



100 years of well logging



SPWLA France & ASET SIG

2026 Second Semester Series: “New Energies, New Molecules”

In person event

Date: Thursday October 15th 2026

Timing: 9:15 am – 4:45 pm

Location: Les Halles, Pau



Program

Item	Start time	End time	Duration	Presenter	Authors	Title	Company
	09:15	09:30	00:15	Emmanuel Caroli		Welcome and introduction	SPWLA France
Hydrogen	09:30	10:00	00:30	Charles Aubourg	C. Aubourg, K. Loiseau, P. Moonen, I. Moretti	H2 production and serpentinization processes: a petrophysic view of pyrenean lherzolites	UPPA
	10:00	10:30	00:30	Laure Dissez		From geoscience concept to exploration to stakeholders : natural hydrogen in the Pyrénées-Atlantiques	Terrensis
	10:30	11:00	00:30			BREAK	
Geothermal Energy	11:00	11:30	00:30	Tom Bradley	Elizabeth Von Wilamowitz-Moellendorff, Auke Barnhoorn, Susanne Laumann, Philip J Vardon	Knowing the Basics? Optimising Logging of Geothermal Wells to Efficiently and Safely Determine Essential Subsurface Information	Baker Hughes
	11:30	12:00	00:30	Auke Barnhoorn	Susanne Laumann, Tom Bradley, Hemmo Abels and Phil Vardon	Delft Subsurface Urban Energy Laboratory: The Geothermal Project at Delft University of Technology in the Netherlands: a multi-scale and multi-purpose research project including a large suite of wireline logging data combined with core analysis	Delft University of Technology
	12:00	14:00	02:00			LUNCH	
Mineraliza	14:00	14:30	00:30	Sylvain Calassou	Ophélie Pascual-Gauci, Pierre-Alexandre Teboul, Sabine Delahaye	Can Mineral Matrix Replacement Unlock Additional CO ₂ Storage Capacity in Basalts?	TotalEnergies
Helium	14:30	15:00	00:30	Nicolas Delcourt		Logging for Helium and Natural Hydrogen: Petrophysical Lessons from 45-8 ENERGY's First Wells in France	45-8 Energy
	15:00	15:30	00:30			BREAK	
CCS	15:30	16:00	00:30	Christophe Blondeau	Sylvain Thibeau, Catherine Prinnet	Lacq CCS Demonstration Pilot, 2010-2016	TotalEnergies
	16:00	16:30	00:30	Ryan Morrison		Unlocking onshore Carbon storage in Continental Europe	SLB
	16:30	16:45	00:15	Emmanuel Caroli		Closing remarks	SPWLA France

Snack and beverage offered in the meeting room

Lunch booked in Halles de Pau at your own expense

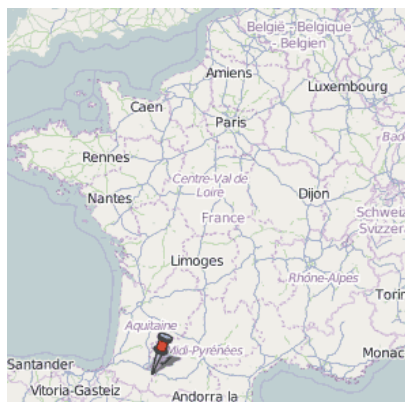
Location

Halles de Pau

Tour du complexe de la république

Rue de la République – 64000 Pau

<https://www.hallesdepau.fr/>



H₂ production and serpentinization processes: a petrophysic view of pyrenean lherzolites

By Charles Aubourg, Université de Pau et Pays de l'Adour (UPPA)

Co-authored by K. Loiseau, P. Moonen, I. Moretti, UPPA

Abstract:

The oxidation of Fe²⁺ to Fe³⁺ in the presence of water leads to the generation of natural hydrogen. This mechanism is particularly prevalent in ultramafic rocks such as lherzolites, where olivine (40 to 60 vol.%) undergoes serpentinization, with peak production occurring at temperatures between 250°C and 350°C. Petrographic transformations during serpentinization are drastic and detectable using geophysical methods. Density decreases from ~3.3 g/cm³ down to potentially ~2.5 g/cm³. The rock shifts from an initial paramagnetic state to a highly magnetic one, yielding nearly 8 vol.% magnetite at 100% serpentinization. In this study, we present several facets of these transformations primarily using X-ray microtomography on a set of variably serpentinized lherzolites, coupled with complementary techniques such as electron microscopy and rock magnetism measurements.

