



## BULLETIN DE VEILLE GEOSCOPIE n°54 – Février 2019

### Edito

Chers lecteurs, adhérents, membres et partenaires,

Voici le n°54 du bulletin de veille Géoscopie, avec sa sélection d'articles d'actualités, de brevets et de publications scientifiques sur toutes les techniques et technologies contribuant à une meilleure connaissance du sous-sol et à sa valorisation sur les 5 derniers mois.

La base de données de veille technologique IP Metrix / Géoscopie contient aujourd'hui plus de 44000 articles. Nous vous rappelons qu'elle peut être interrogée à tout moment, gratuitement pour les membres du POLE AVENIA sur une recherche basique mais personnalisée et ciblée à partir de vos jeux de mots-clés, par exemple en amont d'un projet de R&D ou d'innovation, pour évaluer l'état de l'art et de la concurrence, identifier les experts sur la ou les thématiques de votre choix, etc. N'hésitez pas à nous contacter via [geoscopie@pole-avenia.com](mailto:geoscopie@pole-avenia.com)!

Bonne lecture à tous !

L'équipe du POLE AVENIA

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## ACTUALITÉS

### Les Géosciences en France

**23/07/2018 - Projet de parc éolien en mer : premiers sondages au large de Dieppe** - Le projet de parc éolien en mer, au large de Dieppe et du Tréport, avance. Et c'est une nouvelle étape qui vient de débiter avec la campagne géotechnique actuellement en cours au large de Dieppe

**23/11/2018 - La France aura assez de gaz pour passer l'hiver** - Les sites de stockage souterrains sont intégralement remplis ce mois de novembre, ce qui n'était pas le cas ces dernières années.

**14/12/2018 - La géothermie, pilier de la transition énergétique en Alsace** - La géothermie profonde, qui consiste à extraire, grâce à des puits, de l'eau très chaude (environ 150-200 °C) afin de produire de la chaleur ou de l'électricité pour les entreprises ou les particuliers alentours – est un des piliers de la politique verte insufflée par les élus alsaciens.

**30/12/2018 - Nouveau séisme de magnitude 4,7 à Mayotte** - La préfecture de Mayotte a signalé un séisme de magnitude 4,7 au large de Mayotte. Une nouvelle secousse dans l'essaim de séisme qui fait trembler l'île depuis plusieurs mois.

**11/01/2019 - La moitié des nappes phréatiques affichent un niveau bas à très bas** - Le Bureau de Recherches Géologiques et Minières (BRGM) a publié l'état des nappes d'eau souterraines au 1er janvier 2019. La recharge hivernale est en retard, car la moitié des nappes ont un niveau insuffisant.

**11/01/2019 - Montagne d'or en Guyane : l'ONU « somme » la France d'écouter les populations autochtones** - L'Organisation des Nations unies (ONU), par le biais de son Comité pour l'élimination de la discrimination raciale, « somme » la France soit de reprendre son processus de consultation afin d'écouter les populations autochtones sur ce sujet, soit de suspendre ce projet gigantesque.

### Nouvelles des membres du pôle

**11/12/2018 – IFPEN et Total expérimentent une nouvelle technologie de captage du CO2** - Impliquant les groupes français IFPEN et Total aux côtés notamment de l'énergéticien chinois Dongfang Boiler, le projet Cheers, qui bénéficie d'un financement de 16 M€ sur la période 2017-2022, vise à mettre au point un nouveau procédé de captage du CO2, qui règle le problème de l'azote.

**12/10/2018 – Intelligence artificielle : le Bordelais FieldBox.ai recrute 30 personnes**

Cette start-up bordelaise spécialisée dans l'intelligence artificielle pour l'industrie accélère son développement, notamment à l'international et annonce à "Sud-Ouest" deux nouveaux bureaux, à Paris et Singapour.

**03/12/2018 - Treize entreprises au menu du Focus Adhérents lors de l'Assemblée Générale du POLE AVENIA le 3 décembre 2018** - Le POLE AVENIA a accueilli près de 80 personnes au FOCUS ADHÉRENTS de cette fin d'année 2018. Ce focus a eu lieu à l'issue de son Assemblée Générale le lundi 3 décembre 2018 à la Technopole Hélioparc à Pau.

**11/12/2018 - FEBUS OPTICS réalise une levée de fonds de 1,2 M€ avec l'appui d'ADI Nouvelle-Aquitaine** - FEBUS OPTICS annonce avoir clôturé une levée de fonds de 1,2 M€ auprès de Pléiade Venture, Calao Finance et de 2 Fonds du Crédit Agricole. La société signe une nouvelle étape qui va lui permettre de poursuivre sur son rythme de croissance exceptionnel et d'accélérer son développement commercial international.

**18/12/2018 – Engie s'allie à Sumitomo dans l'éolien en mer** - Le géant japonais rejoint le français Engie et le portugais EDPR pour développer deux projets de parc au large d'Yeu-Noirmoutier (Vendée) et du Tréport (Seine-Maritime).

**26/12/2018 – Total devient un acteur qui compte dans la production d'électricité en France** - Le pétrolier français va augmenter ses capacités avec les deux centrales à gaz cédées par Uniper. Il veut produire le tiers de l'électricité vendue à ses clients finaux.

**02/01/2019 - Total démarre la plus grosse plateforme flottante de son histoire** - A 150 kilomètres, au large des côtes du Nigeria, les eaux profondes (1.600 mètres) du champ d'Egina ont commencé à livrer leur pétrole.

### Marché de la géothermie

**10/12/2018 - MGX Minerals advances geothermal lithium brine extraction strategy in U.S.** - Canadian company MGX Minerals has received an independent scale up and technology engineering review of its rapid lithium extraction technology for geothermal implementation in the Western United States.

**17/12/2018 - Oil & gas firm strikes hot water off the coast of Ireland, exploring option of geothermal power** - Irish oil and gas exploration firm drilling for oil off the south west coast of Ireland ended up finding hot water, but little oil. Now the company explores the option of offshore geothermal power generation.

**19/12/2018 - U.S. funding opportunity for specific geothermal research topics** - Under \$20 million funding



by the U.S. Department of Energy's Small Business Innovation Research and Technology Transfer Offices, projects that help improve downhole telemetry for geothermal drilling and geothermal desalination and critical material recovery systems can seek for funding.

**20/12/2018 – Holzkirchen 3.4 MW geothermal plant starts test operations in Bavaria, Germany** - The geothermal power plant of Holzkirchen in Bavaria, Germany has started test operations. The 3.4 MW geothermal plant has been built by Turboden and is expected to start commercial operation early in the new year.

**03/01/2019 – Finland has geothermal heating plans for a local district** - The new geothermal heating project that has been planned will result in the drilling of deep geothermal wells targeting a depth of 7-8,000 meters (4.3 – 4.9 miles). The wells are intended to derive geothermal heat for a local district heating system to replace fossil fuels.

**03/01/2019 – Controlling emissions of geothermal plants – EU Research Project in Tuscany/ Italy**

A group of 18 European partners are part of the GECO, a "Geothermal Emission COntrol" research project funded by the EU. The project intends to utilise innovative technologies, to study and apply the safe confinement of gaseous emissions of the plants in the subsoil.

