

Türkiye 21. Uluslararası
Petrol ve Doğal Gaz
Kongre ve Sergisi
27-29 Eylül 2023
Sheraton Otel ve Kongre Merkezi
Ankara, Türkiye

21 th International
Petroleum and Natural Gas
Congress and Exhibition of Turkey
September 27th-29th 2023
Sheraton Hotel & Convention Center
Ankara, Türkiye

BİLDİRİLER KİTABI
CONGRESS PROCEEDINGS

DAVET

Türkiye Uluslararası Petrol ve Doğal Gaz Kongre ve Sergisi (IPETGAS 2023), Türkiye Petrol Jeologları Derneği, TMMOB Petrol Mühendisleri Odası ve TMMOB Jeofizik Mühendisleri Odası tarafından 27-29 Eylül 2023 tarihleri arasında Ankara'da, Türkiye Cumhuriyeti'nin 100. kuruluş yılında "Denizinde, dağında, taşında Cumhuriyetimiz 100 yaşında" sloganı ile düzenlenecektir.

IPETGAS'23'ün amacı, petrol endüstrisinin üç disiplinini, yatırımcıları ve servis firmalarını seçkin bir atmosferde buluşturmaktır. Bu bilimsel şölenimizde; Ülkemizin kara ve deniz alanları ile bunların uzantısı komşu ülkelerde petrol ve doğalgaz aramacılığında son dönemdeki bulgular paylaşılacak, altyapı ve stratejiler tartışılacak, yenilenebilir enerji kaynaklarındaki gelişmeler uzmanlarca değerlendirilecektir. Her disiplinden uzmanların özgün sözlü ve poster sunumları yanında seçkin davetli konuşmacılar da geniş perspektiften katılımcıları aydınlatacaklar. Geleceğimiz, her üç disiplinden öğrencilerimiz için sunum fırsatı sağlanacak ve en iyi sunumlar ödüllendirilecektir. Kongremiz sergi alanında endüstrimizin çözüm ortakları, teknoloji ve ürünlerini sergileme fırsatı bulacaklardır. Kongremiz öncesinde tam günlük kurslar ile meslektaşlarımızın yetkinliklerine katkı sunulacaktır. Petrol endüstrisi düzenleyici kuruluşu Maden ve Petrol İşleri Genel Müdürlüğü (MAPEG), sergi alanımızda yatırımcılara ülkemizin arama fırsatları hakkında bilgiler verecektir. Milli Petrol Şirketimiz Türkiye Petrolleri A.O. (TPAO) başta olmak üzere, arama ve üretim şirketleri, Boru Hatları ile Taşımacılık A.Ş. (BOTAŞ) ve Maden Tetkik Arama (MTA) Genel Müdürlüklerimiz sergi alanımızda servis sağlayıcı firmalarla yeni işbirliklerini tartışabileceklerdir.

Türkiye, zengin hidrokarbon rezervlerine sahip Ortadoğu ve Hazar bölgesi ile tüketimi büyük ölçüde ithalata bağımlı olan Avrupa arasında stratejik bir konumda yer almaktadır. Bu coğrafi konumu ve son yıllarda kara ve deniz alanlarında artan arama faaliyetleri neticesinde Karadeniz'de gerçekleştirdiği doğal gaz keşfi yanı sıra kara alanlarında da bir çok keşfe imza atmıştır. Bu keşifler ülkemizin kara ve deniz alanlarındaki fırsatları ve potansiyeli göstermiş, yeni yatırımcıların ilgi odağında yer almasını da sağlamıştır. Bugün Türkiye, dört ultra derin deniz sondaj ve iki sismik gemi filosu ile Akdeniz ve Karadeniz'de kendi imkanları ile aramacılık yapabilen yegâne ülkedir. Bunun yanında, Karadeniz kuzeyinde Ukrayna-Rusya savaşının oluşturduğu güvenlik sorunu ve istikrarsızlık, Avrupa Birliği ülkelerinin enerji arz güvenliğinde Türkiye'nin konumunu daha da güçlendirmiştir.

Kongremiz Cumhuriyetimizin başkenti ve petrol endüstrisinin karargâhı Ankara'da düzenlenecektir. Ankara ili, Tunç Çağı'ndan beri sürekli yerleşim görmüştür. Kentteki müzeler Hitit, Frigler, Lidyalılar, Persler, Romalılar, Bizanslılar, Selçuklular ve Osmanlılar gibi Anadolu'dan geçmiş ve yaşamış bir çok kültürü yaşatmaktadır. Ankara aynı zamanda bir çok sosyal ve kültürel aktivite, otantik mağazalar ve çok sayıda birinci sınıf restoran ve otel ile öne çıkmaktadır.

Türkiye Uluslararası Petrol ve Doğal Gaz Kongre ve Sergisi'nde (IPETGAS'23) Düzenleme Kurulu adına, sizleri 27-29 Eylül 2023 tarihlerinde Ankara'da yapılacak konferansa bildiri göndermeye ve katılıma davet ediyorum. Katılımınız Kongremizin teknik ve sosyal kalitesini artıracaktır. Cumhuriyetimizin 100.yılında 27 Eylül 2023 tarihinde Türkiye petrol endüstrisi şöleninde, katılımınız bizleri onurlandıracaktır.

Kongre Düzenleme Kurulu Adına
İsmail Bahtiyar / Başkan

INVITATION

IPETGAS 2023, International Petroleum and Natural Gas Congress and Exhibition of Türkiye is going to held by the Turkish Association of Petroleum Geologists, the UCTEA Chamber of Petroleum Engineers and the Chamber of Geophysical Engineers of Türkiye between 27-29 September 2023 in Ankara on the 100th anniversary of the establishment of the Republic of Türkiye. The aim of IPETGAS'23 is to bring together the three disciplines, investors and service companies of the petroleum industry in an outstanding atmosphere. In this scientific feast; recent innovations in onshore and offshore petroleum and natural gas exploration of our country and their extension in neighboring countries will be shared, infrastructure and strategies will be discussed, and developments in renewable energy sources will be evaluated by experts. In addition to the oral presentations of experts from all disciplines, distinguished keynote speakers will enlighten the participants in a broad perspective. Our students are our future! Students from three disciplines will be able to deliver oral presentations and best presentations will be rewarded. The shareholders of the market will have a chance to introduce their technologies and products in exhibition. Pre-congress courses will contribute to the competency of our colleagues. The General Directorate of Mining and Petroleum Affairs (MAPEG) as the regulatory body of the petroleum industry will inform the investor of the market about the exploration opportunities of our country.

In the exhibition area, our national petroleum company, Turkish Petroleum Corporation (TPAO), exploration and production companies, Petroleum Pipeline Corporation (BOTAS) and General Directorate of Mineral Research and Exploration (MTA) will be able to discuss new collaborations with service providers.

Türkiye is strategically located between the Middle East and the Caspian region, which has rich hydrocarbon reserves, and Europe, whose consumption is heavily dependent on imports. As a result of this geographical location and the increasing onshore and offshore exploration activities in recent years, many onshore discoveries have been made as well as the natural gas discovery in the Black Sea. These discoveries have shown onshore and offshore opportunities and potential of our country and enabled our country to be become the focus of interest for new investors. Türkiye, with its four fleets of ultra-deep-sea drilling and two seismic vessels, is the only country that can conduct exploration in the Mediterranean and Black Seas with its own means. In addition, the security problem and instability created by the Ukraine-Russia war in the north of the Black Sea have further strengthened Türkiye's position in the energy supply security of the European Union countries.

IPETGAS'23 will be held in Ankara, the capital of our Republic and the headquarters of the oil industry. Ankara Province has been continuously inhabited since the Bronze Age. The museums in the city keep alive many cultures that have passed and lived from Anatolia such as Hittites, Phrygians, Lydians, Persians, Romans, Byzantines, Seljuks and Ottomans. Ankara also stands out for its social and cultural activities, authentic shops and a large number of first class restaurants and hotels.

On behalf of the Organizing Committee of the International Petroleum and Natural Gas Congress and Exhibition of Türkiye (IPETGAS'23), we would like to invite you to present papers and participate in the congress that will be held in Ankara on 27-29 September 2023. Your participation will increase the technical and social quality of our congress.

Your participation in the feast of the Turkish petroleum industry will honor us on the 100th anniversary of our Republic of Türkiye.

On Behalf of the Organizing Committee
Ismail Bahtiyar / President

KURULLAR

Başkanlar Kurulu

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Başkan (TPJD)

Şevket DEMİRBAŞ
Başkan (JFMO)

İnanç Alptuğ HIDIROĞLU
Başkan (PMO)

Düzenleme Kurulu

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Selda GÜRPINAR
Member (JFMO)

Emel KURU
Member (PMO)

27 Eylül 2023, Çarşamba / *27 September 2023, Wednesday*	
08:00-10:30	**KAYIT** / ***REGISTRATION***
10:30-11:30	**AÇILIŞ OTURUMU** / ***OPENING CEREMONY***
	İsmail Bahtiyar Düzenleme Kurulu Başkanı *Organizing Committee President*
	Hasan Sarıkaya TPJD Başkanı-Düzenleyici Kuruluşlar Adına *TAPG President on behalf of the Organizers*
	Melih Han Bilgin TPAO Genel Müdürü *Turkish Peteoleum Chairman and CEO*
11:30-12:30	Ipetgas'2023 Sergi Açılışı Ve Protokol Turu *Ipetgas'2023 Exhibition Opening*
12:30-13:30	**ÖĞLE YEMEĞİ** / ***LUNCH***
13:30-14:00	**ÇAĞRILI KONUŞMA:** Türkiye Cumhuriyeti'nin 100.yılında, Geçmişten Günümüze Türkiye Petrolleri A. O. ***KEYNOTE SPEECH:*** *Turkish Petroleum from past to present on the 100th anniversary of the Republic of Türkiye*
	Melih Han Bilgin TPAO Yönetim Kurulu Başkanı ve Genel Müdürü *Chairman and CEO of Turkish Petroleum*
14:00-16:30	**PANEL:** Türkiye Cumhuriyeti'nin 100. Yılında Geçmişten Günümüze Petrol ve Doğalgaz Sektörü ***PANEL:*** *Oil and Natural Gas Sector from Past to Present on the 100th Anniversary of the Republic of Turkey*
	Prof. Dr. Volkan Ş. Ediger Kadir Has Üniversitesi Enerji Sistemleri Mühendisliği Bölüm Başkanı (Moderatör ve Panelist) *Head of Kadir Has University Energy Systems Engineering Department (Moderator and Panelist)*
	Prof. Dr. Özdoğan Yılmaz CTO, GeoTomo (Panelist) *CTO, GeoTomo (Panelist)*
	Sami Sarıyıldız MAPEG Genel Müdür Yardımcısı (Panelist) *MAPEG Deputy General Manager (Panelist)*
	Enver Çetinkaya TPAO Mühendislik Daire Başkanı (Panelist) *TPAO Head of Engineering Department (Panelist)*
	Gülefşan Demirbaş Shell Türkiye Kamu İlişkileri Direktörü (Panelist) *Shell Türkiye Public Relations Director (Panelist)*
	Çağatay Beydoğan PETFORM Arama ve Üretim Grubu Başkanı (Panelist) *Chairman of PETFORM Exploration and Production Group (Panelist)*
20:00-23:00	**GALA YEMEĞİ** / ***GALA DINNER***
	* Teşrifleri halinde / ** To be confirmeda*

