATION TESTER EVALUATION OF LOW-PERMEABILITY AND LOW-RESISTIVITY-CONTRAST FORMATION WITH DETAILED DIGITAL PLANNING

Remote [Xiannan Wang](#) (CNOOC), [Jian Wang](#) (CNOOC), [Gao Bei](#) (SLB)

13:40 Break

Machine Learning/Artificial Intelligence

Chairperson: Chisato Konishi

13:55 -R- APPLICATION OF MACHINE LEARNING CLASSIFICATION MODELS TO IDENTIFY BOREHOLE BREAKOUTS BASED ON CONVENTIONAL LOG DATA AND BOREHOLE IMAGE LOGS

[Nazir Mafakheri Bashmagh](#) (Kyoto University), [Weiren Lin](#) (Kyoto University)

14:20 -S- LEVERAGING THE COMPUTING POWER TO EXTRACT THE FULL VALUE FROM OLD CORE RESISTIVITY MEASUREMENT DATA FOR SHALY SAND LOG ANALYSIS.

[Hideo Komatsu](#) (INPEX)

14:45 -T- ARTIFICIAL INTELLIGENT (AI) ASSISTED FORMATION EVALUATION AND RESERVOIR MONITORING IN A CO₂ PRODUCING FIELD: CASE STUDIES FROM OFFSHORE PENINSULAR MALAYSIA

[Siti Najmi Farhan Zulkipli](#) (PETRONAS)

15:10 -U- A MACHINE LEARNING BASED WORKFLOW FOR INTEGRATION OF WIRELINE, LWD AND CORE DATA

Remote [Meretta Qleibo](#) (SLB), [Yang Xing Wang](#) (SLB), [Vikas Jain](#) (SLB)

15:35 Break

Invited Talk 4: CCS/CCUS

Chairperson: Nishi Masatoshi

15:50 [TURNING CO2 INTO STONE: CARBON MINERALIZATION TECHNOLOGY AND GLOBAL POTENTIAL](#)

Remote Chiara Marieni (Carbfix)

16:15 [INSIGHTS FROM LARGE-SCALE CO2 STORAGE INJECTION PROJECTS OFFSHORE NORWAY](#)