**04/01/2019 – City of Oradea in Romania granted exploration license for geothermal development** - Romania's National Agency for Mineral Resources (ANMR) has granted the city of Oradea in Northwestern Romania, a geothermal exploration license. With this first license granted to a local municipality, Oradea can now explore geothermal energy resources and apply for funding from the EU.

## Marché du stockage géologique

**22/11/2018 – Innovative CO2 capture technology at geothermal plant could be applied elsewhere** - The CarbFix project at the geothermal power plant of Hellisheidi in Iceland successfully manages to bind CO2 into rocks and could provide a solution for other industries in Iceland and beyond.

**12/12/2018 – Storelectric raises £1 million for energy storage solution** - Storelectric's Compressed Air Energy Storage enables a surplus of wind or solar power to be stored underground where the surplus energy is used to store air in salt caverns, a type of underground reservoir.

**19/12/2018 – Helsinki Produces Energy With Underground Hot And Cold Water Lakes** - Former fuel-oil storage caves in the Helsinki bedrock will store hot water heated in the processes of the Helsinki energy

company Helen, to be used for district heating from 2021 onwards.

**03/01/2019 – North Sea CO2 storage will support transition to low-carbon economy** - The UK Government reaffirmed its support for carbon capture and storage (CCS) – a tested technology that will deliver massive reductions in carbon emissions – and the Acorn CCS Project in north east Scotland secured a licence to select a suitable North Sea CO2 storage site.

**04/01/2019 - Energy Storage Wars: Which Technology Will Prevail ?** - The solution to this intermittency problem lies in storing electricity generated during peak renewable production and releasing it when renewable output falls. A number of existing and in-development energy storage technologies are aimed directly at achieving this outcome

## Techniques et technologies pour les géosciences

**29/11/2018 - Oil And Water: Finding New Uses For Fracking Waste Water** - Fracking requires a huge amount of water, a major concern in dry Western states that otherwise welcome the practice. But New Mexico thinks it can mitigate that problem by pushing oil companies to treat and recycle fracking waste water for use in agriculture — or even as drinking water.

**10/12/2108 – Improving Oil & Gas Performance with Big Data** - Oil & Gas Companies conduct advanced geophysics modeling and simulation to support operations where 2D, 3D & 4D Seismic generate significant data during exploration phases.

**19/12/2018 - Comment l'IA tente de prédire les séismes** - Des chercheurs franco-américains ont décelé des sons bien particuliers émis avant certaines secousses. Leur idée : éduquer une IA pour écouter attentivement une zone sismique, afin d'y trouver les signes d'une activité future.

**22/12/2018 - La fracturation hydraulique a causé le séisme de Fort St. John** - La Commission du pétrole et du gaz de la Colombie-Britannique confirme que le procédé d'extraction est à l'origine du tremblement de terre qui a secoué la région de Fort St. John le 29 novembre.

**27/12/2018 – Gaz de schiste : la Chine veut accélérer** La production de gaz de schiste du principal site chinois a augmenté de 40% cette année. La Chine dispose des réserves de gaz de schiste les plus importantes au monde. Mais le pays peine encore à les exploiter massivement.





## LES PROJETS COLLABORATIFS

**2018 - 2022 - EU project NEWTON-g** [\[source\]](#) **New Tools for Terrain Gravimetry** - HELMHOLTZ ZENTRUM POTSDAM DEUTSCHESGEOFORSCHUNGSZENTRUM GFZ (GERMANY); **INST NATL GEOFISICA VULCANOLOGIA (ITALY)**; INST ROYAL NETHERLAND METEOROLOGICAL (NETHERLANDS); MUQUANS (FRANCE); UNIV GENEVE (SWITZERLAND); UNIV GLASGOW (UK) - Poor knowledge of the spatio-temporal changes in the characteristics and distribution of subsurface fluids remains an insurmountable barrier to addressing important societal issues, including: sustainable management of energy resources (e.g., hydrocarbons and geothermal energy), management of water resources, and assessment of hazard.

**2018 - 2020 - EU project NERUDA** [\[source\]](#) **Numerical and ERT studies for Diffusive and Advective high-enthalpy systems** - **UNIV GENEVE (SWITZERLAND)** - The full development of geothermal energy is still hindered by the little knowledge available on the distribution of high-enthalpy fluids at depth and by the often-complex logistics. High-enthalpy hydrothermal systems preferentially develop in tectonically active and volcanic settings. In such environments, faults have a major control on fluid flow and may affect the overall fluid distribution at depth.

**2018 - 2021 - EU project SECURE** [\[source\]](#) **Subsurface Evaluation of Carbon capture and storage and Unconventional Risk** - BUREAU RECHERCHES GEOLOGIQUES MINIERES (FRANCE); CTR HELMHOLTZ (GERMANY); GEOLOGICAL SURVEY DENMARK GREENLAND (DENMARK); IFP ENERGIES NOUVELLES (FRANCE); INST BADAWCZY (POLAND); INST NAFTY I GAZU (POLAND); RISKTEC SOLUTIONS (UK); SINTEF (NORWAY); TNO (NETHERLANDS); TOTAL (FRANCE); **UNITED KINGDOM RESEARCH INNOVATION (UK)** et al - Subsurface Evaluation of CCS and Unconventional Risks (SECURE) will gather unbiased, impartial scientific evidence for risk mitigation and monitoring for environmental protection to underpin subsurface geoenery development. The project will develop monitoring and mitigation strategies for the full...

**2018 - 2021 - EU project** [\[source\]](#) **- Multidisciplinary and multi-context demonstration of EGS exploration and Exploitation Techniques and potentials / MEET** - AYMING (FRANCE); CTR HELMHOLTZ (GERMANY); ENOGIA (FRANCE); **ES GEOTHERMIE (FRANCE)**; FEBUS OPTICS (FRANCE); GEOTHERMAL ENGINEERING (JAPAN); INST POLYTECH UNILASALLE (FRANCE); INST

ROYAL SCI NATURELLES BELGIQUE (BELGIUM); LAB GEOPHYSICAL INVERSION & MODELING (FRANCE); NYSKOPUNARMIDSTOD ISLANDS (ICELAND); UNIV CERGY PONTOISE (FRANCE); UNIV GOTTINGEN FDN PUBLIC LAW (GERMANY); UNIV TECH DARMSTADT (GERMANY); UNIV ZAGREB (CROATIA); UNIVERSITATSENERGIE GOTTINGEN (GERMANY); VERMILION REP (FRANCE) - The main objective of MEET is to capitalize on the exploitation of the widest range of fluid temperature in EGS (Enhanced geothermal systems) plants and abandoned oil wells. The aim is to demonstrate the lower cost of small-scale production of electricity and heat in wider areas with various geological environments, in order to support a large increase of geothermal-based production sites in Europe in a near future. In order to boost the market...