28 Eylül 2023, Perşembe / *28 September 2023, Thursday*

	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
09:10 10:30	**OTURUM/*SESSION* 1** Cumhuriyetimizin En Büyük Doğal Gaz Keşfi: Sakarya Gaz Sahası *The Largest Natural Gas Discovery of the Republic of Türkiye: Sakarya Gas Field* Oturum Yürütücüleri *Conveners:* **Derya Kılıç DEMİRCİ,** **Emir ERSAY**	**OTURUM/*SESSION* 2** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri *Conveners:* **Çağlar SINAYUÇ,** **Sinem Setenay ERDOĞAN**	**OTURUM/*SESSION* 3** Alışılmadık Hidrokarbon Kaynakları *Unconventional Hydrocarbon Resources* Oturum Yürütücüleri *Conveners:* **Ahmet MENGEN,** **Deniz YILDIRIM**	**OTURUM/*SESSION* 4** Bölgesel Jeoloji ve Tektonik *Regional Geology and Tectonics* Oturum Yürütücüleri *Conveners:* **Aytaç EREN,** **Mehmet MUTAFÇILAR**	**OTURUM/*SESSION* 5** Hidrokarbon Aramalarında Elektromanyetik ve Potansiyel Alan Yöntemler (Gravite ve Manyetik) *Hydrocarbon Explorations using Electromagnetic and Potential Field Methods (Gravity and Magnetic)* Oturum Yürütücüleri *Conveners:* **M. Emin CANDANSAYAR,** **Sema ARABACI**	**OTURUM/*SESSION* 6** Yapay Zeka ve Özdevimli Öğrenme *Artificial Intelligence and Machine Learning* Oturum Yürütücüleri *Conveners:* **Nuri DEMİRDÖVEN,** **Mehmet Onur DOĞAN**
09:10 09:30	*Seismic Trace Correlation Approach for Gas Probability Mapping in Sakarya Gas Field Reservoirs, Western Black Sea, Turkey* **Sait Baytok,** **Ergin Karaca**	*Minimization of the Noise in the Calculated Pressure Derivative Data for the Interpretation of Transient Tests* **Doğuhan Coşar,** **Çağlar Sınayuç**	Alışılmadık Hidrokarbon Kaynak Aramacılığında Dünya'da Ve Türkiye'de Yapılan Çalışmalar **Ahmet Ergün Mengen,** **Canalp Özkul,** **Mehmed Ekrem Yazaroğlu, Sezer Sevinç**	Foça-Karaburun Açıkları Aktif Tektoniği Ve Stratigrafisinin Deniz Sismiği Verileriyle İncelenmesi: İlksel Sonuçlar **Derman Dondurur,** **Aslıhan Nasıf,** **Özkan Özel,** **Orhan Atgın,** **Denizhan Vardar,** **Muhammet Duman**	*Experience and Prospects of Magnetotelluric Method Application for Hydrocarbon Prospecting* **Nikolay Palshin,** **Elena Aleksanova,** **Dmitry Epishkin,** **Denis Yakovlev,** **Andrey Yakovlev**	*Machine Learning Assisted Forecasting of Field Performance: A Case Study* **Emre Artun,** **Serhat Canbolat,** **Elif Cihan Yıldırım,** **Cansu Açıkgöz,** **Onur Yürüker**
09:30 09:50	*High-Resolution Visco-Acoustic Fwi Model Building and Least-Squares Migration in the Black Sea Resolving Imaging And Illumination Challenges For A Deep-Water Dataset* **Samuel Madden,** **Kelly Mistry,** **Zengbao Chen,** **Cara Smith,** **Olivia Lewis,** **Maria Shadrina,** **Sait Baytok, Can Özsoy,** **Can Ören,** **Emir Yusuf Ersay,** **Kenan Yazan,** **Ergin Karaca**	*Integrating Various Sources of Indicators and Water Measurements Data of Different Degree of Uncertainty to Understand Aquifer Encroachment and Resulted Water Breakthrough to Gas Producers* **Murat Zhiyenkulov,** **Michael Nashaat,** **Hassan Kolivand,** **Oleh Lukin,** **Abdurrahman Shah,** **Kassem Ghorayeb,** **Viacheslav Filatov,** **Denys Grytsai**	*Petroleum: How Long More, How Much More* **Salih Saner**	Sapanca Gölü Tabanından Gaz/Sıvı Çıkışlarını Sağlayan Pockmarkların Yarı-Otomatik Morfolojik Analizi **Enes Sönmez,** **Hülya Kurt**	Manyetotellürik Yöntemin Güneydoğu Anadolu'Da Petrol Arama Amaçlı Kullanımının Değerlendirilmesi *Evaluation of Magnetotelluric Method for Petroleum Exploration in Southeast Anatolia* **Ahmet Tuğrul Başokur**	*Determining Hydrocarbon-Bearing Volcanic Sediments Using Neural Network Method – Based NPHI Cubes: A case Study* **Nur Göçer Ersay,** **Musa Çetin**
09:50 10:10	*An Integrated Petrophysical Technique Leads to Resolve Ultra-Thin Bed Reservoir Properties in Highly Laminated Shaly-Sand Sequences Of Black Sea, Turkey* **Mert Kılıç,** **Batur İşdiken,** **Tanmoy Dutta,** **Uğur Yüce**		*Impact of Numerics on Monte-Carlo Based Type-Well Generation for Unconventional Fields* **Doruk Alp**	İzmir Körfezi'nin Aktif Tektoniğinin ve Stratigrafisinin Deniz Sismiği Verileriyle İncelenmesi: İlksel Sonuçlar **Aslıhan Nasıf,** **Derman Dondurur,** **Özkan Özel,** **Orhan Atgın,** **Denizhan Vardar**	*A Multiphysics Approach to Evaluating Gas Prospectivity with Case Examples* **Daniel Baltar Pardo,** **Dag Helland Hansen,** **Elias Andre Nerland**	*Leveraging Edge Computing with Artificial Intelligence and Machine Learning for Subsurface Assets* **Afife Gozde Celik,** **Ratish Kumar Selvaraj**
10:10 10:30	*Lithogram: An Innovative Approach for Net-Sand and Lithofacies Estimation in Thin to Laminated Clastic Reservoirs by Using Synthetic Seismogram Method* **Emir Yusuf Ersay,** **Batur İşdiken,** **Ergin Karaca,** **Ömer Akbaş, Derya Kılıç Demirci, Tanmoy Dutta,** **Suat Aktepe**	*Unlocking New Reservoir Zones at Shallow Depth Based on Integrating Post-Hydraulic Fracture Performance with Reservoir, Petrophysics and Geology Data* **Murat Zhiyenkulov,** **Michael Nashaat,** **Hassan Kolivand,** **Yerlan Seilov,** **Abdurrahman Shah,** **Kassem Ghorayeb,** **Roman Madatov,** **Svetlana Grytsai,** **Viacheslav Filatov**	*The Fracability Evaluation of Dadas Shale in Southeastern Turkey Based on its Geomechanical Properties* **Oğuz Cihaner,** **Betül Yıldırım**	*Implications for the Neotectonics of the NW Margin of the Arabian Plate: A Case Study of the E-W-trending Altıntaş Basin (Gaziantep, Türkiye)* **Aydın Çiçek, Ali Koçyiğit**	Gravite Tabaka Sıyırma Yöntemi ile Doğu Akdeniz'de Gravite Anomalilerinin Analizi ve Tektonik Yapıların İncelenmesi **İlkin Özsöz**	*Prediction of Flow Rates From Using Plt p-T Measurements in A Horizontal Well By Machine Learning Methods* **Muharrem Hilmi Çevik,** **Murat Çınar**
10:30 10:50	**KAHVE ARASI / *COFFEE BREAK***					