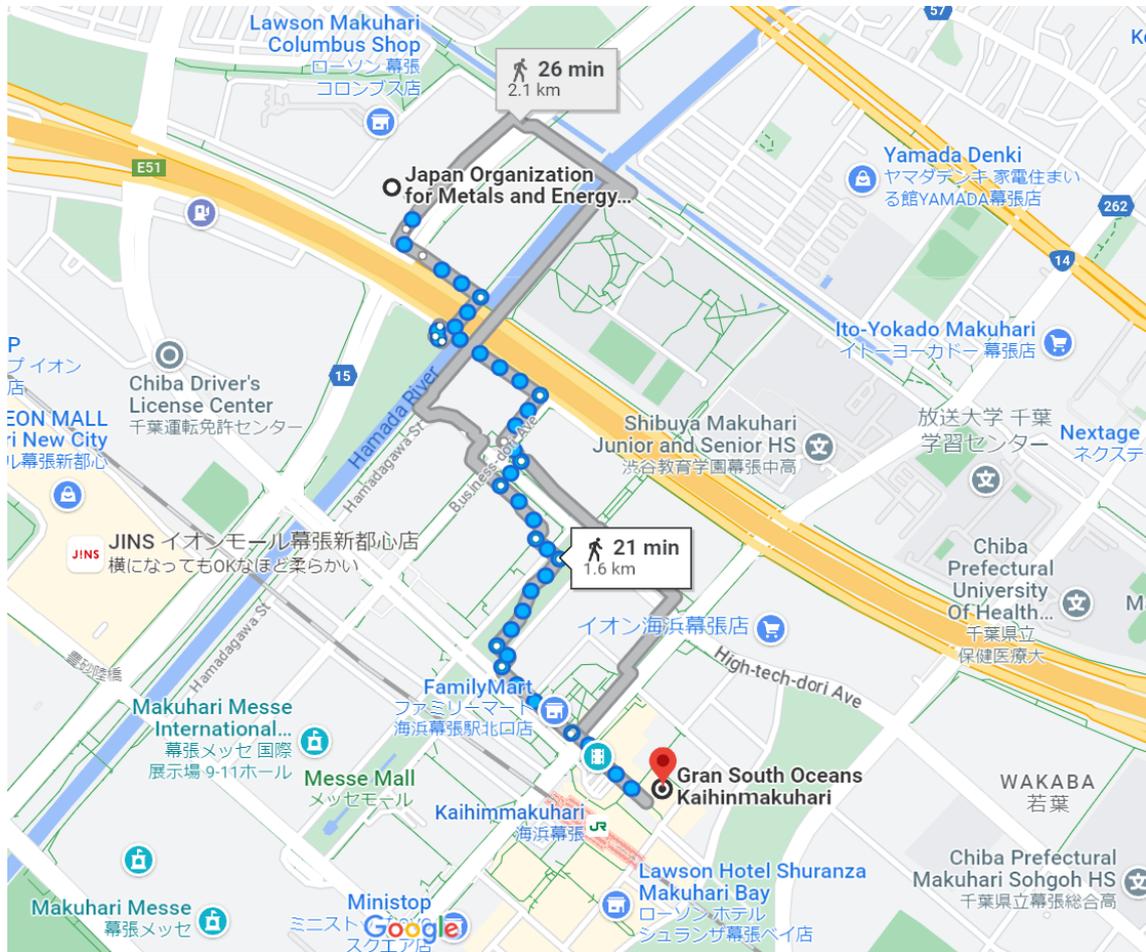
Remote Philip S. Ringrose (Norwegian University of Science & Technology / Equinor)

16:40 Closing

Networking Dinner: Wednesday, September 13

We are excited to invite you to a spectacular evening of fun, laughter, and celebration! We are hosting a networking party and would be absolutely delighted if you could join us for this special event. We serve free-flow alcohol (soft drink as well) and buffet style foods. Please join us.

- Date: Sep-13-2023
Time: 18:30-20:30
Venue: Gran South Oceans Kaihin-Makuhari (near JR Kaihin-makuhari station)
<https://goo.gl/maps/qsb9FnjkeoCr7F9x7>
Dress Code: Business casual
Fee: Included in symposium registration
Transportation: 20 mins to walk (No special arrangement by committee)



Symposium Committee 2023

| | |
|---------------|---|
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| Review | Yasuhiro Yamada, Kyushu University |
| Review | Yoshinori Sanada, Taisei |
| Reception | Kanako Furuto, JAPEX |
| Reception | Lingdan Xia, SLB |

Keynote Address

The emerging role of petrophysics in Carbon Capture and Underground Storage

Miss. Jennifer Market (SPWLA President, Independent consultant)

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ABSTRACT

As we look beyond traditional petroleum to emerging areas such as carbon capture and storage, we consider what measurements and interpretative practices from traditional hydrocarbon exploration/production can be applied in CCUS, which can be adapted, and what new challenges we face that will require innovative solutions. This talk gives an overview of petrophysics applications in CCUS and explores the yet - unanswered challenges.

Biography

Jennifer Market is a borehole acoustics, geomechanics, and mining geophysics expert, based in Perth, Australia. She has a long history of cutting-edge tool and application development and specializes in practical implementations of innovative ideas. She is the 2023-2024 SPWLA president.



Invited Talk 1-1

Potential for CCS in the US – A Project Manager’s Perspective

Dr. Ram Seetharam, Energex Consultants

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ABSTRACT

Carbon capture and storage (CCS) can be an effective large-scale solution for reducing carbon footprint in key industrial sectors such as ammonia, methanol, ethanol, cement and steel. With the recently enhanced incentives being provided for carbon capture in the US, CCS projects could break even or in some cases generate revenue while solving the carbon emissions problem for these sectors. Where feasible, onsite geological sequestration is the most cost-effective solution. Aggregating emissions from multiple sources via pipeline offtake and centralized offsite sequestration is another effective option. Risks can be mitigated significantly by detailed geological characterization, careful design of injection wells and zones, and effective plume modeling and monitoring.