**2018 - 2022 - EU project GEOFIT** [\[source\]](#) **Deployment of novel GEOthermal systems, technologies and tools for energy efficient building retrofitting** - CNR (ITALY); COMET GESINCO (SPAIN); COMHARCHUMANN FUINNIMH OILEAIN ARANN TEORANTA (IRELAND); COMSA CORPORACION INFRAESTRUCTURAS (SPAIN); ENERVALLIS (BELGIUM); FAHRENHEIT (GERMANY); FDN EURECAT (SPAIN); GROENHOLLAND GEO ENERGIESYSTEMEN (NETHERLANDS); IDP INGENIERIA ARQUITECTURA IBERIA (SPAIN); IDS GEORADAR (ITALY); INST AUSTRIAN TECH (AUSTRIA); INTS TECH ROYAL KTH (SWEDEN); NOBATEK INEF 4 (FRANCE); OCHSNER WARMEPUMPEN (AUSTRIA); **R2M SOLUTION (ITALY)**; SIART (ITALY); UNIV NATL GALWAY IRELAND (IRELAND); UNIV PERUGIA (ITALY); UNIV TECH LULEA (SWEDEN); UPONOR (FINLAND) et al - GEOFIT is an integrated industrially driven action aimed at deployment of cost effective enhanced geothermal systems (EGS) on energy efficient building retrofitting. This entails the development of innovative EGS and its components, namely, non-standard heat exchanger configurations, a novel hybrid heat pump and electrically driven compression heat pump systems...

**2018 - ANR CLEARVIEW** [\[source\]](#) **Doing tomography differently building the imaging tools of tomorrow** CNRS CORSE (FRANCE); CNRS TOULOUSE (FRANCE); INST IANS APPLIED ANALYSIS NUMERICAL SIMULATION IANS - Abstract Imaging what is inaccessible to direct observation, based on elastic waves, is a major issue with a wide range of applications of high societal and economic impact. In this project we aim at drastically improving the resolution of seismic tomography to produce enhanced finely-resolved images in a domain with such high societal and economic interest: regional seismological tomography at unprecedented resolution, in particular for...



## AGENDA DU POLE AVENIA ET DE SES PARTENAIRES

Date	Événements	Lieu
13-14 Février 2019	<b>FORAGES PROFONDS EN FRANCE : 30 ANS DE RÉSULTATS</b> , colloque organisé par la SGF en partenariat avec le BRGM et l'ANDRA	Paris, France
9-10 Avril 2019	<b>3rd AAPG/IGA HYDROCARBON-GEOHERMAL CROSSOVER WORKSHOP</b>	Genève, Suisse
3-6 Juin 2019	<b>81ST EAGE CONFERENCE &amp; EXHIBITION 2019</b> - Embrace Change : Creativity for the Future. POLE AVENIA organise une session dédiée aux start-ups en geoscience et aux environnements propices à l'innovation	Londres, Royaume-Uni
11-14 Juin 2019	<b>EUROPEAN GEOHERMAL CONGRESS (EGC) 2019</b> , organisé par l' <b>EGEC</b>	La Haye, Pays-Bas
25-26 Juin 2019	<b>GEOENERGY DAYS 2019</b> – Exhibits, B2B & conferences. Manifestation phare & internationale du POLE AVENIA sur l'innovation dans les géosciences et en ingénierie du sous-sol, toutes industries considérées. Pays invité 2019: le Sénégal	Palais Beaumont PAU, France
6-8 Novembre 2019	<b>IGC TURKEY 2019</b> - 4th International Geothermal Energy Congress & Exhibition. Le POLE AVENIA emmènera une délégation de PME membres dans le cadre du projet GEO-ENERGY EUROPE (annonces à venir dans l'année)	Izmir, Turquie
21-22 Nov. 2019 (à confirmer)	5 <sup>ème</sup> édition des <b>24H DE L'INNOVATION AU CENTRE DE LA TERRE</b> , défi étudiant organisé par le POLE AVENIA sur des sujets industriels apportés par les membres	Pau, France

### Communication du POLE AVENIA

**SAVE THE DATE**  
**GEOENERGY DAYS 2019**  
25 – 27 JUIN 2019, PAU – France

SALON – RENDEZ-VOUS B2B – CONFÉRENCES – BUSINESS TOURS



PAYS INVITÉ D'HONNEUR 2019 :  **LE SÉNÉGAL**

**GRAND RDV DE L'INNOVATION DANS LES FILIÈRES DU SOUS-SOL**



◆ 2 jours de rencontres B2B, conférences & ateliers  
◆ 1 jour de visites d'entreprises locales

GEOENERGY DAYS est le seul événement international en France qui offre des opportunités pour développer l'innovation et le business, partager des compétences et initier des partenariats dans les industries du sous-sol:

- Pétrole et Gaz
- Géothermie profonde
- Stockage géologique
- Mines et carrières
- Hydrogéologie
- Géotechnique

ORGANISÉ PAR:  **POLE AVENIA**

MEMBRE DE: 

**CONVENTION INTERNATIONALE SUR L'INNOVATION POUR TOUS LES PROFESSIONNELS (PME, ENTREPRISES, ORGANISMES DE RECHERCHES ET FORMATIONS, ORGANISMES PUBLICS, AUTORITÉS LOCALES...) DES FILIÈRES DU SOUS-SOL**

**SUJETS**

- Géoinformatique & Géomatique
- Géophysique & Géomodélisme
- Forage & équipement de puits
- Gestion de réservoir
- Exploitation minière
- Enregistrement et surveillance
- Efficacité énergétique
- Optimisation des installations
- Développement de logiciels
- Sécurité & services environnementaux
- Formation spécialisée et ressources humaines
- Gestion de l'eau
- Estimation ressources & réserves

**PAYS INVITÉ D'HONNEUR:**  
Sénégal

**Pays attendus :**

- Algérie
- Azerbaïdjan
- Belgique
- Allemagne
- Hongrie
- Iran
- Islande
- Mexique
- Mauritanie
- Nigeria
- Norvège
- Oman
- Russie
- Espagne
- Turquie
- USA
- Brésil
- Suisse
- Etc.

**PARTICIPANTS**



**ÉDITION 2018**

 **350+ participants**

 **1000+ B2B meetings**

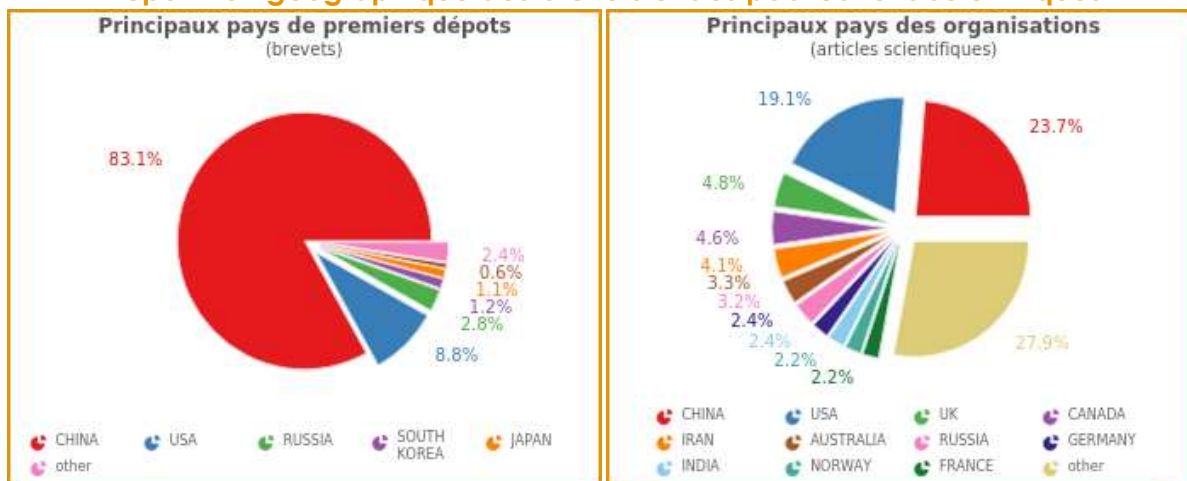
 **21 Pays**

[www.geoenergydays.com](http://www.geoenergydays.com) / [geoenergydays@pole-avenia.com](mailto:geoenergydays@pole-avenia.com)