28 Eylül 2023, Perşembe / *28 September 2023, Thursday*

	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
10:50 12:30	**OTURUM/*SESSION* 7** Cumhuriyetimizin En Büyük Doğal Gaz Keşfi: Sakarya Gaz Sahası *The Largest Natural Gas Discovery of the Republic of Türkiye: Sakarya Gas Field* (12:30-12:50) Oturum Yürütücüleri *Conveners:* **Murat Fatih TUĞAN, Ergin KARACA**	**OTURUM/*SESSION* 8** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri *Conveners:* **İsmail DURGUT, İbrahim KOCABAŞ**	**OTURUM/*SESSION* 9** Alışılmadık Hidrokarbon Kaynakları *Unconventional Hydrocarbon Resources* Oturum Yürütücüleri *Conveners:* **Gökhan Hacımehmetoğlu, Sezer SEVİNÇ**	**OTURUM/*SESSION* 10** Kuyu Tamamlama Uygulamaları *Well Completion Applications* Oturum Yürütücüleri *Conveners:* **Evren AKBAŞ, Eren Emre GEÇER**	**OTURUM/*SESSION* 11** Dünya'da ve Türkiye'de Enerji Dönüşümü *Energy Transition in the World and Türkiye* & Petrol ve Doğalgaz Sektörü'nde Sürdürülebilirlik *Sustainability in the Oil and Gas Industry* Oturum Yürütücüleri *Conveners:* **Metin Talat GÜLERYÜZLÜ, Erdinç ŞENTÜRK**	**OTURUM/*SESSION* 12** Yapay Zeka ve Özdevimli Öğrenme *Artificial Intelligence and Machine Learning* Oturum Yürütücüleri *Conveners:* **Arzu AKTEPE, Aziz ELİBÜYÜK**
10:50 11:10	*The Link Between Seismic and Stratigraphic Analysis: How Pre-stack Stochastic Inversion Improves Seismic Resolution in Ultra-Thin Clastic Reservoirs* **Ergin Karaca, Emir Yusuf Ersay, Burak Salantur**	*Analysis of the Effect of Salt Zones on Gas Production From Gas Hydrates in the Mediterranean Sea* **Sükrü Merey, Lin Chen**	*Hamitabat Formation Tight Sandstone Reservoirs Sweet Spot Identification* **Sezer Sevinç, Ahmet Ergün Mengen, Kirill Ezhov**	*Comparative Analysis of Acid Fracturing in ŞEHİT ESMA ÇEVİK - Field Well Using 3 1/2" and 2 7/8" Tubings: A Comprehensive Study* **Görkem Kaya**	Türkiye'deki İklim Değişikliği ve Karbon Yakalama-Depolama Uygulamaları ile İlişkili Mevzuatın İncelenmesi **Seytaç Bülbül, Çağlar Sınayuç, Mehmet Onur Doğan**	*Quantitative Interpretation Using Rock Physics Driven Convolutional Neural Network* **Ufuk Durmuş**
11:10 11:30	*Quantitative Seal Analysis of the Compaction Faults in Western Black Sea Basin, Turkey* **Bulut Tortopoğlu, Nisansu Balcı**	*Estimation of Missing Well-Log Sections Using Machine Learning Assisted Multivariate Imputation: A Case Study* **Emre Artun, Serhat Canbolat, Elif Cihan Yıldırım, Cansu Açıkgöz, Onur Yürüker**	*Evaluation of Dadas Formation Potential: A Case Study From Southeast Turkiye* **Mehmed Ekrem Yazaroğlu, Sinem Artan Ercengiz, Canalp Özkul, Suzan Müge Yetim, Ahmet Ergün Mengen, Can Ercan, Yinal Neşes Huvaj**	Coiled Tubing ile Açık Kuyu Sondaj Operasyonu **Seçkin Öztel**	*A Simulation Study of Underground Hydrogen Storage in the Northern Marmara Field* **Hasan Gürsel, Murat Fatih Tuğan, Çağlar Sınayuç**	*Implementing Adaptive Neuro-Fuzzy Inference System for Analysis of Heavy Oil Behavior Through Magneto-Rheology* **Uğur Özveren**
11:30 11:50	*Critical Strain Approach for Critical Drawdown Analysis with the Advance of Cambridge Clay Model in Sakarya Gas Field, Western Black Sea Basin, Turkey* **Bulut Tortopoğlu, Adil Gürkan Ceyhan, Nisansu Balcı**	*Coal Bed Methane Characterization for Gas Production Recovery Optimization - Zonguldak, Türkiye* **Sofiane Belhocine, Ahmet Ergün Mengen, Muhammed Emin Bulguroğlu, Rabah Boudissa**	*Development Of A Computational Tool for Wellbore Stability Analysis and Mud Weight Optimization* **Ekrem Alagoz, Ahmet Ergun Mengen, Fethi Bensenouci, Emre Can Dundara**	*Radial Drilling* **Doruk Kıraç, Görkem Kaya**	*Evaluation of Sustainability Aspects of CO2 Sequestration in Depleted Shale Reservoirs Using Data Analytics* **Kanan Aliyev, Emre Artun, Burak Kulga**	*AI Seismic Interpretation: A Deeper Understanding of the Subsurface* **Luis Gomez Martinez, Abdulqadir Cader, Ryan Williams, Peter Szafian**
11:50 12:10	*Solutions to Complex Well-Testing Challenges and Proving Production Potential: Successful Well Test operations on the Sakarya Ultra-deep Water Gas Field in the Black Sea, Türkiye* **Cosan Ayan, Suat Aktepe, Köksal Çığ, Melih Gökmen, Adil Gürkan Ceyhan, Murat Fatih Tuğan, Yakov Shumakov, Bertrand Theuveny**	*Assessing CO2 Enhanced Geothermal Potential and CO2 Storage in A Red Sea Rift Basin, Al Wajh: A Comprehensive Reservoir Model and Simulation Study* **Bora Yalçın, Justin Ezekiel, Martin Paul Mai**	*Pore Characterization and FESEM Analysis of the Niobrara Formation in Aristocrat Angus PC H11-07 Core, Wattenberg Field, Denver Basin, CO* **Elvan Aydın**	*Coiled Tubing ile Canlı Kuyuda Slickline Tahlisiyesi* **Seçkin Öztel**	*Sustainability in Energy From Oil & Gas to Geothermal Energy* **Harun Yarım**	*Leveraging AI in Automating Geophysical Feasibility Studies: A Leap Forward in CCS Monitoring* **Mehdi Paydayesh, Amir Shamsa, Maria Perezhogina**
12:10 12:30	*Formation Damage Mechanisms and Solutions in Sakarya Field* **Uğur Paköz**	*Calculation of Natural Gas Viscosity of A Gas Reservoir using Correlations and Comparison with Manual Readings Through Well Known Charts* **Abdullah Gürkan İşcan**	*Characterizing an Unconventional Reservoir with Onshore Conventional 3d Seismic Data: Case Study Using Seismic Inversion for The Dadas-1 Member* **Artem Orlov, Kirill Ezhov, Mehmed Ekrem Yazaroğlu, Canalp Özkul, Ahmet Ergün Mengen**	*Resolving Cement Evaluation in the Challenging Environment of Large and Thick Casing* **Alhadi Zahmuwl, Rob Loov, Diana Vargas**	Modüler Çelik Yapılar, Petrol ve Gaz Sahalarının da İdeal Çözüm **Mert Özdemir**	Yapay Zeka ile Sismik Hız Modellerinin Doğrudan Kestirimi: Eğitim Veri Seti ve Derin Ağ Eğitimi **Mojtaba Najafikhatounabad, Hacer Yalım Keleş, Selma Kadıoğlu**
	(12:30-12:50) *Utilization of Particle Size Distribution Data for Field Development: Unconsolidated Laminated Sandstone Formation Case* **Buse Göral, Uğur Paköz**					
12:30 13:30	**ÖĞLE YEMEĞİ / *LUNCH***					