Speaker



Charles Aubourg is a professor at the University of Pau. A specialist in rock magnetism and rock fabrics, he has focused over the past five years on natural hydrogen research, with a particular emphasis on Pyrenean lherzolites.

From geoscience concept to exploration to stakeholders : natural hydrogen in the Pyrénées-Atlantiques

By Laure Dissez, Terrensis

Abstract:

Natural hydrogen is emerging as a new molecule of interest in the energy transition, with growing exploration activity worldwide. The geological processes behind its generation, migration, accumulation and behaviour within the subsurface are still not fully understood. Identifying prospective systems therefore requires an integrated approach combining geological concepts, geophysical data and exploration strategies.

The Pyrénées-Atlantiques, in southwestern France, provide a promising setting to investigate the potential of naturally hydrogen gas accumulation. This presentation will introduce the main geological concepts considered for natural hydrogen generation, migration and accumulation with a focus on Sauve Terre H² and Coucourou exploration projects. This talk presents the geological rationale behind these exploration permits and the exploration strategy.

Exploring a new subsurface energy resource is not only a scientific and technical challenge. Natural hydrogen projects are also embedded in a territorial context involving local communities, stakeholders, existing land uses and environmental considerations. These aspects can strongly influence how exploration projects are understood and developed.

Through the example of the Pyrénées-Atlantiques, this presentation will follow a journey from geoscience concept to exploration to community, highlighting the need to connect subsurface understanding with exploration practice and societal dialogue when assessing the potential of this emerging energy resource.

Speaker



Laure Dissez is a French geoscientist specialized in subsurface exploration and low-carbon energy resources. She has built her career in applied geosciences and the energy industry, with a strong focus on innovative subsurface solutions. She is currently involved in the development of natural hydrogen exploration projects within TBH2 Aquitaine, contributing to the advancement of geological hydrogen as a sustainable energy source. Her work supports the transition toward new decarbonized energy systems based on underground resources.

Knowing the Basics? Optimising Logging of Geothermal Wells to Efficiently and Safely Determine Essential Subsurface Information

By Tom Bradley, Baker Hughes¹

Co-authored by Elizabeth Von Wilamowitz-Moellendorff², Auke Barnhoorn³, Susanne Laumann³,
Philip J Vardon³

1 Baker Hughes Company, Blokmakersweg 10, 1786 RC Den Helder, Netherlands

2 Baker Hughes Company, Kontinentalvegen 8, 4056 Tananger, Norway

3 Delft University of Technology, Stevinweg 1, 2628 CN Delft, Netherlands Tom.Bradley@bakerhughes.com

Abstract:

As the geothermal industry matures, the need for accurate subsurface data is becoming recognised for the successful realisation of projects. These data are commonly needed for the determination of subsurface petrophysical properties that control the heat production, and hence viability of the project, including but not limited to rock type, porosity, permeability, reservoir quality, and other properties such as geological structure and geomechanical properties. Many of these can be derived from measurements by wireline and logging whilst drilling (LWD) surveys recorded in open hole and/or cased hole, either during drilling (for LWD) or immediately after the wells have been drilled (for wireline), which have been used in the hydrocarbon extraction industry for many decades.

There is a considerable overlap in the subsurface knowledge requirements of the hydrocarbon extraction and geothermal industries, and now the need for detailed subsurface knowledge is recognised in the geothermal industry there is considerable interest in applying these technologies in geothermal exploration. However, the acquisition of these technologies often have associated costs which may be significant, resulting from the investments during development, the costs of ongoing support and maintenance, the costs associated with deploying these technologies in a well, and the costs associated with interpretation of the data. As the economics of geothermal energy extraction can be considerably more challenging than hydrocarbon extraction, geothermal operators are often unable to justify investment in data acquisition and interpretation (which may have significant expense) at the start of a project when there is little income, even though this is when the data is most needed to ensure the success of a project. Later in the life of a project when economics make data acquisition easier to support, it may be difficult, or even impossible to acquire this data.