Biography

Ram is the founder of Energex Consultants, specializing in CCS project evaluation, design and execution. He also serves as the Hydrogen Program Lead at the University of Houston, where he manages two industry collaborative projects evaluating projects for Repurposing Offshore Infrastructure for Clean Energy (ROICE) in the Gulf of Mexico. Ram recently retired as a senior executive at ExxonMobil after serving 33 years in the Upstream industry. He has held multiple key managerial and technical leadership positions for projects in Kazakhstan, Russia, North Sea, Middle East and Unconventionals. Ram has master’s and Ph.D. degrees in Chemical Engineering from the University of Houston, and a Bachelors in Chemical Engineering from the Indian Institute of Technology, Madras.



Invited Talk 1-2

Predicting and monitoring the long-term behavior of CO₂ injected in a deep saline aquifer: A case study at the Nagaoka site, Japan

Takahiro Nakajima, GCS Assoc., RITE

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ABSTRACT

This paper presents a case study on predicting and monitoring experiences from the Nagaoka site, which is the first CO₂ storage project in Japan. The target reservoir at the depth of 1100m was selected, where the injected CO₂ is in super-critical state. From the site characterization and well tests, three monitoring wells were designed and drilled around the injection well. Nearly 10 kt of CO₂ was injected from July 2003 to January 2005. Geophysical monitoring techniques including continuous pressure measurement, time-lapse well logging, cross-well seismic tomography, and 3D seismic survey have been conducted. These monitoring data were used for history matching of CO₂ behavior to update the heterogeneity of the reservoir characteristics. Time-lapse well logging had been conducted more than 12 years as the post-injection monitoring, and revealed spatiotemporal variations of trapping mechanism in the reservoir. This pilot scale project results provide variable insights on many aspects in geological CO₂ storage, including rock physics and geological modeling. The monitoring program was selected to improve the knowledge of the long-term behavior of injected CO₂ in the reservoir; therefore, this experience can also be useful to select the cost-effective monitoring method at CO₂ storage projects.

Biography

Takahiro Nakajima has been working as a geophysicist at Research Institute of Innovative Technology for the Earth (RITE) since September 2010. He has been engaged in the interpretation of reservoir complex using logging data at geological CO₂ storage sites. He is also working on simulations of CO₂ behavior in the ground using TOUGH2 simulator. He had received Ph. D degree in Applied Physics from Tokyo Institute of Technology. Before taking on the current role, he joined JAEA and worked for monitoring of the state in the ground using geophysical methods.



Invited Talk 2-1

CCS PROJECT AND RESEARCH ACTIVITIES OF INPEX AND JAPT

Tatsuo Shimamoto (INPEX / JAPT)

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ABSTRACT

In October 2020, the Japanese Government established the goal of achieving carbon neutrality by 2050, aiming for zero greenhouse gas emissions. According to METI's benchmark, a storage capacity of 120 to 240 million tons of CO₂ per year is required by 2050. Seeking CO₂ geological storage sites abroad would necessitate sea transportation due to Japan's island geography, presenting both technical and economic challenges. However, the total CO₂ storage capacity in depleted oil and gas reservoirs in Japan is limited to 400 million tons. Consequently, prioritizing domestic saline aquifer formations becomes imperative as the primary target for CO₂ storage in Japan.

To drive the commercialization of Japan's initial CCS projects, the state-owned entity JOGMEC selected 7 candidate projects through public bidding in June 2023. JOGMEC will allocate funds to cover study costs for these CCS projects, with INPEX being involved in two projects situated in Tohoku and the Capital area. In addition to these two, INPEX is strategizing various CCS projects both within Japan and internationally. Moreover, INPEX established the I-RHEX research group within its Technical Research Institute last year. This group is dedicated to research and development concerning underground CO₂ storage, as well as the technologies for CO₂ separation, recovery, and transportation.