28 Eylül 2023, Perşembe / *28 September 2023, Thursday*

	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA	BEGONIA
13:30 14:50	**OTURUM/ *SESSION* 13** Derin Deniz Operasyonları *Deep Water Operations* Oturum Yürütücüleri *Conveners*: **Fatih KARAKAYA, Süleyman ABRAVCI**	**OTURUM/ *SESSION* 14** Kuyu Tamamlama Uygulamaları *Well Completion Applications* Oturum Yürütücüleri *Conveners*: **Hüseyin Kerem GÜNER, Mehmet GÖÇ**	**OTURUM/ *SESSION* 15** Petrol Sistemleri Analizi, Havza Modellemesi ve Jeokimya *Petroleum Systems Analysis, Basin Modeling, Geochemistry* Oturum Yürütücüleri *Conveners*: **Cengiz SOYLU, Zeynep Özlem CİHAN**	**OTURUM/ *SESSION* 16** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri *Conveners*: **Hüseyin ÖZDEMİR, Zafer ÖZER**	**OTURUM/ *SESSION* 17** Petrol, Doğal Gaz, LPG ve LNG Pazarı *Oil, Gas, LPG and LNG Market* & Jeotermal Enerji *Geothermal Energy* Oturum Yürütücüleri *Conveners*: **Okan YARDIMCI, Ahmet ÜÇER**	**OTURUM/ *SESSION* 18** Alışılmadık Hidrokarbon Kaynakları *Unconventional Hydrocarbon Resources* Oturum Yürütücüleri *Conveners*: **Mahmut PARLAKTUNA, Günay ÇİFÇİ**	**Öğrenci Bildiri Yarışması** **Student Paper Contest** (14:00-16:20) Oturum Yürütücüleri Conveners: **Hakkı AYDIN, Damla ALTINTAŞ**
13:30 13:50	Karadeniz Derin Deniz Sahalarında Riser Öncesi Dizayn Hususları *Top Hole Design Considerations in Black Sea Deepwater Fields* **Burak Büyükkağnıcı, Fatih Karakaya, Amit Sankhe**	*Advanced Tractor Techniques in Extended Reach Wells Allow Confirmation of Well Integrity and Execution of Perforation Services in Key Turkish Offshore Gas Fields* **Daniel Steen Haase Soerensen, Ugur Ezer, Mohammed Ameen Al Ganad, Fadil Duman**	*A Case Study of The Regional 3-D Basin Modeling in Amu Darya and Afghan-Tajik Basins* **Yücel Deniz Erdal, Zeynep Adıgüzel, Şükrü Gökhan Köse, Hasan Güney, Helby Ellen, Ayodeji Temitope Ajayi, Mustafa Demirci, Emrah Dölek**	*An Integrated Approach to Carbonate Reservoir Characterization: A Case Study From Se of Turkey* **Mustafa Kamil Yüksek, Aslihan Deliktaş, Atilla Aydemir**	LPG'nin Günümüzde Konvansiyonel ve Alternatif Kullanımı **Can Toydemir, Lpg Dairesi, Yasin Ersöz**	Tuna Deltası (Romanya ve Bulgaristan Açık Denizi) Kıtasal Yamacı'nın Gaz Hidrat Potansiyeli ve Sismik Stratigrafisi **Orhan Atgın, Günay Çifci**	*Predicting Bottomhole Temperature of Offshore Production Wells In the North Sea* **Tuğberk Berat Günel** *Application of CT in Reservoir Characterization* **Efe Erek** *Energy Transition* **Yaren Esra Kahya**
13:50 14:10	Derin Deniz Operasyonlarında İkili Kulenin Avantajları *The Advantage of Dual Derrick in Ultra-Deepwater Operations -* **Evren Bektaş, Fatih Karakaya, Hüseyin Kasapoğlu, Amit Sankhe, Okan Kırgıl**	*Overview of Acid Fracturing Operations in Carbonate Reservoirs of Turkey* **Ufuk Kılıçaslan, Ahmet Ergün Mengen, Özlem Özcan, Mutlu Daşdemir, Yasin Ünal, Bekir Onay, Bülent Şahinbaş, Vasily Semenovich Mironov, Aleksei Vasilevich Khlopkov**	*Exploring Hydrocarbons in 1.75 Billion-Year-Old Pre-Cambrian Deposits of South Africa Using Environment Friendly SDDT Technology* **Ongun Yoldemir, Joerg Enge**	*Physics-Informed Neural Networks for Solving Partial Differential Equations: Applications and Challenges* **Amir Shamsa, Mehdi Paydayesh, Maria Perezhogina**	Kahramanmaraş Depremlerinin Türk Akaryakıt Piyasasına Etkisi **Sinem Okumuş, Aysun Korucan**	*A Study Of An Experimental Possible Production Mechanisms Of Hydrate Formation* **Hasan Hüseyin Engüçlü**	Türkiye'de Buhar ve Karbondioksit Enjeksiyonu. Faydaları ve Zorlukları **Mehmet Mertcan Doğan** *Steamflooding Interval Horizontal Wells* **Oğuzhan Uçar**
14:10 14:30	Derin Deniz Jetleme Operasyonlarında Etkinliğin ve Stabilitenin Artırılması & Matkap Pozisyonlanmasının Etkisi *Enhancing Efficiency and Stability in DW Jetting Operations & Role of Bit Stick-Out Length* **Oğuzhan Kaylan, Fatih Karakaya**	*Importance of Cement Slurry Density & GEO-LITE* **Yigit Altunal, Burak Ekici**	*Pitfalls in Basin Modeling - A Case Study From the Eastern Black Sea* **Turan İşçimen**	*Integrated Reservoir Characterization of Fractured Carbonates: Garzan Limestone Case* **Ufuk Durmuş**	Jeotermal Sahalarda Mikrosismik İzleme Yöntemi ile Rezervuar Takibi **Burcu Turhan, Tuğçe Bilgiç, Ünal Selek, Kadir Balcı, Ali Yıldırım, Bülent Kaypak**	Batı Karadeniz Kıtasal Kenarının Gaz Hidrat Potansiyeli **Özkan Özel, Ashhan Nasif Dondurur, Derman Dondurur**	*Stimulation of a Tight Sandstone Reservoir Through Hydraulic Fracturing: Taylor Sandstone Case, Texas* **Muloh Gariba Sheron** *Forecasting the Performance of Shale Gas Wells Using Machine Learning* **Mohammed Shedaiva**
14:30 14:50	Derin Deniz Emniyet Vanaları Kontrol Sistemleri Güvenilirliği *Subsea BOP Control System Reliability* **Fatih Karakaya, Yasin Demiralp, Necip Bektaş**	*Tight Gas Field Development in Thrace Basin by Hydraulic Fracturing* **Ufuk Kılıçaslan, Ahmet Ergün Mengen, Özlem Özcan, Sofiane Belhocine, Rabah Boudissa, Vasily Semenovich Mironov, Aleksei Vasilevich Khlopkov**	Rock Eval Piroliz Analizi ile Kinetik Parametrelerin Karakterizasyonu ve Silürüyen Yaşlı Dadaş Formasyonu'nun Kinetik Parametrelerinin Belirlenmesi Projesi **Cihan Can, Zeynep Özlem Cihan, Şükrü Gökhan Köse, Yücel Deniz Erdal**	*Unlocking New Discovery in Thrace Basin, Turkey: Probabilistic Neural Network Application to Estimate Nphi and Acoustic Impedance Cross Plotting for Hydrocarbon Mapping* **Sait Baytok, Ergin Karaca**	Sismik Hız ile Boşluk Basıncı İlişkisi Örnek Çalışma: Denizli Havzası **Orhan Güreli**	*A Deep Dive Into the Black Box of Artificial Intelligence* **Orhan Kurt**	*Approximating Hydraulic Fracture Permeability Enhancement* **Onuralp Mete Yağmur**
14:50 15:10	**KAHVE ARASI / *COFFEE BREAK***						

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	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
15:10 16:30	**OTURUM/*SESSION* 19** Akdeniz Baseni Petrol Potansiyeli ve Yeni Gelişmeler *Petroleum Potential and New Developments of the Mediterranean Basins* Oturum Yürütücüleri *Conveners*: **Ali DEMİRER, Fatih ÖZDAMAR**	**OTURUM/*SESSION* 20** Petrol ve Doğal Gaz Politikaları, Hukuki ve Ekonomik Gelişmeler *Oil and Gas Policies, Legal and Economic Developments* Oturum Yürütücüleri *Conveners*: **Uğur GÖNÜLALAN, Emre ÖZGÜR**	**OTURUM/*SESSION* 21** Petrol Sistemleri Analizi, Havza Modellemesi ve Jeokimya *Petroleum Systems Analysis, Basin Modeling, Geochemistry* Oturum Yürütücüleri *Conveners*: **Şükrü Gökhan KÖSE, Ayşegül CANATALI**	**OTURUM/*SESSION* 22** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri *Conveners*: **Hüseyin ÖZDEMİR, Korhan AKIN**	**OTURUM/*SESSION* 23** Jeotermal Enerji *Geothermal Energy* Oturum Yürütücüleri *Conveners*: **Serhat AKIN, Harun YARIM**	**OTURUM/*SESSION* 24** Alışılmadık Hidrokarbon Kaynakları *Unconventional Hydrocarbon Resources* Oturum Yürütücüleri *Conveners*: **Turhan AYYILDIZ, Sezgin AYTUNA**
15.10 15:30	*Geochemical Characteristics and Paleoenvironmental Conditions of the Organic-Rich Triassic Facies in the Western Taurides* **Zeynep Dincer Kırman, İsmail Ömer Yılmaz, Hasan Çağlar Üsdün**	Türkiye'deki Petrol ve Doğal Gaz Arama ve Üretim Faaliyetlerinin Teknik ve Ekonomik Analizi *Technical and Economic Analysis of Oil and Natural Gas Exploration and Production Activities in Turkey* **A.Uğur Gönülalan**	Doğu Trakya Havzası Basen ve Petrol Sistemi Modellemesi *Basin and Petroleum System Modeling in the Eastern Thrace Basin* **Esra Yalçın Yılmaz, Şükrü Gökhan Köse**	*Utilizing Seismic Amplitude Information and Extending the Value of The Seismic Beyond Structural Imaging* **Omar Aly, Aya Ibrahim, Tarek Nafie, Ahmed Hassan, Mohamed Fekry, Amin Al Maktari, Aref Al Shadadi, Mohammed Ali Al Rawqi**	*A Numerical Toolkit for Optimization of Model Parameters for Tracer Tests* **Doğuhan Barlas Sevindik, Ali Berkay Tokel, Selçuk Erol, Serhat Akın**	*Coalbed Methane Exploration, West Black Sea Region, Turkey* **Muhammed Emin Bulguroğlu, Ahmet Ergün Mengen, Fatma Şanal, Onurhan Taç, Tuba Evren Sökmensüer, Ali Sarı**
15:30 15:50	Doğu Akdeniz'deki En Büyük İki Deltanın (Nil ve Seyhan-Ceyhan) Gelişiminde Tektonizmanın Karşılaştırmalı Analizi *Comparative Analyses Tectonism on the Development of two Largest Deltas (Nile and Seyhan-Ceyhan) in the Eastern Mediterranean* **Yasemin Geze Kalanyuva, Nizamettin Kazancı**	*Current Status of Türkiye About Carbon Capture and Sequestration: A Case Study Related to Carbon Capture and Sequestration in The Bati Raman Heavy Oilfield Of Türkiye* **Emre Özgür, Şükrü Merey**	Dolomitleşme Sıcaklığının ve Zamanlamasının Rezervuar Kalitesine Etkisi Nedir? Örnek Çalışma: GDA Bölgesindeki Mardin Grubu Dolomitlerinin Kümelenmiş İzotop Sıcaklıkları **Deniz Atasoy, Aynur Geçer Büyükutku, Arzu Aktosun**	*Seismic Reservoir Characterization of Hydrocarbon-Bearing Sandstones, in A Producing Field, Thrace Basin* **Taner Arpacı**	*Carbon Utilization Potential in Geothermal Fields* **Erdinç Şentürk, Gültekin Tarcan**	Doğu Karadeniz'de Gaz Hidratlar ve 2 Çamur Volkanının Keşfi ve Gwangyang Körfezi'nde Sığ Gaz Birikimleri **Sevinç Özel Füzün, Günay Çifci, Seda Okay Günaydın, Sermet Gündüz, Dae Choul Kim**
15:50 16:10	Levant ve Herodot Basenleri Stratigrafik Birimlerin Benzerliği, Sismik Kesit Örnekleri **Fatih Özdamar**	*Comparison of Host Government Petroleum Contracts And Applicability for Turkiye Deepwater Offshore Licences* **Fatih Vural**	*Conceptual Risk Modeling for Biogenic Gas Fields* **Yücel Deniz Erdal**	*Multiple Approaches to Reservoir Characterization of Gas-Bearing Sandstone: a Case Study from the Thrace Basin, Turkey* **Mustafa Kamil Yüksek**	*Top Cementing Job A Lesson Learnt from Geothermal Well Drilling in Alasehir Geothermal Field* **Emrah Gürel, Ömer Yukselce, Emir Dimici, Cemil Seckin**	Bozcahüyük (Seyitömer/ Kütahya) Yöresindeki Bitümlü Marnların Organik Jeokimyasal Verilerinin Değerlendirilmesi ile Sentetik Petrol Potansiyelinin Ortaya Konulması **Ali Sarı, Fatih Büyük**
16:10 16:30			*Investigation the impact of Messinian Event in the Eastern Black Sea according to Biogenic Gas System Perspective* **Mehmet Hazar, Yücel Deniz Erdal, Şükrü Gökhan Köse**	*The Critical Role of Velocity in Pore Pressure Estimations and the Impact of the Centroid Effect* **Ergin Karaca**	Kapadokya Bölgesinde Gömülü Kalderanın Manyetotellürk Yöntem ile Görüntülenmesi ve Jeotermal Potansiyelinin Değerlendirilmesi **Ahmet Tuğrul Başokur, Özlem Hacıoğlu, Naser Meqbel, Halil İbrahim Arslan, Tevfik Efeçınar**	*New Generation Approaches for the Manufacturability of Gas Hydrate, One of Turkey's Alternative Energies* **Güzide Kalyoncu Ergüler**