In this paper, we discuss the subsurface properties that are of interest to geothermal: particularly porosity and permeability, using the extensive wireline data acquisition from the geothermal doublet drilled at the Delft University of Technology in The Netherlands as a case study. We compare different log derived methods to determine these properties. We compare the costs to the value of information, and discuss which technologies are most appropriate to acquire this information. We then propose a geothermal logging suite that will provide the key properties desired for geothermal in the most efficient way, both in terms of costs and health, safety, and environmental considerations.

Speaker



Tom Bradley is an Associate Fellow with Baker Hughes, specialising in open hole formation evaluation. After graduating in 1996 from The Royal School of Mines, Imperial College, London with a degree in Geology with Engineering Geology, he started his career in 1997 with Western Atlas International as a log data processor. Since then, he has worked for Baker Hughes globally in a variety of technical and supervisory roles. Since 2005 he has been based in the Netherlands, and as part of his current role he is advising multiple stakeholders in the development of geothermal energy in the Netherlands and Europe. He is a board member and former president of the Dutch Petrophysical Society, A board member of the SPWLA Alternative Subsurface/Energy Transition Special Interest Group. With the Society of Petroleum Engineers, he has served twice as a Global Distinguished Lecturer and is a former North Sea Region Formation Evaluation Award Winner.

Delft Subsurface Urban Energy Laboratory: The Geothermal Project at Delft University of Technology in the Netherlands: a multi-scale and multi-purpose research project including a large suite of wireline logging data combined with core analysis

By Auke Barnhoorn

Co-authored by Susanne Laumann, Tom Bradley, Hemmo Abels and Phil Vardon

Abstract:

In autumn 2023, the drilling of the geothermal doublet on the campus of Delft University of Technology was initiated. A large collection of research data, including coring and openhole wireline logging has been collected in the producer (DEL-GT-01) and the injector (DEL-GT-02-S2) wells. The openhole sections covered a depth range between 2550 and 2925m along hole at a $\sim 45^\circ$ inclination through the upper Alblasserdam, Delft and lower Rodenrijs Members of the Nieuwerkerk Formation in the producer and a depth range between 2190 and 2570 m along at a $\sim 45^\circ$ inclination through the upper Alblasserdam, Delft and lower Rodenrijs Members of the Nieuwerkerk Formation in the injector. In both wells, three individual logging runs were performed. The first run consisted of a gamma ray, caliper, induction and p-, s-wave and full waveform acoustic dataset. The second run in both wells contained a gamma ray, a resistivity borehole imager and an acoustic borehole imager. The last contained a spectral gamma ray, neutron porosity/density and a nuclear magnetic resonance (NMR) dataset. This extensive set of logging dataset gives the capability to do a detailed sedimentological and structural interpretation of the Nieuwerkerk Formation in the Delft subsurface, as well as detailed log-to-log correlation for subsurface property prediction to identify which set of log data can be used to do property prediction and extrapolation to other properties for e.g. mechanical studies, seismicity and flow and performance predictions.

Speaker



Auke Barnhoorn holds a tenured Associate Professor position in Applied Geophysics and Petrophysics at the Department of Geoscience and Engineering at Delft University of Technology (The Netherlands). In addition, he is currently the Director of the Geoscience and Engineering Laboratory. His main research interests are rock physics and rock mechanics and failure forecasting. He uses experimental facilities in Delft to study the anisotropic properties of rocks combining geomechanical and acoustic measurements and 3D imaging of the rock structures. His research has applications in e.g., geothermal energy, CO₂ storage and induced seismicity. Furthermore, he is involved in the geothermal project at the campus of Delft University of Technology and he is leading the efforts on wireline logging of the geothermal wells. Auke is educated at Utrecht University in the Netherlands where he holds a MSc in geology and at ETH-Zürich (Switzerland) where he received his PhD. After his PhD he had post-doc positions at the Australian National University in Canberra (Australia) and at Utrecht University in The Netherlands, before moving to Delft University of Technology in 2011.

Can Mineral Matrix Replacement Unlock Additional CO₂ Storage Capacity in Basalts?