Concurrently, the Japanese Association of Petroleum Technology (JAPT) inaugurated the "CCS committee" this year, aiming to facilitate the exchange and dissemination of CCS-related information. The committee's membership currently comprises universities, upstream companies, research institutes, along with construction, engineering, and service companies.

Biography

Tatsuo Shimamoto is a Fellow at the Technical Headquarters, serving as Chief Technical Lead for Reservoir Engineering and CCUS Development at the Technical Research Center of INPEX. He also holds the position of Vice President at the Japanese Association for Petroleum Technology (JAPT). He received his Ph.D. in Reservoir Engineering from Waseda University in 2006, and both his Master's and Bachelor's degrees in Reservoir Engineering from Tokyo University in 1989 and 1991, respectively. He has been involved in petroleum reservoir characterization since 1991 in Teikoku Oil and INPEX and currently focuses his research on the estimation of storage capacity for CCUS.



Invited Talk 2-2

TIDAL SIGNAL ANALYSIS TO MONITOR CARBON DIOXIDE MIGRATION

**Kozo Sato (The University of Tokyo
Frontier Research Center for Energy and Resources) – Remote**

Copyright 2023, held jointly by the Japan Formation Evaluation Society (JFES) and the submitting authors. This paper was prepared for the JFES 28th Annual Symposium held from September 13-14, 2023.

ABSTRACT

Reliable and cost-effective monitoring techniques are needed to ensure safe and effective geological sequestration of carbon dioxide (CO₂). This presentation introduces a practical technique for analyzing CO₂ migration using tidal signals entangled in pressure transients. The gravitational attractions of the solar-system bodies cause Earth and ocean tides, and the pore pressure exhibits diurnal and semidiurnal fluctuations in response to such tidal phenomena. Since the pressure-fluctuation amplitude is related to the reservoir stiffness, it can be used to estimate the elastic properties and fluid saturations of the reservoir. Applying tidal signal analysis in a time-lapse manner, one can see the temporal changes in CO₂ saturation and consequently describe the dynamic behavior (migration) of the sequestered CO₂. The monitoring results of CO₂ migration using Earth tides for onshore CCS (Nagaoka) and ocean tides for offshore CCS (Tomakomai) are presented. The proposed methodology essentially requires only continuous pressure data, which are routinely available during CCS operation, and thus can be a cost-effective and labor-saving monitoring technique.

Biography

Sato worked for Teikoku Oil (now merged with INPEX) for 17 years before joining the University of Tokyo. Throughout his career in both industry and academia, Sato has worked on both field-oriented and theory-oriented research topics related to improved oil/gas recovery and CCS. His research interests include mathematical modeling of fluid flow in heterogeneous media; reservoir characterization using tracers, pressure transients, and tidal signal analysis; well stimulation for productivity enhancement; and thermodynamics of subsurface fluid systems, all with applications to reservoir engineering. Sato holds a BS degree from the University of Tokyo and MS and Ph.D. degrees from Stanford University, all in petroleum engineering.



Invited Talk 3-1

Geomechanical Challenges Associated with Massive Storage of CO₂

**Mark D. Zoback, Professor of Geophysics, Emeritus
Stanford University**

Copyright 2023, held jointly by the Japan Formation Evaluation Society (JFES) and the submitting authors. This paper was prepared for the JFES 28th Annual Symposium held from September 13-14, 2023.