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	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
09:10 10:30	**OTURUM/*SESSION* 25** Derin Deniz Operasyonları *Deep Water Operations* Oturum Yürütücüleri *Conveners*: **Erdal ASKU,** **Alpaslan ŞAHİN**	**OTURUM/*SESSION* 26** Sedimantoloji, Stratigrafi ve Çökelim Ortamları *Sedimentology, Stratigraphy and Depositional Systems* Oturum Yürütücüleri *Conveners*: **Alaaddin SAYILI,** **Aslı ELMACI**	**OTURUM/*SESSION* 27** Sismik Veri Toplama ve Sismik Veri İşlem *Seismic Data Acquisition and Seismic Data Processing* Oturum Yürütücüleri Conveners: **Derman DONDURUR,** **Hakan KARSLI**	**OTURUM/*SESSION* 28** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri Conveners: **Ceyda ÇETİNKAYA KAYRIN,** **Yasemin GEZE KALANYUVA**	**OTURUM/*SESSION* 29** Petrol Endüstrisi'nde Dijitalleşme ve Teknolojik Gelişmeler *Digitalization and Technological Developments in Petroleum Industry* Oturum Yürütücüleri Conveners: **Önder ŞARAÇOĞLU,** **Ali BAŞER**	**OTURUM/*SESSION* 30** Cumhuriyetin 100. Yılında Yerbilimleri'nde Kadın Olmak Oturum Yürütücüsü Conveners: **Umut BEŞPINAR**
09:10 09:30	Derin Deniz Emniyet Vanası Kuyudan Kuyuya Atlatma *BOP Hopping Operation* **Ahmet Başar Dimez,** **Fatih Karakaya,** **Albert Higgins,** **Fırat Doğu Kaya,** **Yasin Demiralp,** **Andrew Timms,** **Uğur Cengiz**	*Palaeoenvironmental Significance of Pithonellid Calcitarchs in Se Anatolia: A Discussion on the Use of the Term 'Calcispheres'* **Oğuz Mülayim,** **İsmail Ömer Yılmaz,** **Bruno Ferré**	*Seismic Reprocessing for Carbon Storage* **Arindam Kanrar,** **Joseph Sutcliffe,** **David Barlass,** **Shona Joyce,** **James Bailey,** **Khaled Abdel Aleem** **Abdel Aleem,** **Rachel Little,** **Priyabrata Pradhan**	Güneydoğu Anadolu Bölgesi Diyarbakır Yöresi Tektonik Süreçlerinin Bir Üretim Sahasına Etkisi **Canberk Güzelcan,** **Aslıhan Delikтaş,** **Berat Niran Taşdemir,** **Cansu Güner Çiçek,** **Ceyda Çetinkaya Kayrın**	*Development of a Pore-to-Grid Digital Twin and Software Ecosystem: A Case Study for Sakarya Gas Field Development Project* **Mehmet Çiçek,** **Nuri Demirdoven**	**Fatma Umut Beşpınar (ODTÜ)**
09:30 09:50	Casing İçinde Gravel Pack Operasyonu *Cased Hole Gravel Pack* **Uğur Cengiz,** **Eren Emre Geçer,** **Carlos Anderson Domingos,** **Atilla Mazman,** **Bekir Oğulcan Bulut,** **Yasin Demiralp,** **Fırat Doğu Kaya,** **Fatih Karakaya**	*Carbonate Sedimentology, Micropaleontological Analysis and Stable Isotope Geochemistry of the Garzan Formation at the Core of Gercus Anticline and Subsurface Extent, Batman, Se Turkey* **Damla Altıntaş,** **İsmail Ömer Yılmaz,** **Sevinç Özkan Altıner**	*Multi-Year Evolution of Processing Improvements to A 10 Day Delivery. The Edvard Grieg Pp and Ps Time-Lapse Obc Story* **Richard Ford,** **Francesca Twynam,** **Alice Ramsden** **Taylor Leitch,** **Michael Hooke,** **Per Eivind Dhelie,** **Vidar Danielsen,** **Arnstein Kvilhaug,** **Knut Richard Straith**	*Three Dimensional Reservoir Characterization of Dodan Field as a Candidate Underground Gas Storage (UGS)* **Nilsu Kıstak,** **Diethard Kratzer,** **Robert Rieger,** **Claudia Steiner-Luckabauer,** **Ceyda Çetinkaya Kayrın,** **Fevzi Mert Türesin,** **Hasan Çağlar Üsdün**	*Architecting a Big Data Platform for the Oil and Gas Industry: The Dijital TPAO Project* **Muhsin Gürel,** **Adil Cem Albayrak,** **Resul Kayım**	**Sema Tekin (PMO)**
09:50 10:10	Karadeniz Derin Deniz Operasyonlarında Kullanılan İlk Dört Zonlu MSGP *First 4 Zone MSGP for Black Sea Deepwater Case Study* **Eren Emre Geçer,** **Carlos Anderson Domingos,** **Fatih Karakaya,** **Evren Akbaş,** **Fırat Doğu Kaya**	Gondwana Buzulları ve GD Anadolu Paleozoyik Petrol Sistemlerine Olan Etkileri **Nihat Bozdoğan,** **Bayram Kara**	*Full Waveform Inversion and Modern Signal Processing Brings Imaging Uplift for Presalt Reservoirs in the Kwanza Basin* **Samuel Madden,** **Mina Matter, Alex Cooke,** **Amr Ghanem,** **Carina Lansky,** **Mahmoud Mahfouz,** **Deepak Rathee**	*Bypass Pay Identification and Hydrocarbon Quantification with Advanced Pulsed Neutron Behind Casing As a Result of Logging Optimization and Data Analysis* **Yernur Akashev,** **Samira Ahmad,** **Chiara Cavalleri,** **Sviatoslav Yuras**	*An Integrated GIS-based Asset Information Management System: ZEKI GX & ZEKI EX* **Yavuz Gultekin,** **Mehmet Cicek**	**Gözde Venedik (JFMO)**
10:10 10:30	Tamamlama Operasyonlarında Sıvı Kaybı ile Mücadele için Tasarım Optimizasyonu *Completion Design Optimization to Tackle Fluid Loss* **Carlos Anderson Domingos,** **Eren Emre Geçer,** **Nuno Carvalho,** **Evren Akbaş,** **Atilla Mazman,** **Fatih Karakaya**	*Sequence Sequence Analysis and Depositional Models of the Maastrichtian to Early Eocene Succession at the Gercus Anticline, Batman, Southeast of Turkey* **Mehmet Özen Gürbüz**	*Dual-Source and Hexa-Source Time-Lapse OBC Acquisition and Imaging for the Edvard Grieg Field* **Richard Ford,** **Francesca Twynam,** **Alice Ramsden,** **Taylor Leitch,** **Michael Hooke,** **Per Eivind Dhelie,** **Vidar Danielsen,** **Arnstein Kvilhaug**	*Sub-Seismic Fault and Fracture Analysis Using Conventional and Image Logs: A Case Study In Bozhüyük Field, Southeast Turkey* **Cansu Güner Çiçek,** **Onur Yürüker,** **Osman Merey,** **Ceyda Çetinkaya Kayrın**	*Autonomous Corrosion and Scale Management for ESP Wells* **Rathish Kumar Selvaraj,** **Dana Kayshibaeva,** **Michael Van Spankeren**	**Hafize Akıllı (Wing)**
10:30 10:50	**KAHVE ARASI / *COFFEE BREAK***					