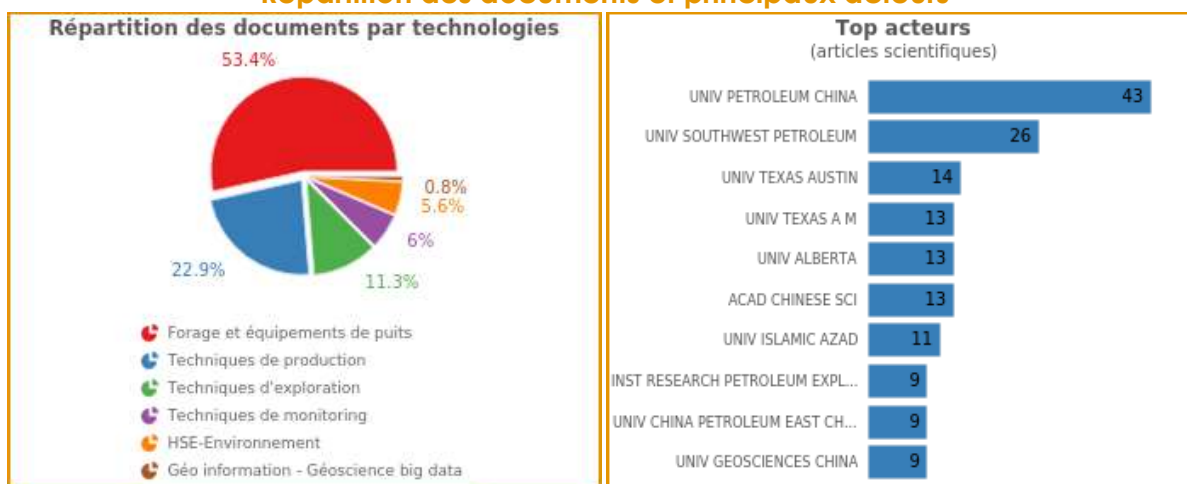


## TABLEAUX DE BORD DE L'ACTIVITÉ SCIENTIFIQUE ET TECHNIQUE

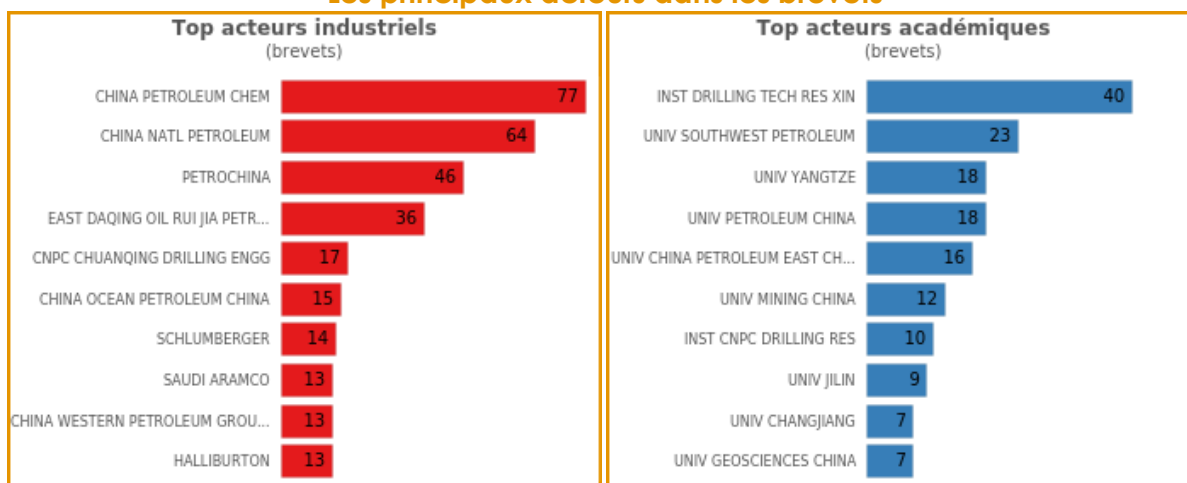
### Répartition géographique des brevets et des publications scientifiques



### Répartition des documents et principaux acteurs



### Les principaux acteurs dans les brevets







## LES BREVETS

### Géo information - Géoscience big data

**27/07/2018 - [CN108333598](#) A GEOLOGICAL DISASTER MONITORING SYSTEM** - GUANGZHOU CHINA REACHES LOCATION TECH (CHINA) - The invention claims a geological disaster monitor system comprises monitoring station terrace server and user terminal; Monitoring station the monitoring data to platform server; Platform server of each monitoring station is transmitting the monitoring data carrying out centralized computer system design and filtering and generating warning information;

### Techniques d'exploration

**05/07/2018 - [WO2018125167](#) GEOPHONE DEPTH CALIBRATION** - HALLIBURTON (USA) - A method and system for processing a slowness profile. A method may comprise disposing a geophone array into a borehole, positioning the geophone array at a first location within the borehole.

**05/07/2018 - [US2018188409](#) SYSTEMS AND METHODS FOR MONITORING RADIATION IN WELL LOGGING** - SCHLUMBERGER (FRANCE) - A downhole tool includes a radiation generator configured to output radiation using electrical power received from a power supply.

**10/07/2018 - [CN207598232](#) A LOGGING WHILE DRILLING SMALL SIGNAL CONDITIONING CIRCUIT SYSTEM** - INSTRUMENT BELL JR WEI SUZHOU - This utility model claims drilling well logging field the invention claims a logging while drilling small signal conditioning circuit system.

**10/07/2018 - [CN108267784](#) A SEISMIC SIGNAL STOCHASTIC NOISE SUPPRESSING TREATMENT** - GUOWANG JIANGXI ELECTRIC POWER; NATL ELECTRIC NETWORK (CHINA); STATE GRID (CHINA) - A seismic signal stochastic noise suppressing treatment method.

**31/07/2018 - [CN108343427](#) LOGGING WHILE DRILLING INSTRUMENT CORE SHAFT** - HANGZHOU FENGHE PETROLEUM SCIENCE TECH - The invention claims a logging while drilling instrument it comprises core shaft: Core shaft the main body has liquid inlet and outlet of the metal flow passage tube and clamping element core shaft main body is set on the containing groove of metal flow passage tube is set in the containing groove.