ABSTRACT

The next several decades pose enormous challenges, and opportunities, for the global oil and gas industry. While oil and gas will continue to be used for decades to come, it is now recognized that enormous quantities of CO₂ have to be stored in subsurface geologic formations to reach global decarbonization goals. In this talk, I will focus on a number of Geomechanical issues that have to be considered to ensure long-term storage efficacy. While it has been long recognized that changes in reservoir pressure should not exceed the pressure at which hydraulic fracturing might occur of seal formations, this presentation will focus on a number of other issues have not been sufficiently addressed. First, it is important to identify potentially active faults to limit the possibility that injection-related increases in pore pressure could induce seismic, or aseismic, slip on known faults. Also, as existing evidence shows that potentially active faults (and the damage zones that surround them) are permeable, the presence of potentially active faults represent possible leakage pathways that should be avoided, even when injection-related pressure changes are too small to induce fault slip. Second, when utilizing depleted oil and gas reservoirs for long-term storage of CO₂, it is important to understand both the mechanical changes of the reservoir rocks and the stress changes that resulted from depletion. Such knowledge is required to predict how pressure associated with CO₂ injection will affect the reservoir. Finally, from the perspective of induced seismicity, it is critically-important to identify reservoirs with both top seals and bottom seals to avoid pressure communication to potentially active faults in the basement.

Biography

Dr. Mark D. Zoback is the Benjamin M. Page Professor of Geophysics, *Emeritus* at Stanford University. Dr. Zoback conducts research on in situ stress, fault mechanics, and reservoir geomechanics with an emphasis on shale gas, tight gas and tight oil production as well as CO₂ sequestration. He is the author of two textbooks and the author/co-author of approximately 400 technical papers. His most recent book, *Unconventional Reservoir Geomechanics*, was written with Arjun Kohli, and published in 2019 by Cambridge University Press. His online course, Reservoir Geomechanics, has been completed by over 12,000 people around the world. Dr. Zoback has received a number of awards and honors including election to the U.S. National Academy of Engineering in 2011.



Invited Talk 3-2

Worldwide Perspective of CCS/CCUS Site Characterization: The Best Practices and Lessons Learned

Kaibin Qiu, Geomechanics Advisor | New Energy Business Manager

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ABSTRACT

CCS/CCUS Site characterization is one of the critical phases of the CCS/CCUS lifecycle, which provides the foundation for the long-term containment of CO₂ storage. The uniqueness of CCS/CCUS site characterization makes it impossible to use identical workflow and take technical considerations applicable to oil and gas fields. This presentation summarizes the key challenge, and the uniqueness of the CCS/CCUS site characterization, highlights the best practices and lessons learned of site characterization from multiple CCS/CCUS projects worldwide, and provides recommendations on conducting site characterization effectively.

Biography

Kaibin Qiu is Geomechanics Advisor/New Energy Business Manager for Schlumberger China, Japan, and Korea. He has over 20 years in the industry and has worked on many geomechanics projects and integrated exploration and field development projects around the globe. In recent years, he has been actively applying reservoir geomechanics to explore and develop HPHT, deep water, tight gas, shale gas, and methane hydrate. Kaibin also plays a key role in driving business growth on new energy (such as geothermal and carbon capture and storage). Kaibin Qiu has been a technical director for multiple CCS projects and developed and delivered multiple carbon capture, utilization, and storage (CCUS) courses to companies in the United Kingdom, Australia, Korea, Japan, and China.

Kaibin has authored over 40 technical papers and is currently the Associate Editor of the SPE Journal and Technical Review Editor of the multiple SPE technical journals. Kaibin Qiu is a member of SPE JPT Editorial Committee.



Invited Talk 4-1

TURNING CO₂ INTO STONE: CARBON MINERALIZATION TECHNOLOGY AND GLOBAL POTENTIAL

Chiara Marieni (Carbfix) - Remote

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ABSTRACT

Carbfix captures CO₂ and turns it into stone underground in less than two years through proprietary technology that imitates and accelerates natural processes, providing a permanent and safe carbon storage solution. This cost-effective carbon capture and mineral storage technology has successfully reduced over 90,000 tons of CO₂ emissions and is ripe for dramatic upscaling. This talk gives an overview of Carbfix technology, its potential application worldwide, and the pathways to CO₂ mineral storage at Gt scale.