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	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
10:50 12:30	**OTURUM/*SESSION* 31** Derin Deniz Operasyonları *Deep Water Operations* Oturum Yürütücüleri *Conveners*: **Erdal ASKU,** **Selin Eda TEKİROĞLU**	**OTURUM/*SESSION* 32** Geliştirilmiş Petrol Kurtarımı *Enhanced Oil Recovery &* Üretim Mühendisliği *Production Engineering* Oturum Yürütücüleri *Conveners*: **Murat ÇINAR,** **Veli Volkan ÜSTÜN**	**OTURUM/*SESSION* 33** Sismik Veri Toplama ve Sismik Veri İşlem Seismic Data Acquisition & Seismic Data Processing Oturum Yürütücüleri Conveners: **Orhan GÜRELİ,** **Yılmaz SAKALLIOĞLU**	**OTURUM/*SESSION* 34** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri Conveners: **Ferit BİNZET,** **Tuğba ÖZDOĞAN**	**OTURUM/*SESSION* 35** Petrol Endüstrisi'nde Dijitalleşme ve Teknolojik Gelişmeler Digitalization and Technological Developments in Petroleum Industry Oturum Yürütücüleri Conveners: **Zübeyir KÜÇÜK,** **İhsan Burak KULGA**	**OTURUM/*SESSION* 36** Sedimantoloji, Stratigrafi ve Çökelim Ortamları Sedimentology, Stratigraphy and Depositional Systems Oturum Yürütücüsü Convener: **İsmail Ömer YILMAZ,** **Fevzi Mert TÜRESİN**
10:50 11:10	Sakarya Sahasından Sondajdan Tamamlama Operasyonlarına Entegre Kuyu İnşası *Integrated Well Construction from Drilling To Completion for Sakarya Field* **Atilla Mazman,** **Eren Emre Geçer,** **Carlos Anderson Domingos,** **Nuno Carvalho,** **Fatih Karakaya**	*Recent Activities in Heavy-Oil Batı Raman Field* **Ufuk Kılıçaslan,** **Turgay İnceişci,** **Yusuf Demirel,** **Ahsen Özesen**	Sismik Yansıma Veri İşlemi İçin Geliştirilen Yeni Bir Yazılımın (Ata-Sis) Tanıtımı **Alican Pekiyi,** **Hulya Kurt**	*Reservoir Saturation Monitoring Over Time: Case Studies From Karacali Gas Field and Bati Raman Heavy Oil Field* **Uğur Yüce**	Mobil&Web Tabanlı Jeolojik Numune Toplama ve Saha Planlama Sistemi **Tünay Öztürk**	*Preliminary Results of Mineralogical, Organic Petrographical and Rock-Eval Pyrolysis Analyses of the Oligocene Formation in the Silivri (NE Thrace Basin)* **Cüneyt Bircan,** **Rıza Görkem Oskay,** **Ali İhsan Karayiğit**
11:10 11:30	Derin Deniz Kuyularında Çok Zonlu Akıllı Tamamlama Dizisi Tasarımı ve Operasyonu *Designing and Running Multi-Zone Smart Completions in Deepwater Wells* **Nuno Carvalho,** **Bekir Oğulcan Bulut,** **İlker Kemal Öztürk**	A Numerical Study on the Effect of Flue Gas Composition on Oil Recovery in Low-Permeability Formations **Yashar Tavakkoli Osgouei,** **Mehmet Onur Dogan,** **Caglar Sinayuc**	An Acoustic Wave Equation with the Effects of Reflectivity **Jianyong Bai,** **Orhan Yılmaz**	Raman Sahası Garzan Formasyonu Hedefli Rezervuar Karakterizasyonu ve Saha Geliştirme Çalışması *Raman Field Garzan Formation Targeted Reservoir Characterization and Field Development Study* **Merve Benzek,** **Ceyda Çetinkaya Kayrın,** **Safigül Tuba Kamanlı,** **Melahat Aslı Akdere**	*Some Useful Applications of Whole-Core CT Scanning* **İbrahim Olgun Uğurlu**	Güneydoğu Anadolu Bölgesi Üst Kretase Karbonat İstifinin (Adıyaman Grubu) Stratigrafisi, Foraminifer Biyostratigrafisi ve Mikrofasiyes Özellikleri **Recep Özkan**
11:30 11:50	Sakarya Sahası Faz-I Üst Tamamlama Operasyonlarında Ana Tasarım Değişimleri ve İyileştirmeleri *Major Design Changes & Improvements During Sakarya Phase-I UC Operations* **Alparslan Konbul,** **Eren Emre Geçer,** **Fatih Karakaya,** **Nuno Carvalho,** **İlker Kemal Öztürk**	*Combustion Tube Experimental Setup Design for Underground Coal Gasification* **İsmail Hakkı Sarıçam,** **Murat Çınar**	Vibratör Harmonikleri - Sinyal mi Gürültü mü ? **Orhan Güreli**	*3D Geological Modeling Study of the Garzan Formation in Cakilli Field* **Safigül Tuba Kamanlı,** **Elvan Aydın**	*Repurposing Pipelines for Hydrogen and Hydrogen Blend Service* **Nicholas Waple,** **Robert Preston** **Callum Peace,** **Harry Cotton,** **Hooman Haghighi**	*Palynological and Paleobiogeographical Findings from the Upper Ordovician Successions in the Central and Eastern Taurides* **Sinem Tanrıkulu,** **Sevinç Özkan Altıner,** **Demir Altıner**
11:50 12:10	Sakarya Gaz Sahası Geliştirme Projesinde Hizmet Kalite Yönetimi *Service Quality Management in Sakarya Gas Field Development Project (SGFDP), Black Sea, Turkey* **Esen Nasıroğlu,** **Hüseyin Savaşçı,** **Fırat Üstün,Erdal Asku**	*Overcoming Complex Flow Assurance Issues with Respect to Gas Hydrate Formation in Deep-Water Well Testing Operations* **Yakov Shumakov,** **Ozgur Karacali**	*Innovative Distributed Acoustic Sensing Technology and Applications in Borehole Seismic* **Rafael Guerra**	*Elastic Response of Porous Rock to Accumulated Slip on Strike Slip Fault Networks in Geo-Reservoirs* **Bora Yalçın, Olaf Zielke,** **Martin Paul Mai**	*Magnetotelluric System NORD* **Dmitrii Epishkin,** **Denis Yakovlev,** **Andrey Yakovlev,** **Nikolay Palshin,** **Nikita Zorin**	*Late Paleocene-Early Eocene Stratigraphy and Hydrocarbon Potential, Southeast of Turkey* **Mehmet Özen Gürbüz,** **Halil Şeker,** **İsmail Bahtiyar,** **Hasan Altınbay,** **Ali Can Diyarbakırlı,** **Mehmet Şahin,** **Deniz Atasoy,** **Mahir Kaya,** **Hasan Çağlar Üsdün,** **Fırat Göçmenoğlu,** **Sinem Artan Ercengiz,** **Yinal Neşes Huvaj**
12:10 12:30	*Evolution of Lower and Upper Completions in Ultra-Deep-Water Gas Wells, Offshore Black Sea: Learnings, Improvements and Potential Innovations* **Yves Mbiguis**	*Single Configuration Enables Seamless Workflow From Cleanup to Extended Well Test and to Production in a Harsh Environment* **Symon Thomas Shiels**	*Low Frequency Single Geophone Versus Standard Geophone Array: A Field Test Study in the Se Turkey* **Yılmaz Sakallıoğlu,** **Zhao Mingqiu, Chen Xin**	*Navigating Complex Carbonate Reservoirs: Use Cases From A Novel Integrated Well-Placement Workflow* **Kemal Çağrı Hekimoglu,** **Melike Özkaya Türkmen,** **Onur Yürüker,** **Batur Alp Aydın,** **Osman Merey,** **Ceyda Çetinkaya Kayrın**	*Integrated End-To-End Carbonate Acidizing Workflow* **Jakub Witek,** **Edmund Eswein**	*Hydrocarbon Exploration and Potential of Mannar Basin of Srilanka, Using Environmental Free Sdat Technology* **Ongun Yoldemir**
12:30 13:30	**ÖĞLE YEMEĞİ / *LUNCH***					

29 Eylül 2023, Cuma / *29 September 2023, Friday*

	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
13:30 14:50	**OTURUM/*SESSION* 37** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri *Conveners*: **A.Coşkun NAMOĞLU,** **Arzu AKTOSUN**	**OTURUM/*SESSION* 38** Üretim Mühendisliği *Production Engineering* Oturum Yürütücüleri *Conveners*: **Murat DEMİR,** **Serhat GÜLE**	**OTURUM/*SESSION* 39** Sismik Yorum *Seismic Data Interpretation* & Hidrokarbon Aramalarında Elektromanyetik ve Potansiyel Alan Yöntemler (Gravite ve Manyetik) *Hydrocarbon Explorations Using Electromagnetic and Potential Field Methods (Gravity and Magnetic)* Oturum Yürütücüleri Conveners: **Kadir Barış BAKİOĞLU,** **Ercan ARABACI**	**OTURUM/*SESSION* 40** GDA Kenet Kuşakları ve İlişkili Basenlerin Petrol Potansiyeli *Petroleum Potential of Southeastern Anatolia and Surrounding Areas* Oturum Yürütücüleri Conveners: **Şule YILMAZ,** **Atilla AYDEMİR**	**OTURUM/*SESSION* 41** Petrol ve Doğal Gaz Endüstrisinde İş Sağlığı, Güvenliği ve Çevre *Health, Safety and Environment in the Oil and Gas Industry* Oturum Yürütücüleri Conveners: **Meliha Beyza KOZAK,** **Yaprak Damla YAĞMUR**	**OTURUM/*SESSION* 42** Alışılmadık Hidrokarbon Kaynakları *Unconventional Hydrocarbon Resources* Oturum Yürütücüsü Convener: **Salih SANER,** **Süleyman ÇOŞKUN**
13:30 13:50	Güneydoğu Anadolu Bölgesi'nde Petrol Üretilen Rezervuar Birimler **Erhan Yılmaz,** **Fevzi Mert Türesin**	ESP Malzeme Kullanım Ömürlerinin (Runlife) Adıyaman, Diyarbakır ve Batman Bölgelerinde İncelenmesi *Investigation of ESP Equipments Runlife in Adıyaman, Diyarbakir and Batman Regions* **Ayhan Budak**	*Seismic Facies Analysis: From Basin to Prospect, From Visualisation to Value* **Simon Mann,** **James Ostrikoff,** **Stefane Gesbert**	Paleo-fayların 2023 Depremlerindeki Rolü ve Petrol Havza ile Yapılarına Etkisi *The Role of Paleo Faults in The 2023 Earthquakes and Their Effects on the Oil Basin and Its Sturucture* **Doğan Perinçek**	Batı Karadeniz'deki Petrol Platformlarının Gemi Trafiğine Olan Etkisi ve Oluşabilecek Kaza Sonrası Petrol Dağılımı **Ersan Başar,** **Mehmet Kerem Kemerli**	*Methane Adsorption Kinetics Of Core Samples From Tight Oil Field in Southeastern Turkiye* **Artuğ Türkmenoğlu,** **S. Esra Safran,** **Candan Kızılırmak,** **Can Ercan**
13:50 14:10	Rezervuar kompartmanlarının belirlenmesinde jeokimyasal yaklaşım: Çakıllı Sahası *Geochemical Approaches for Determinaiton of Reservoir Compartments: Çakıllı Field* **Hüsnü Çorbacıoğlu,** **Serdar Doğan,** **Yağmur Sümer Görenekli,** **Samet Öksüz**	*Wireless Monitoring of Artificial Lift Wells GEOEM Wireless Well Monitoring* **Aastik Saluja,** **Nick Nazarovs**	Gravite Gradyent Tensörlerinden Doğu Akdeniz Havzalarının Hidrokarbon Potansiyelinin Kestirimi **İlkin Özsöz, Bülent Oruç**	Hoya Formasyonu'nun Petrol Sistemi **Deniz Atasoy,** **Aynur Geçer Büyükutku,** **Arzu Aktosun,** **Fevzi Mert Türesin,** **Hüsnü Çorbacıoğlu**	*Analysis of Spreading of Oil Spill on the Sea Surface During Gravity-Viscous and Surface Tension-Viscous Regimes* **Metehan Erdoğan,** **İsmail Durgut**	*Natural Fracture modeling in Unconventional Dadaş-1 Member for 3d Seismic Survey: Case Study, Turkey* **Artem Orlov,** **Canalp Özkul,** **Fethi Bensenouci,** **Mehmed Ekrem Yazaroğlu,** **Ahmet Ergün Mengen,** **İsmail Ömer Yılmaz**
14:10 14:30	*Improved Permeability Prediction of a Heteregeneous Carbonate Reservoir Using Pore-Space and Pore Type Characterization* **İbrahim Olgun Uğurlu**	*Integrated Artificial Lift Optimization Workflow and New Technologies Implementation Helps Improving Reciprocating Rod Pumping Performance on Heavy Oil Fields, Onshore Romania* **Gheorghe Ditoiu,** **Vasile Mogos**	*Gravity and Magnetic Based Solutions for Integrated Regional-To-Basin Exploration* **Andrea Sirtori,** **Luciana De Luca,** **Giuseppe Bancalà,** **Samuele Ratti,** **Massimo Clementi**	*Imprints of Late Paleozoic-Early Mesozoic Tethyan Evolution in the Northern Arabian Plate (Se Turkey) and İts Role in the Paleozoic Petroleum System* **Gökay Yıldız**	Petrol Döküntülerinde Risk Değerlendirmesi ve Acil Müdahale Planlarının Önemi **Pelin Doğruyol,** **Müge Bıyıklıoğlu,** **Ayşe Tuna İşsever**	*Evaluation of XRD, CEC, and LSM Methods for Fracturing Fluid Optimization: Experimental Findings* **Ekrem Alagoz,** **Ahmet Ergun Mengen,** **Yalçın Yaradılmış**
14:30 14:50	*Use of Reservoir Geochemistry in High Water Cut Production: A Case Study in the Karakuş Field* **Placido Franco,** **Roberto Galimberti,** **Alara Dişpençe,** **Onur Acilar,** **Esra Eren Tokoğlu,** **Sinem Artan Ercengiz,** **Onur Yürüker,** **Ceyda Çetinkaya Kayrın,** **Tufan Tığlı**	Açık Deniz Gaz Kuyularında Kum ve Su Kontrolu için Uygulanabilen Bazı Kimyasal Yöntemler **Nazan N Topgüder**	Güney Karolayna Kıyı Kenarındaki Clubhouse Crossroads Mafiklerinin(CAMP) 3 Boyutlu Gravite ve Manyetik Ters Dönüşümü **Kübra Sibel Albayrak**			
14:50 15:10	**KAHVE ARASI / *COFFEE BREAK***					