**17/08/2018 - [CN108412481](#) ULTRASONIC DOPPLER MULTIPHASE FLOW IS FLOW OF WELL MEASURING DATA INTERPRETATION METHOD AND DEVICE FOR** - CHINA NATL PETROLEUM (CHINA); DAGANG OILFIELD GROUP (CHINA); PETROCHINA (CHINA) - The invention claims ultrasonic doppler multiphase flow is flow of well measuring data the method of explaining claims well logging information explain field.

**22/08/2018 - [RO132778](#) COMPUTER-IMPLEMENTED METHOD FOR UNITARY CONFIGURATION AND DESIGN OF FLOW-METERS AND FLOW-METER COMBINATIONS** - MOTIT HORIA MIHAI (ROMANIA) - The invention relates to a computer-implemented method for unitary configuring and designing flow-meters and flow-meter combinations meant for both closed pipes and open channels.

### Forage et équipements de puits

**03/07/2018 - [CN108238955](#) A WATER BASE DRILLING FLUID BY ION LIQUID INHIBITOR PREPARATION AND APPLICATION METHOD** - CHINA PETROLEUM CHEM (CHINA); INST DRILLING TECH RES XIN (CHINA) - The invention claims a water base drilling fluid by ion liquid inhibitor preparation and application method.

**04/07/2018 - [EP3342842](#) DEWAXING AND DEAROMATING PROCESS OF HYDROCARBON IN A SLURRY REACTOR** - TOTAL (FRANCE) - The invention is a process for the production of a hydrocarbon fluid comprising the step of catalytically hydrogenating a hydrocarbon cut in presence of both a dearomatization catalyst and a dewaxing catalyst in a single slurry reactor.

**05/07/2018 - [US2018187492](#) DRILLING BOTTOM HOLE ASSEMBLY FOR LOSS CIRCULATION MITIGATION** - SAUDI ARAMCO (SAUDI ARABIA) - A drilling bottom hole assembly for loss circulation mitigation includes a drill bit configured to drill a wellbore in a formation.



**12/07/2018 - [US2018195359](#) TENSION CUTTING CASING AND WELLHEAD RETRIEVAL SYSTEM** - WEATHERFORD TECH (USA) - An apparatus for use in a well includes a tubular mandrel configured to connect to a downhole assembly. An outer hub is configured to attach to a wellhead and has a bore therethrough.

**12/07/2018 - [WO2018128636](#) DISSOLVABLE CONNECTOR FOR DOWNHOLE APPLICATION** - HALLIBURTON (USA) - A dissolvable connector allows a wireline or similar conveyance to be detached from a downhole tool or device based on conditions in a downhole environment instead of an external action, such as application of tension or an electrical pulse.

**12/07/2018 - [CA2954193](#) METHOD AND SYSTEM FOR CONTROLLING STROKE LENGTH AND STROKE SPEED IN A CONVENTIONAL PUMP JACK** - HASELOH PETER G (CANADA) - A method and system for determining the exact relative position of a conventional beam style pump jack for the purpose of controlling stroke length and stroke speed, without changing the main mechanical characteristics of the pump jack.

**13/07/2018 - [CN108276512](#) A TEMPERATURE SENSITIVE POLYMER AND PREPARATION METHOD THEREOF** - UNIV PETROLEUM CHINA (CHINA) - This invention claims a method for preparing through controlling reacting temperature and polymerization reaction of the solution ph value of salt concentration.

**19/07/2018 - [US2018201826](#) SYNERGISTIC CORROSION INHIBITORS** - BAKER HUGHES (USA) - where z is an integer ranging from 1 to 100; and where a lower amount of the corrosion inhibitor additive is used to achieve the same or better results in inhibiting the corrosion of the metal surface as compared to an otherwise identical method for inhibiting corrosion absent the corrosion inhibitor additive.

**19/07/2018 - [CA2987832](#) DRILL BIT HAVING SHEAR CUTTERS WITH REDUCED DIAMETER SUBSTRATE** - VAREL INT IND LP - A bit for drilling a wellbore, includes: a bit body; and a cutting face having an inner cone section and an outer shoulder section.

**19/07/2018 - [US2018202906](#) OIL-BASED MUD DRILL CUTTING CLEANING FOR INFRARED SPECTROSCOPY** - SCHLUMBERGER (FRANCE) - Oil-based mud cuttings are cleaned of drilling fluid and mud additives. After sorting and rinsing the cuttings with diesel, the cuttings are put in a syringe, which is repeatedly filled and emptied of diesel.

**26/07/2018 - [US2018209232](#) WHIPSTOCK/BOTTOM HOLE ASSEMBLY ARRANGEMENT AND METHOD** - BAKER HUGHES (USA) - A whipstock/bottom hole assembly (BHA) arrangement including a whipstock, a BHA, an interconnection arrangement releasably securing the whipstock to the BHA, a fluid flow configuration in the BHA, the configuration directed at the interconnection arrangement.

**31/07/2018 - [US10036219](#) SYSTEMS AND METHODS FOR WELL CONTROL USING PRESSURE PREDICTION** - CHEVRON (USA) - Disclosed are systems and methods for predicting a stabilized pressure in a wellbore of a well after an undesired influx of formation fluids, i.e., a kick, into the wellbore in a real-time drilling operation.

**31/07/2018 - [CN108341609](#) FOAMING AGENT COMPOSITION AND POLYURETHANE FOAM PLASTIC CEMENT SLURRY AND PREPARATION METHOD THEREOF** - UNIV PETROLEUM CHINA (CHINA) - The invention claims a petroleum and natural gas well cementing engineering field specifically.

**02/08/2018 - [FR3062178](#) PUMP A BARREL WITH OSCILLATING PLATE** - IFP ENERGIES NOUVELLES (FRANCE) - The present invention relates to a pump barrel with the oscillating plate, for which the angle of inclination of the rotary plate with respect to the drive shaft is adjustable by means of a swivel pin.

**02/08/2018 - [US2018216454](#) METHOD AND APPARATUS FOR DETERMINING THE PERMEABILITY OF A FRACTURE IN A HYDROCARBON RESERVOIR** - GEOLOG (ITALY) - A method for determining the permeability of a fractured zone in the subsurface, wherein at least one well is being drilled and at least said fractured zone is encountered.

**09/08/2018 - [US2018223622](#) WELLBORE CEMENT MANAGEMENT SYSTEM** - NEODRILL - A well cement management system includes a well support base for urging below a bottom of a body of water, a wellbore tubular component disposed through the well support base.

**09/08/2018 - [JP2018123279](#) DEGRADATION INHIBITOR FOR DRILLING MUD AND DETERIORATION SUPPRESSION METHOD** - KURITA WATER IND; OBAYASHI (JAPAN); OHBAYASHI (JAPAN) - To provide an agent for suppressing deterioration of





drilling mud which suppresses hydration swelling of mixed clay by addition to drilling mud and suppresses rise in viscosity and reduction in specific gravity of the drilling mud, and use thereof.

**10/08/2018 - [IN201724028109](#) DURABLE ROCK BIT FOR BLAST HOLE DRILLING** - VAREL INT IND LP - A rock bit for blast hole drilling includes: a bit body having a coupling formed at an upper end thereof, a plurality of lower legs, a dome formed between the legs, and a bore formed through the coupling and the dome.