Biography

Chiara Marieni has been working as a project manager at Carbfix (Iceland) since February 2022. She has an extensive background in geochemistry applied to carbon mineralization, with a PhD from the University of Southampton (UK).



Invited Talk 4-2

INSIGHTS FROM LARGE-SCALE CO₂ STORAGE INJECTION PROJECTS OFFSHORE NORWAY

Philip S. Ringrose (Norwegian University of Science and Technology (NTNU) and Equinor Research Centre) - Remote

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ABSTRACT

The development of industrial-scale CCS in Norway, starting with the Sleipner project in 1996, gives a uniquely long track record of experience with CCS and provides valuable insights for the projected global growth in CCS. The long timescales of operational experience and the associated monitoring datasets (especially time-lapse seismic) provide important insights into how CO₂ storage in saline aquifers actually works. For example, the Sleipner project can be used to assess the storage efficiency and used to calibrate theoretical estimates based on fluid dynamics. Likely rates of pressure increase and the factors controlling formation pressurization can also be quantified, for example using the Snøhvit case study.

Pressure management is a key issue for development of multiple injection projects in prospective sedimentary basins around the world. As the reservoir pressure rises with increasing rates of injection, formation pressures may approach the Geomechanical limits, potentially leading to induced seismicity and creation of hydro-fractures. An analytical basin-pressure approach is developed to assess these challenges, guiding a pathway towards Gigatonne-scale storage in support of industrial scale decarbonization of society. This experience is vital as we attempt to achieve global scale-up of CCS technology, alongside multiple emissions reduction actions (including renewable energy, efficiency measures and lifestyle changes).

Biography

Philip Ringrose is (part-time) Professor in CO₂ Storage at the Norwegian University of Science and Technology (NTNU) and a leader in the *Centre for Geophysical Forecasting* based at NTNU. He is also a specialist in CO₂ storage and reservoir geoscience at the Equinor Research Centre, Trondheim, Norway. He has published widely on reservoir geoscience and flow in rock media and has published textbooks on 'Reservoir Model Design' and 'How to Store CO₂ underground.'



Venue and Access

VENUE: Technology & Research Center (TRC)
Japan Organization for Metals and Energy Security (JOGMEC)
1-2-2, Hamada, Mihama-ku, Chiba 261-0025, Japan
Tel: +81 (43) 276 9212

HOW TO GET TO THE JOGMEC-TRC:

From Makuhari-Hongo Station (JR Sobu Line; 40 min from Tokyo station)