By Sylvain Calassou, TotalEnergies

Co-authored by Ophélie Pascault-Gauci, Pierre-Alexandre Teboul, Sabine Delahaye, TotalEnergies

Abstract:

In situ CO₂ mineralization—the conversion of dissolved CO₂ into stable carbonate minerals within reactive rocks—offers a pathway for permanent geological storage. Its deployment, however, requires a robust understanding of the coupled geochemical kinetics and reservoir evolution that control injectivity, reaction rates, and ultimate storage capacity. Here we combine (i) a geographical perspective—the global distribution of reactive rocks relative to our industrial CO₂ sources/emissions—and (ii) a process-based scientific framework to assess the potential and limits of this approach.

Ultrabasic rocks (ophiolites, peridotites) represent a critical fundamental step: they are extremely reactive toward CO₂, enabling very fast mineralization, but typically exhibit poor reservoir properties (low effective porosity and permeability). Results from Oman illustrate this contrast: natural carbonation and pilot-scale injections demonstrate rapid reaction kinetics, yet injectivity is constrained by the scarcity of transmissive fractures (P. Mahzari et al 2025. World CCUS Conf). As such, ultrabasic systems are ideal laboratories to quantify elementary dissolution–precipitation kinetics and to assess how strong reactivity feeds back on hydromechanical properties, rather than immediate large-scale storage solutions.

Basalts and related basic rocks are generally less reactive than peridotites but offer much better initial reservoir properties, allowing exploration of larger storage volumes over industrial timeframes. This is highlighted by the natural analogue of Meñakoz (near Bilbao, Spain), where submarine basalts display massive natural matrix replacement and pore clogging by carbonate. Multi-scale X-ray imaging, up to synchrotron resolution, reveals complete mineralization of an initial ~20% porosity (vesicles and fractures) and, more strikingly, ~10% replacement of the basaltic matrix by calcite, leading to ~30% mineralization of the rock volume. U–Pb dating shows that the main calcite phase is sub-contemporaneous with basalt emplacement, demonstrating that extensive matrix replacement can occur naturally.

These observations directly raise a key question for engineered storage: can a significant fraction of mineral matrix replacement be achieved within industrial timescales, beyond simple pore filling? Addressing this question to any in-situ mineralization project is the critical path. How to quantify porosity/permeability evolution/kinetics/exchange surfaces to model volumetric estimation of CO₂ storage capacity.

By integrating global mapping of reactive lithologies and industrial assets with insights from natural analogues (Oman, Meñakoz) and forthcoming ICDP ongoing investigations (i.e. Horoman, Hokkaido) this work frames CO₂ mineralization as a continuum—from ultrabasic systems optimizing process understanding to basaltic reservoirs enabling larger-scale application—while explicitly identifying remaining uncertainties and research needs, without presuming any industrial deployment.

Speaker



Sylvain Calassou is a geoscientist at TotalEnergies, with extensive experience in structural geology, sedimentary basin analysis, and geodynamic processes. He has led multidisciplinary research programs aimed at improving the understanding of convergent margins and tectonic evolution, notably through collaborations with BRGM and CNRS in the Pyrenees. His work bridges fundamental geoscience and energy exploration, contributing to advances in basin characterization, natural hydrogen systems, geothermal resources, and subsurface energy solutions. He is also the author of numerous scientific publications and innovative developments related to the energy transition and subsurface geosciences.

Logging for Helium and Natural Hydrogen: Petrophysical Lessons from 45-8 ENERGY's First Wells in France

By Nicolas Delcourt, 45-8 Energy

Abstract:

Helium and natural hydrogen are moving from geological curiosities to strategic industrial resources. 45-8 ENERGY, created in 2017 and now operating nine active projects across four countries, has been exploring for these gases in under-explored European settings and, since September 2024, operates the first helium production plant in Western Europe at Fonts-Bouillants (Nièvre, France). This presentation offers a general overview of the company's fully integrated approach: exploration, production, distribution and helium recycling, before focusing on the subsurface work that underpins it.

The first part introduces both resources: why helium and natural hydrogen matter, how they differ from hydrocarbons in generation, migration and trapping, and what this implies for a screening and maturation workflow built on regional geological synthesis, proprietary gas-composition databases, surface geochemistry, and geophysical acquisition (3D seismic, gravimetry, airborne electromagnetics).