**10/08/2018 - [FR3062737](#)** - SCHLUMBERGER (FRANCE) - A method, a device, and a product of the program carry out an evaluation of the field of oil in part by the construction of a network of nodes interconnected representing various active ingredients of oil fields, as well as at the time of the attributes petro.

**16/08/2018 - [NL1042686](#) PACKER SEALING ELEMENT WITH NON-SWELLING LAYER** - HALLIBURTON (USA) - Example apparatuses and methods are described for providing a swell packer apparatus having a vulcanized non-swelling outer layer with a pattern cut into it to expose an inner swellable sealing element.

**22/08/2018 - [EP3363876](#) PROCESS FOR THE CLEANING OF OIL AND GAS WELLBORES** - LAMBERTI (ITALY) - Cleaning composition for use in cleaning wellbore walls, tubing or casing.

**23/08/2018 - [US2018239051](#) SCINTILLATING GAMMA RAY SPECTROMETER AND ITS USE IN MUD LOGGING SYSTEM** - SHELL (NETHERLANDS) - A gamma ray scintillation spectrometer is disclosed in which an inorganic scintillation crystal has a channel extending therethrough for receiving a sample into, and disposing a sample out of, the scintillation crystal.

**23/08/2018 - [US2018238162](#) METHOD AND APPARATUS FOR AUTOMATED DRILLING RIG SHEAVE FRICTION CALIBRATION** - SCHLUMBERGER (FRANCE) - A method and autodriller for monitoring hookload in a well drilling system that measures raw hookload; determines a velocity of a travelling block.

**24/08/2018 - [CN108442882](#) TWO-DIMENSIONAL SEISMIC DATA WITH THE SHALE BIG DISPLACEMENT HORIZONTAL WELL DRILLING GEOLOGY** - CHINA PETROLEUM CHEM (CHINA); CTR GEOLOGY INVESTIGATION BUREAU WUHAN GEOLOGICAL SURVEY CHINA (CHINA) - The invention claims a based on two-dimensional seismic data with the shale big displacement horizontal well drilling geology guide.

**30/08/2018 - [WO2018156527](#) WELLSITE KEROGEN MATURITY DETERMINATION UTILIZING RAMAN SPECTROSCOPY** - SCHLUMBERGER (CANADA) - A method for determining thermal maturity of a formation sample.

## Techniques de production

**09/07/2018 - [RU2660683](#) METHOD OF DEVELOPING LOW-PERMEABILITY OIL FIELDS BASED ON THE USE OF HORIZONTAL WELLS WITH LONGITUDINAL FRACTURES OF HYDRAULIC FRACTURING** - AKTIONERNOE OBSHCHESTVO ROSSIJSKAYA INNOVATIONNAYA TOPLIVNO ENERGETICHESKAYA KOMPANIYA AO RITEK (RUSSIA) - FIELD: oil and gas industry. SUBSTANCE: invention relates to oil industry and can be applied to development of purely oil fields with low permeability of the petroleum rock.

**12/07/2018 - [WO2018129136](#) RESERVOIR STIMULATION COMPRISING HYDRAULIC FRACTURING THROUGH EXTENDED TUNNELS** - SCHLUMBERGER (CANADA) - A technique facilitates hydrocarbon fluid production. A well is formed in a subterranean region by drilling a borehole, e.g. a generally vertical wellbore.

**26/07/2018 - [FR3061909](#) METHOD FOR ENHANCED RECOVERY OF OIL BY INJECTION OF AN AQUEOUS COMPOSITION CONTAINING POLYMERIC MICROGELS** - POWELTEC (FRANCE); SNF (FRANCE) - The present invention relates to a method of enhanced oil recovery by scanning a subterranean formation comprising injecting into the subterranean formation an aqueous composition comprising microgels comprising at least one crosslinked polymer.

**26/07/2018 - [WO2018136050](#) DETERMINING FLUID ALLOCATION IN A WELL WITH A DISTRIBUTED TEMPERATURE SENSING SYSTEM USING DATA FROM A DISTRIBUTED ACOUSTIC SENSING SYSTEM** - HALLIBURTON (USA) - Fluid allocation in a well can be determined with a distributed temperature sensing system using data from a distributed acoustic sensing system. Flow data indicating a flow rate of a fluid through a perforation in a well based on an acoustic signal generated during a hydraulic fracturing operation in the well can be received.



**26/07/2018** - [US2018209256](#) **Y-GRADE NGL STEAM ASSISTED GRAVITY DRAINAGE** - LINDE (GERMANY) - A method of recovering hydrocarbons from a (non-bitumen) heavy crude oil bearing reservoir with structural relief uses the combination of Y-Grade NGL and steam assisted gravity drainage.

**09/08/2018** - [US2018223177](#) **NANOPARTICLE-ENHANCED RESIN COATED FRAC SAND COMPOSITION** - SAUDI ARAMCO (SAUDI ARABIA) - A nanoparticle-resin coated frac sand composition is provided. The nanoparticle-resin coated frac sand composition includes a silica sand, an epoxy resin, methanol, a hardener, and nanoparticles.

**16/08/2018** - [WO2018146107](#) **SURFACTANT FOR ENHANCED OIL RECOVERY** - TOTAL (FRANCE) - The invention relates to a method of extracting hydrocarbons from a subterranean formation, comprising: – injecting a surfactant composition into the subterranean formation, and – collecting hydrocarbons displaced by the injected surfactant composition.

**16/08/2018** - [WO2018147756](#) **METHOD OF REPEAT HYDRAULIC FRACTURING IN A HORIZONTAL WELL** - SCHLUMBERGER (CANADA); SHLUMBERGER TECH (NETHERLANDS) - A method of repeat hydraulic fracturing in a horizontal well can comprise: creating a geometric model for assessing the level of stress in a formation.

### Techniques de monitoring

**12/07/2018** - [WO2018128558](#) **A METHOD AND A SYSTEM FOR MANAGING A SUBTERRANEAN FLUID RESERVOIR PERFORMANCE** - SCHLUMBERGER (CANADA) - Reservoir data obtained from a plurality of fluid reservoirs and comprising dependencies of a composition of a fluid produced from a reservoir on time or on a reservoir pressure or both and at least one parameter characterizing a pore space of the reservoir formation are stored in a training database in a memory storage.

**20/07/2018** - [CN108303732](#) **AN ARTIFICIAL EARTHQUAKE WAVE AUTOMATIC MONITORING SYSTEM** - UNIV GEOSCIENCE WUHAN CHINA (CHINA) - The invention claims an artificial earthquake wave automatic monitoring system comprises three components detector synchronous communication device signal line and main machine.

**26/07/2018** - [RU2662466](#) **UNDERGROUND PIPELINE SECTION CORROSIVE STATE EVALUATION METHOD BASED ON THE CORROSION SURVEYS AND IN-PIPE DIAGNOSTICS DATA** - PUBLICHNOE AKTSIONERNOE OBSHCHESTVO TRANSNEFT PAO TRANSNEFT (RUSSIA) - FIELD: fault detection.SUBSTANCE: use for the underground pipeline section corrosion condition evaluation.