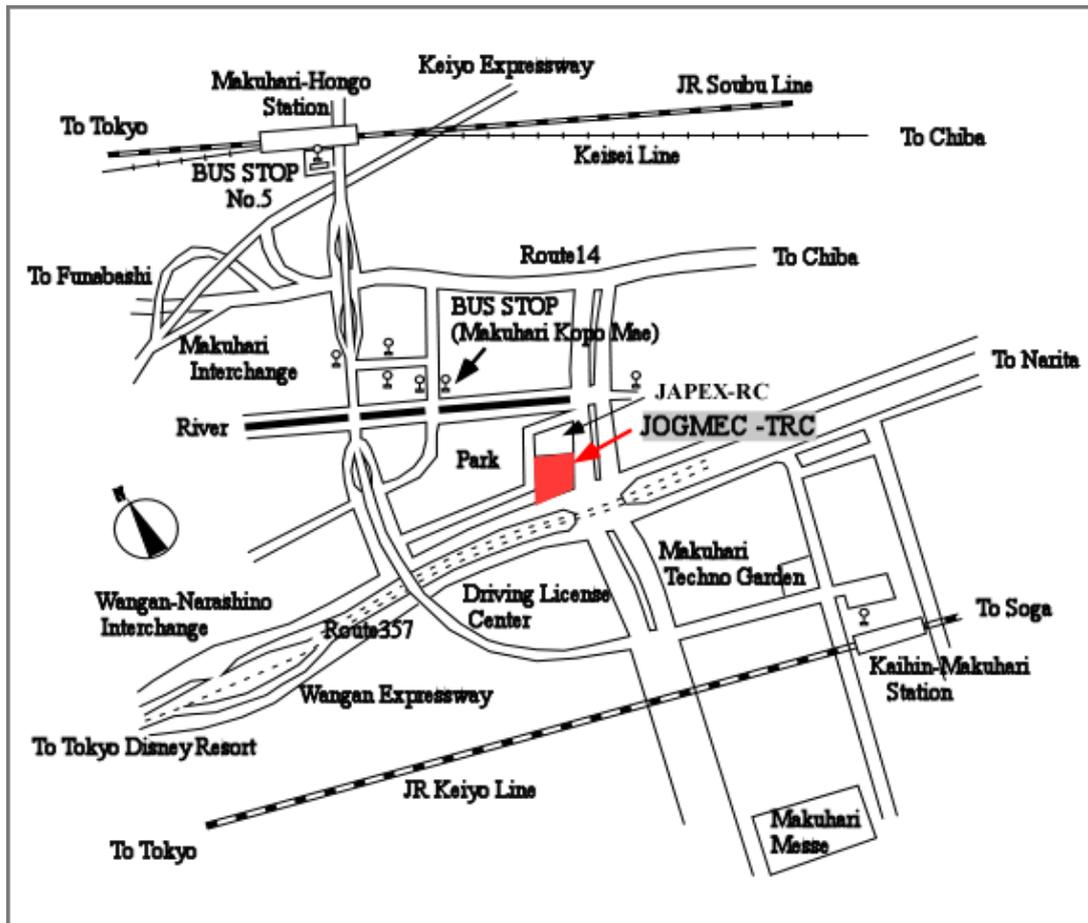
- 10 min. by taxi or 30 min. on foot
- 10 min. by City bus (see below map and bus schedule)

From Kaihin-Makuhari Station (JR Keiyo Line; 30 min. from Tokyo station)

- 10 min. by taxi or 20 min. on foot
- 10 min. by City bus (see below map and bus schedule)

City Bus Service

City bus services are available from Makuhari-Hongo Station and Kaihin Makuhari Station. Please refer to the bus schedule in the next page. Take “Columbus City Line” and get off at “Sekiyu Kaihatsu Gijyutsu Center”.



Accommodations and Other Travel

Land Transportation from Narita Airport

For foreign visitors, limousine bus service is the most convenient to the hotel. Ticket is available at the orange colored "Friendly Airport Limousine Bus" booths for the bus heading to your hotel. "Keisei Bus" goes to Makuhari area. The fee is around 2,400 – 3,000 yen depending on the destination.

Taxi to the hotel around Makuhari area is more than 10,000 yen. The taxi to the center of Tokyo is around 30,000 yen.

Accommodation

Hotel can be searched by "Kaihin Makuhari".

Some examples of the hotels in Makuhari and Tokyo area are listed below and available at your choice. JFES does not have block booking, so make the reservations by directly contacting with the hotels.

Makuhari Area

20 min. walk to JOGMEC-TRC or 10 min. by taxi

- Hotel the Manhattan
<http://www.the-manhattan.co.jp/english/>
- Hotel Springs Makuhari
<http://springs.co.jp/english/index.html>
- APA Hotel & Resort Tokyo Bay Makuhari
https://apahotel.com/ja_en/hotels/detail.php?id=16673