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	GRAND BALL ROOM-1	GRAND BALL ROOM-2	GRAND BALL ROOM-3	MAGNOLIA	GERBERA	CAMELLIA
15:10 16:30	**OTURUM/*SESSION* 43** Rezervuar Çalışmaları *Reservoir Studies* Oturum Yürütücüleri *Conveners*: **Hakkı ŞİMŞEK,** **Adnan EROĞLU**	**OTURUM/*SESSION* 44** *Sondaj Mühendisliği* *Drilling Engineering* Oturum Yürütücüleri *Conveners*: **Gürşat ALTUN,** **Ahmet AY**	**OTURUM/*SESSION* 45** Jeodezi, Geomatik ve Uzaktan Algılama Çalışmaları *Geodesy, Geomatics and* *Remote Sensing Studies* Oturum Yürütücüleri Conveners: **Bülent ORUÇ,** **Ayça KARAÇAY**	**OTURUM/*SESSION* 46** Jeotermal Enerji *Geothermal Energy* Oturum Yürütücüleri Conveners: **Muzaffer SİYAKO,** **Deniz ATASOY**	**OTURUM/*SESSION* 47** Petrol ve Doğal Gaz Endüstrisinde İş Sağlığı, Güvenliği ve Çevre *Health, Safety and* *Environment in the Oil and* *Gas Industry* Oturum Yürütücüleri Conveners: **Şebnem Doğa ATAY** **BALİ,** **Beyzade KAYGISIZ**	**OTURUM/*SESSION* 48** Alışılmadık Hidrokarbon Kaynakları Unconventional Hydrocarbon Resources Oturum Yürütücüsü Convener: **Can S. BAKİLER,** **Betül YILDIRIM**
15:10 15:30	Genetik Ters Çözüm ve Sismik Nitelik Kombinasyonu ile F3 Blok Kuzey Denizi Potansiyel Hidrokarbon Alanlarının Belirlenmesi *A Combination of Genetic* *Inversion and Seismic* *Attributes for Prospect* *Identification in F3 Block,* *North Sea* **Süleyman Alemdar,** **Ertan Pekşen**	*Planning and Execution* *of a Horizontal Well in* *Southeast Anatolian Field:* *Advanced Processes and* *Technologies for Drilling* *and Logging* **İhsan Kaya,** **Davide Di Tommaso,** **Inan Sare,** **Shahbazi Kaveh**	Doğal Tehlikelerin Değerlendirilmesinde Konumsal Bilgi Teknolojilerinin Kullanımı **Sultan KOCAMAN**	*Geothermal Energy* *Potential of Radioactive* *Heat Production and* *Magnetic Susceptibility* *Characteristics in Kütahya* *Simav Basin* **Elif Meriç İlkimen,** **Cihan Çolak,** **Ali Aydın**	Büyük Gemi Kazaların Önlenmesi ve Çıkarılan Dersler **Mehmet Kerem Kemerli**	*Reservoir Characterization* *of Unconventional Dadaş* *Formation in Southeastern* *Turkey* **Canalp Özkul,** **İsmail Ömer Yılmaz,** **Ahmet Ergün Mengen,** **Fethi Bensenouci,** **Kirill Ezhov,** **Mehmed Ekrem** **Yazaroğlu**
15:30 15:50		Experimental Investigation Of The Effect Of Type And Concentration Of Polymers On The Rheological Properties Of Drilling Fluids **Mehmet Soylu**	*Bathymetry Effect on* *Complete Bouguer* *Anomalies Along the* *Turkish Shoreline of the* *Black Sea* **Sevda Olgun,** **Aydın Üstün**	Jeotermal Kaynakların Yönetiminde Reenjeksiyonun Önemi **Nilgün Doğdu,** **Oktay Çelmen**	Petrol ve Doğal Gaz Üretim Faaliyetleri Sonucu Oluşan Atıksuların Membran Teknolojileri ile Yönetimi **Börte Köse Mutlu,** **İsmail Koyuncu,** **Recep Kaya, Hale Özgün,** **M. Evren Erşahin,** **Mahmut Altınbaş,** **Sema Sayılı,** **Şebnem Doğa Atay Bali,** **Pelin Hoşhan, Esra Eren**	Geomechanics Aided Solution to Support Drilling and Completion of Dadaş Unconventional Reservoirs, Se-Türkiye **Fethi Bensenouci,** **Ahmet Ergun Mengen,** **Canalp Özkul,** **Artem Orlov,** **Kirill Ezhov,** **Mehmed Ekrem** **Yazaroğlu,** **İsmail Ömer Yılmaz**
15:50 16:10	Yeraltı Doğalgaz Depolama Rezervuarları: Antropojen Sismisite, Deprem Tehlikesi ve Sürdürülebilirlik **Hüseyin Sadi Kuleli,** **Ekrem Zor,** **Mehmet Ergin,** **Haluk Kunter,** **Taner Teoman,** **Haldun Bingol**	*A Synopsis on* *Pressure-While-Drilling* *Applications* **Korhan Kor**	Deniz Alanlarında Radar Uzaktan Algılama Yöntemiyle Hidrokarbon Sızıntıları Tespiti **Ayça Karaçay**	*Implications for the* *Geothermal Potential* *of the Area Between the* *Dead Sea Transform* *Fault System and the* *East Anatolian Transform* *Fault System (Karasu Rift)* *Based on Geochemical,* *Geological and Deep Well* *data: S Turkiye* **Aydın Çiçek, Galip Yüce**	Petrol ve Doğalgaz Sektörünün İklim Değişikliğine Etkileri **Murat Çilingiroğlu**	*An analitical Study of* *Hydraulic Fracturing* *Optimiszation for Tight* *Shale Formation* **Emre Can Dündar,** **Ahmet Ergun Mengen,** **Vasily Mironov,** **Aleksei Khlopkov,** **Ekrem Alagoz**
16:10 16:30		*Mature Field Development* *By Means of Rotary* *Steerable System and* *Reservoir Navigation* *Services, Turkey* **Paolo Sudiro,** **Melike Özkaya Türkmen,** **Elif Cihan Yıldırım,** **Batur Alp Aydın**	Kara Alanlarında Uzaktan Algılama Yöntemleriyle Hidrokarbon Aramacılığı **Ayça Karaçay**		Türkiye Petrolleri Anonim Ortaklığı (TPAO)'nda Sera Gazı Emisyon Hesaplama Çalışmaları **Fatma Salçın,** **Erkan Buzpınar,** **Hatice Selcen Köse,** **Pınar Aydoğdu,** **Elif Gökçek Küllük,** **Şebnem Doğa Atay Bali,** **Muhammet Mustafa** **Çelebi,** **Galip Yılmaz,** **Ali Sercan Malgaz**	

A Simulation Study of Underground Hydrogen Storage in the Northern Marmara Field

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ABSTRACT

Considering its significant working gas capacity of 2.25 billion cubic meters and its strategic proximity to industrial hubs and ports, an inquiry was conducted to determine the potential viability of repurposing the Northern Marmara depleted gas field for underground hydrogen storage (UHS).

Field-specific evaluation of the potential issues found in the literature was conducted, and microbial consumption of hydrogen and impurities in the withdrawn stream were determined to be the prominent risk factors.

The field was modelled, and simulated using a commercial software suite, previously published field data and previously presented storage schedule and constraints. The simulation spanned an initial depletion period between 1997-2002, 25 years of methane storage between 2007-2032, hydrogen storage between 2032-2057, and finally an extended withdrawal period before the abandonment.

A comparison with the field's current use as a natural gas storage was done by juxtaposition of the energy content of the produced gas streams. Stream composition during the UHS period showed high variability due to methane being withdrawn alongside hydrogen. Overall, 3.12 times less energy was withdrawn during the UHS period compared to methane storage period.

INTRODUCTION

The Sixth Assessment Report on Climate Change Mitigation of the Intergovernmental Panel on Climate Change (IPCC) states that hydrogen could play a unique role as an energy carrier to enable grid flexibility. Subsequently, Underground Hydrogen Storage (UHS) emerges as a crucial part of the hydrogen value chain to enable large scale seasonal energy storage, and supply security.

Although most UHS demonstrations have been with salt caverns as the storage media, depleted gas field pilot projects of hydrogen storage mixed with methane in Austria by RAG (Underground Sun Project) and in Argentina by HyChico (Patagonia Wind) have resulted with encouraging results for future trials.