The second part addresses the well-scale evaluation, where conventional petrophysics is confronted with unfamiliar fluids. Drawing on recent wells drilled on the Fonts-Bouillants and Avant-Monts Franc-Comtois licences, we describe the drilling and acquisition programmes deployed (gamma ray, neutron, density, resistivity and sonic logging together with mud-gas monitoring, sampling and production testing) and the interpretation issues they raise. Particular attention is given to the response of neutron tools in hydrogen-free gas mixtures (He, N₂, CO₂) and to the use of neutron–density crossplots for lithology and porosity determination in carbonate and clastic sequences. We also discuss how log-derived answers are tied back to gas composition and flow-rate data acquired during testing, which remain the ultimate control on resource assessment for these gases.

The talk concludes on the open questions this raises for the petrophysical community: which tools and models genuinely transfer from oil and gas to helium and natural hydrogen evaluation, and where new calibration work is still needed.

Speaker



Nicolas Delcourt is a geoscientist specialized in petroleum and subsurface exploration, with international academic training in France, Norway, and the United Kingdom. He holds an MSc in Petroleum Geoscience from Imperial College London, where he graduated with Distinction and received the PETEX Award for his research on reservoir pressure evolution. Early in his career, he contributed to frontier exploration studies within TotalEnergies, notably on the Guyana-Suriname exploration

portfolio, before continuing his work in energy-resource exploration and subsurface characterization.

Lacq CCS Demonstration Pilot, 2010-2016

By Christophe Blondeau, TotalEnergies

Co-authored by Sylvain Thibeau, Catherine Prinet, TotalEnergies

Abstract:

TotalEnergies built and operated CO₂ capture, transportation and storage facilities in Southwest France where 51 000 tonnes of CO₂ have been captured and injected between 2010 and 2013, followed by the plugging and abandonment of the injection well and a post injection monitoring period of three years, defined with the administration and in line with the EU CCS Directive.

The main geoscience and reservoir steps of the project included the site selection (Rousse reservoir, in Jurançon, south of Pau); the site characterization and modeling; a full risk assessment and the associated monitoring plan; as well as a community outreach program

The following learnings were derived from the monitoring observations:

- The environmental surveillance did not detect any CO₂ attributable to a CO₂ leakage from the store.
- A learning from the fauna and flora monitoring is that changes between the various surveys may well be due to different human or natural factors not related to the CO₂ injection, potentially creating false alarms on the storage performance.
- Seismicity surveillance enabled to locate a large number of events, at various scales. The established Traffic Light System did not trigger any action as these events were either two small magnitude or unrelated to the storage pilot

Speaker



Christophe Blondeau is a reservoir and subsurface engineering specialist with extensive experience at TotalEnergies, spanning reservoir management, production optimization, reserves evaluation, and field development across Europe, the Middle East, and Africa. He has held technical leadership roles in Norway, Abu Dhabi, and Nigeria, contributing to the management of complex carbonate and clastic reservoirs. More recently, his work has focused on subsurface energy-transition topics, including geological CO₂ storage, reservoir simulation, and long-term carbon sequestration performance assessment.

Unlocking onshore Carbon storage in Continental Europe

By Ryan Morrison, SLB

Abstract:

How can mainland Europe build a CCS industry tailored to its own geological and industrial realities?

While carbon capture and storage (CCS) deployment in Northern Europe has been enabled by extensive offshore storage resources and established transport networks, many European countries face a different reality.

This presentation examines the role of onshore carbon storage in accelerating industrial decarbonization, using Poland's HuCCSar Project as a pioneering case study. The session will explore how scalable, cost-effective CCS solutions can help overcome the region's carbon storage deficit.

Learn how innovative CCS infrastructure, stakeholder engagement, and regional collaboration can transform carbon management from ambition into action. By combining technical innovation, stakeholder engagement, and policy alignment, it provides a replicable model for inland CCS deployment across Europe and unlocks a pragmatic pathway to scale and deliver net zero for hard-to-abate industries across the region.

Speaker



Ryan Morrison is an accomplished commercial and operational leader with over 27 years in the Energy industry. His 20yrs experience at SLB, spanning sales, service delivery, project execution, and strategic business development across the UK, Europe, the Caspian and Central Asia regions. Currently serving as the Head of New Energy for Europe, Ryan leads commercial strategy and market development for emerging energy solutions, supporting the energy transition through partnership building, customer engagement, and commercialization of new technologies. Ryan is also part of the NSTA's Technology Leadership Board Transition Workstream.