**14/08/2018** - [CN108398719](#) **EARTHQUAKE WAVE DATA PROCESSING METHOD AND DEVICE FOR** - BGP (CHINA); CHINA NATL PETROLEUM (CHINA); UNIV USTC SCIENCE TECH (CHINA) - The invention claims an earthquake wave data processing method and corresponding device for the common field for earthquake wave data is converted into the offset of the earthquake wave data then the common offset earthquake wave data processing.

### HSE-Environnement

**12/07/2018** - [CA2990897](#) **WELLHEAD ASSEMBLY WITH INTEGRATED TUBING ROTATOR** - OIL LIFT TECH (CANADA) - Embodiments of a wellhead assembly have a tubular body with a removable bottom cap to house a tubing rotator comprising a multi-enveloping worm gear assembly which provides sufficient torque to rotate tubing strings in deep and/or deviated wellbores.

**23/08/2018** - [US2018238467](#) **SYSTEM AND METHODS FOR OPERATION OF A BLOWOUT PREVENTOR SYSTEM** - GENERAL ELECTRIC (USA) - A leak identification system for a blowout preventer (BOP) system is provided. The leak identification system includes a plurality of sensors configured to monitor one or more conditions of the BOP system and a leak detection computer device.



## LES PUBLICATIONS SCIENTIFIQUES

### Géo information - Géoscience big data

[Efficient big data assimilation through sparse representation: A 3D benchmark case study in petroleum engineering](#) - **2018 - PLoS ONE** - INST INTERNATIONAL RESEARCH STAVANGER IRIS (NORWAY); UNIV BERGEN (NORWAY) - Data assimilation is an important discipline in geosciences that aims to combine the information contents from both prior geophysical models and observational data (observations) to obtain improved model estimates.

### Techniques d'exploration

[An algorithm for fast elastic wave simulation using a vectorized finite difference operator](#) - **2018 - Computers and Geosciences** - ACSIR NGRI (INDIA); INST CSIR NATL GEOPHYSICAL RESEARCH (INDIA) - Modern geophysical imaging techniques exploit the full wavefield information which can be simulated numerically.

[High-resolution multi-component distributed acoustic sensing](#) - **2018 - Geophysical Prospecting** - SCHOOL COLORADO MINES (USA) - Distributed acoustic sensing uses an optical fibre together with an interrogator unit to perform strain measurements. The usage of distributed acoustic sensing in geophysics is attractive due to its dense spatial sampling and low operation cost if the optical fibre is freely accessible.

[Variational Bayesian inversion \(VBI\) of quasi-localized seismic attributes for the spatial distribution of geological facies](#) - **2018 - Geophysical Journal International** - UNIV EDINBURGH (UK) - We introduce a new Bayesian inversion method that estimates the spatial distribution of geological facies from attributes of seismic data, by showing how the usual probabilistic inverse problem can be solved using an optimization framework while still providing full probabilistic results.

[Measurements of complex resistivity spectrum for formation evaluation](#) - **2018 - Measurement: Journal of the International Measurement Confederation** - UNIV PETROLEUM CHINA (CHINA) - Low resistivity reservoirs, which are important oil reservoirs with considerable productivity, cannot be easily identified through traditional electrical logging methods. In this paper, we introduced a new logging method for effective identification of low resistivity reservoirs.

[Numerical Modeling of 3D Hydraulic Fractures Interaction in Complex Naturally Fractured Formations](#) - **2018 - Rock Mechanics and Rock Engineering** - SCHLUMBERGER (USA) - The unconventional fracture model can simulate complex fracture network propagation in a formation with pre-existing natural fractures. The interaction between hydraulic fracture branches, or stress shadowing effect, could be modeled by 2D or 3D displacement discontinuity method (DDM).

### Forage et équipements de puits

[Hard rock cutting with high pressure jets in various ambient pressure regimes](#) - **2018 - International Journal of Rock Mechanics and Mining Sciences** - BESTEC (GERMANY); MONTANUNIVERSITAT LOBEN (AUSTRIA); RAG ENERGY DRILLING (AUSTRIA) - An alternative drilling technology has been developed, in which ultra-high pressure jetting with in excess of 2500 bar jet pressure is combined with mechanical drilling techniques.

[A new method of multi-scale fracture identification in tight gas sandstone reservoir](#) - **2018 - Geosystem Engineering** - CHANGQING OILFIELD (CHINA); PETROCHINA (CHINA); UNIV YANGTZE (CHINA) - Identification of fractures is an important guide for the selection of well location as well as improvement of single-well recovery.

[Impact of drilling mud on chemistry and microbiology of an Upper Triassic groundwater after drilling and testing an exploration well for aquifer thermal energy storage in Berlin \(Germany\)](#) - **2018 - Environmental Earth Sciences** - CTR GFZ GERMAN RESEARCH FOR GEOSCIENCES (GERMANY); CTR HELMHOLTZ (GERMANY); UNIV TECHNISCHE BERLIN (GERMANY) - After completion of an exploration well, sandstones of the Exter Formation were hydraulically tested to determine the hydraulic properties and to evaluate chemical and microbial processes caused by drilling and water production.





[Geothermal energy as a cause of anthropogenic natural hazards. Possibilities for sustainable development of this technology - 2018 - Geographische Rundschau](#) - DEPT STADT UMWELTSOZIOLOGIE (GERMANY) - Geothermal energy has for long been used by humans for cooking, bathing and heating. Today this source of energy is considered as environmentally friendly, renewable and available all year round at (nearly) any place in the world.

[Modeling of wave propagation in drilling fluid - 2018 - Journal of Offshore Mechanics and Arctic Engineering](#) - UNIV AKRON (USA); WEATHERFORD INTERNATIONAL (USA) - The study presents a one-dimensional (1D) numerical model of wave propagation as well as transmission/reflection phenomena in Newtonian and non-Newtonian drilling mud flow associated with oil/gas drilling activities.

[Study of carbonation in a class G Portland cement matrix at supercritical and saturated environments - 2018 - Construction and Building Materials](#) - UNIV FED RIO GRANDE DO NORTE (BRAZIL) - The carbon dioxide (CO<sub>2</sub>) is a chemical compound that can be present at subsurface, inside the porous of reservoir rocks containing oil or natural gas, dissolved or free.

[A novel method to investigate cement-casing bonding using digital image correlation - 2018 - Journal of Petroleum Science and Engineering](#) - UNIV LOUISIANA LAFAYETTE (USA); UNIV OKLAHOMA (USA) - The main focus of current industry practices on the cementing of oil and gas wells is short-term cement-design goals such as high strength, adequate pumpability and proper placement of cement in the wellbore.

[Review of biodegradable synthetic-based drilling fluid: Progression, performance and future prospect - 2018 - Renewable and Sustainable Energy Reviews](#) - UNIV MALAYA (MALAYSIA); UNIV PUTRA MALAYSIA (MALAYSIA) - This paper provides a comprehensive review on ester based drilling fluid (EBDF). It is no secret that esters with biodegradability and bioaccumulation attributes are among the promising alternatives to synthetic base oil in drilling fluids.