A recent study conducted by the Energie Beheer Nederland (EBN) and the Netherlands Organization for Applied Scientific Research (TNO) has concluded that offshore UHS options are technologically feasible to be considered, but storage of pure hydrogen in depleted gas fields still requires field trials to be proven as a concept.

As the first commercial offshore discovery of Turkish Petroleum, the Northern Marmara Gas Field has a unique location with its proximity to many heavy industries, ports and the İzmit Refinery. The trap consists of a shale cap rock of Ceylan Formation, and a limestone reservoir that belongs to Soğucak Formation at a depth of 1150 meters. Initial reservoir pressure is 14300 kPa while the reservoir temperature is 68.8 °C. The Original Gas in Place (OGIP) and Working Gas Capacity (WGC) for the field are reported by Şahin, Abravcı and Tırek (2012) as 5.5 bcm and 2.25 bcm, respectively. After the termination of the production at the end of 2001, some host gas was left as cushion for future storage endeavors. The field has been serving as the largest natural gas storage media of Türkiye as part of the Silivri Storage Facility since 2007. Currently, it is under further development with new wells being drilled with the aim to increase the WGC up to 4.6 bcm. Moreover, "European potential for hydrogen storage in depleted gas fields and aquifers" by the Hydrogen Underground Storage in Porous Reservoirs (HyUSPRe) Consortium has considered the Northern Marmara Field to be the only known candidate for UHS in Türkiye.

Since UHS is a practice at its infancy, research is being conducted to investigate the potential effect of cyclic storage on the rock and fluid properties, wellbore and near-wellbore elements, transport properties, and overall operational feasibility. While the existing literature indicates that geochemical reactions with brine or rock are not major concerns due to their slow reaction rates, research in this area is still in progress. A particular concern that gained significant attention is the microbial consumption of H_2 and the subsequent formation of biofilms. Estimating the extent of microbial effects on hydrogen loss and transport is a novel scientific challenge.

In this study, Northern Marmara Field's viability is assessed for UHS by comparison of the energy content of the withdrawn gases, and possible technical issues are pointed out. A simulation was conducted involving 25 years of cyclic methane storage followed by 25 years of cyclic hydrogen storage. It is important to note that the model used in this study does not address various challenges that may arise during operation, such as microbial consumption, biofilm formation, leakage, and well integrity problems. Furthermore, potential improvements resulting from production optimization and additional field development have not been taken into account in this investigation.

METHODS

First, an evaluation of the field in the context of UHS is carried out based on an extensive literature research. Next, the contour map from Kaptanoğlu (1998) was digitized using the Surfer software. A commercial software suite (CMG) was used for the modelling and the compositional simulator (GEM) was used for the simulation. To construct a reservoir model, historical

wellhead pressure and production data from Öztürk (2004) were matched and the model was further validated by the comparison of analytical solution of the dry gas reservoir (P/z vs Gp plot) with data extracted from Şahin, Abravcı and Tırek (2012) using the Matlab plugin Grabit. PR-1978 was used as the equation of state. Forward simulations were carried out to assess the purity of the streams, and to compare the energy content of the withdrawn gases between methane and hydrogen storage periods of 25 years each. For the cycling constraints, the field practice presented by Abravcı (2017) is used as 215 days of injection with 9 million m3/day and 120 days of withdrawal with 16 million m3/day flow rates between 14300 kPa and 8400 kPa pressure limits. Lastly, an extended withdrawal period is simulated to retrieve the hydrogen that has been left behind in the reservoir due to dispersion.

FINDINGS

Evaluation of Site-specific Factors

The primary concern associated with any UHS site is the potential microbial impact. Hydrogen, being a universal electron donor, can be utilized by various microbial organisms for their metabolic processes. This could potentially result in the production of methane, acetone, or in severe cases, sulfate as a consequence of hydrogen consumption. Considering that each subsurface structure may inhabit a distinct microbial community, accurately modeling and assessing the extent of these microbial effects pose a scientific challenge that necessitates site-specific laboratory investigations as a starting point.

Currently, there is no data regarding the subsurface biota, nor is there a valid methodology to estimate the extent of biological reactions' effect. However, based on the assumption of a salinity level of 30,000 ppm (Çalışgan, 2005), a preliminary evaluation can be made, referencing the paper by Thaysen et al. (2021) titled "Estimating microbial growth and hydrogen consumption in hydrogen storage in porous media". It can be said that Northern Marmara Field is susceptible to all known kinds of microbial hydrogen reactions.

Although rapid geochemical reactions are unlikely to occur under field temperature conditions, it is highly recommended to perform lithology-specific laboratory experiments and modeling studies. It is worth noting that despite hydrogen's low solubility in water, the composition of the formation brine can still exert a subtle yet significant influence. Various other risk factors have been identified in the final report for the Underground Sun Project, and the HyUSPRe reports. While risks associated with components and environmental factors are not considered major concerns, the Northern Marmara, being an aged field located in a seismically active zone, demands meticulous attention to equipment and hazard protection.

MODEL VALIDATION

History match for the initial production period of the field (1997-2002) was conducted based on the field data obtained from Öztürk's MSc. thesis (2004). For the production well locations, Kaptanoğlu, Atalay, Yörük (1998) was used, and later for the storage period, wells from Gümrah et al. (2005) were added. An error margin less than 5% for each well was attained, and the resulting model's performance was validated by the analytical solution of dry gas reservoir compared with the extracted field data from Şahin, Abravcı and Tırek (2012). The resulting model had 51x61x4 blocks with 65x65x8.5 meters lengths with constant porosities of 20% and constant permeabilities of 50 mD. As suggested by Terstappen (2021) numerical dispersion was controlled by the total variation limiting flux limiter (TVD) available in the software and assumed to be a substitute for the physical dispersion.

SIMULATION OUTCOMES

25 years of CH_4 storage followed by 25 years of H_2 storage were simulated. As visualized in Figure-1, during H_2 injection, the CH_4 present in the reservoir is pushed to the periphery. During the withdrawal periods of H_2, at some point, the CH_4 that was pushed to the periphery comes back and gets produced alongside with H_2. The fraction of CH_4 in the withdrawn stream decreases with time, but still remains around 8% after the field reaches equilibrium. The composition of the gas stream, and therefore the energy content, has shown great variations even for the same well within the same cycle. This situation calls for different field constraints and well-specific withdrawal plan to be utilized for H_2 storage.

As a result of dispersion which is also visible in Figure-1, 2:61% of the injected H2 gets left behind in the reservoir after the last storage cycle. However, further depletion of the field below the threshold pressure of 8400 kPa could enable this remaining hydrogen to be reproduced. In fact, under the model assumptions, depletion down to 6000 kPa is already enough to reproduce 99.5% of the injected hydrogen.

Table-1 presents a concise summary table outlining the results obtained for the CH4 and H2 storage periods. In the end, as a result of hydrogen storage, 3.12 times less energy was withdrawn compared to the same duration of methane storage. Furthermore, 10% of the withdrawn energy during H_2 storage came from CH_4 that was withdrawn alongside with H_2.

CONCLUSION

When locally produced from renewable sources, hydrogen can offer significant advantages in terms of energy security and addressing climate change. The Northern Marmara Field possesses a strategic location for UHS, being in close proximity to potential end-users and export routes. However, its current utilization as a natural gas storage enables the supply of a larger amount of energy in a more stable manner. The challenge of compositional variations in the produced stream could potentially be overcome through surface purification

techniques, and real-time monitoring and optimization of the production.

Nevertheless, the issue of microbial hydrogen loss poses a significant threat to the feasibility of UHS in the field, and as of now, no effective method has been proposed to prevent this phenomenon. This study represents the first exploration of the possibility of storing hydrogen in the Northern Marmara Field. However, there are numerous factors that must be carefully considered before making the complex decision of utilizing the field for hydrogen storage. Further research and evaluation are crucial to fully assess the viability and address the challenges associated with hydrogen storage in this location.

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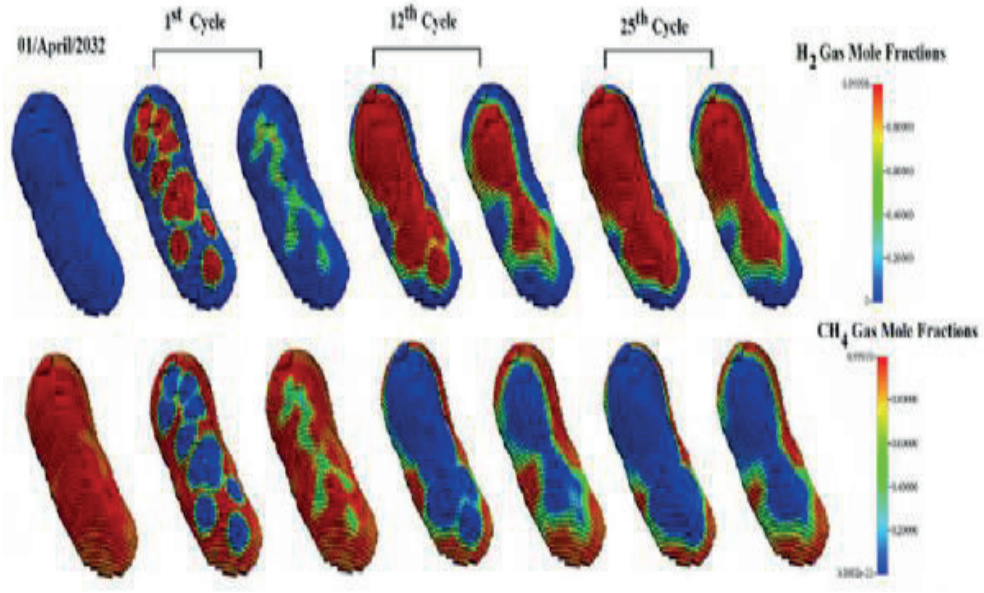
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Figure-1



Comparision of gas compositions after the end of gas injection and withdrawal phases.

Table-1

Years (25 Cycles)	2007-2032	2032-2057	
Cycled Gas	CH4	H2	CH4
Production (gmoles)	1.66392×10^{12}	1.57457×10^{12}	54980640700
Production (million tons)	26.69	3.17	0.88
Produced Energy (TWh)	371.05	106.65	12.25

Summary of the Results