Tokyo area

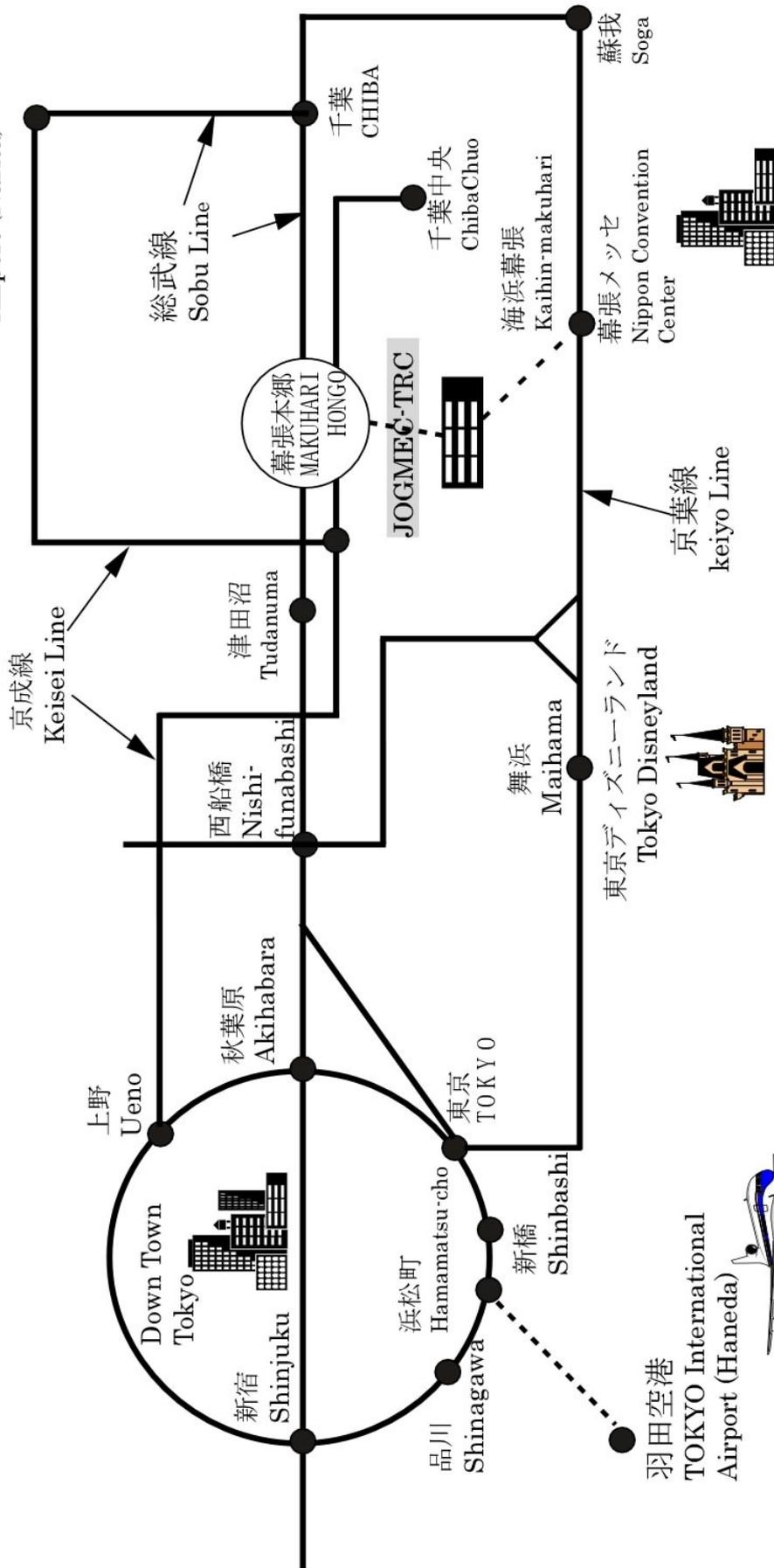
40 min. to Makuhari Hongo (via JR Sobu Rapid Train) then bus

- Shinagawa Prince Hotel
<http://www.princehotels.com/shinagawa/>
- Mércure Hotel Ginza Tokyo
<http://www.accorhotels.com/gb/hotel-5701-mercure-tokyo-ginza/index.shtml>

Probably you can search hotel by the keywords, such as "Kaihin Makuhari", "Makuhari Hongo", "Chiba" in hotel booking agent site.



成田空港
New Tokyo International
Airport (Narita)



羽田空港
TOKYO International
Airport (Haneda)