[Fired-siltstone based geopolymers for CO<sub>2</sub> sequestration wells : A study on the effect of curing temperature - 2018 - MERCon 2018 - 4th International Multidisciplinary Moratuwa Engineering Research Conference](#) - UNIV MONASH (AUSTRALIA); UNIV MORATUWA (SRI LANKA) - Wellbore integrity during Carbon Dioxide (CO<sub>2</sub>) storage in deep aquifers is a major problem as the currently used well cement will lose its integrity at higher temperatures and eventually leads to CO<sub>2</sub> leakage into the atmosphere.

## Techniques de production

[Electrical Double-Layer Expansion Impact on the Oil-Quartz Adhesion for High- and Low-Salinity Brines - 2018 - Energy and Fuels](#) - CNRS PAU (FRANCE); CTR SCIENTIFIQUE TECHNIQUE JEAN FEGER CSTJF (FRANCE); TOTAL (FRANCE); UNIV PAU PAYS ADOUR (FRANCE) - Expanding the electrical double layer of minerals through low-salinity brine injection has been suggested as a possible enhanced oil recovery mechanism.

[Building a 3D faulted a priori model for stratigraphic inversion: Illustration of a new methodology applied on a North Sea field case study - 2018 - Journal of Applied Geophysics](#) - GEOSIRIS (FRANCE); IFP ENERGIES NOUVELLES (FRANCE) - Accurate reservoir characterization is needed all along the development of an oil and gas field study. It helps building 3D numerical reservoir simulation models for estimating the original oil and gas volumes in place and for simulating fluid flow behaviors.

[Maximum Magnitude Forecast in Hydraulic Stimulation Based on Clustering and Size Distribution of Early Microseismicity - 2018 - Geophysical Research Letters](#) - INST GEOLOGICAL (SWITZERLAND); SERVICE SWISS SEISMOLOGICAL SED (SWITZERLAND); UNIV NEUCHATEL (SWITZERLAND) - We interpreted the spatial clustering and size distribution of induced microseismicity observed during the stimulation of an enhanced geothermal system beneath Basel by comparison with scale-invariant synthetic data derived from discrete fracture network models.

[Halogenation Chemistry of Hydraulic Fracturing Additives under Highly Saline Simulated Subsurface Conditions - 2018 - Environmental Science and Technology](#) - MIT (USA); UNIV YALE (USA) - Unconventional natural gas extraction via hydraulic fracturing coupled with horizontal drilling (HDHF) has generated disruptive growth in the domestic energy sector.

[Experimental study of directional propagation of hydraulic fracture guided by multi-radial slim holes - 2018 - Journal of Petroleum Science and Engineering](#) - MIT (USA); UNIV PETROLEUM CHINA (CHINA); UNIV SOUTHWEST PETROLEUM



(CHINA) - The conventional hydraulic fracturing fails in the target oil/gas zone (remaining oil, closed reservoir, etc.) which is not located in the azimuth of maximum horizontal stress of available wellbores.

[Advances in CO2 utilization technology: A patent landscape review - 2018 - Journal of CO2 Utilization](#) - PETRONAS RESEARCH SDN BHD (CHINA); UNIV TECH (GERMANY); UNIV TENAGA NASIONAL (MALAYSIA) - There is rising concern on the increasing trend of global warming due to anthropogenic CO2 emission which steers progress of carbon capture and storage (CCS) projects worldwide. However, due to high cost and uncertainties in long term geological storage.

[Molecular dynamics study of interfacial properties in CO2 enhanced oil recovery - 2018 - Fluid Phase Equilibria](#) - UNIV HUAZHONG SCIENCE TECH (CHINA) - CO2 enhanced oil recovery (EOR) is a promising technique for carbon capture, utilization and storage (CCUS). Owing to the abundant distribution of nanostructure in unconventional oil reservoirs, the investigation on the interfacial properties of the CO2 and oil system in nanopores is still lacking as well as the corresponding mechanism of displacement of oil by injecting CO2 in CO2 EOR.

[Surface charge effect of nanogel on emulsification of oil in water for fossil energy recovery - 2018 - Fuel](#) - UNIV MISSOURI SCIENCE TECH (USA) - Crosslinked polymeric hydrogels in nano-size, termed as nanogels, have significant technological applications by stabilizing Pickering emulsion. Herein, we present our experimental observations and the results of the emulsion stability analysis on the effects of nanogel concentration, oil-to-water ratio, nanogel charge, and ambient temperature.

[Extended poromechanics for adsorption-induced swelling prediction in double porosity media: Modeling and experimental validation on activated carbon - 2018 - International Journal of Solids and Structures](#) - UNIV PAU & PAYS ADOUR (FRANCE) - Natural and synthesised porous media are generally composed of a double porosity: a microporosity where the fluid is trapped as an adsorbed phase and a meso or a macro porosity required to ensure the transport of fluids to and from the smaller pores.

[Role of Kaolinite Clay Minerals in Enhanced Oil Recovery by Low Salinity Water Injection - 2018 - Energy and Fuels](#) - UNIV STAVANGER (NORWAY) - Both laboratory studies and field observations have confirmed increased oil recovery by low salinity water injection beyond that obtained by standard water injection. Whether extra oil is produced or not depends on certain reservoir conditions, and among them is the content of clay minerals.

[The Role of Fe-Bearing Phyllosilicates in DTPMP Degradation under High-Temperature and High-Pressure Conditions - 2018 - Environmental Science and Technology](#) - UNIV WASHINGTON ST LOUIS (USA) - To ensure safer and more efficient unconventional oil/gas recovery and other energy-related subsurface operations, it is important to understand the effects of abundant Fe-bearing phyllosilicates on the degradation of phosphonates, which are applied to inhibit scale formation.

## Techniques de monitoring

[Vertical seismic profiling using a daisy-chained deployment of fibre-optic cables in four wells simultaneously – Case study at the Ketzin carbon dioxide storage site - 2018 - Geophysical Prospecting](#) - CTR HELMHOLTZ (GERMANY); INST BAW FED WATERWAYS ENGINEERING RESEARCH (GERMANY) - The geological storage of carbon dioxide is considered as one of the measures to reduce greenhouse gas emissions and to mitigate global warming.

[Is CO2 injection at Aquistore aseismic? A combined seismological and geomechanical study of early injection operations - 2018 - International Journal of Greenhouse Gas Control](#) - GEOLOGICAL SURVEY CANADA (CANADA); UNIV ALBERTA (CANADA); UNIV BRISTOL (UK); UNIV LEEDS (UK); UNIV SASKATCHEWAN (CANADA) - Fluid injection is known to induce seismic events if the injection causes fracturing of the surrounding rock or if resulting pressure changes reactivate pre-existing faults and fractures.

[Common-focus point-based target-oriented imaging approach for continuous seismic reservoir monitoring - 2018 - Geophysics](#) - SAUDI ARAMCO (SAUDI ARABIA) - The ideal approach for continuous reservoir monitoring allows generation of fast and accurate images to cope with the massive data sets acquired for such a task. Conventionally, rigorous depth-oriented velocity-estimation methods are performed to produce sufficiently accurate velocity models.