GEOSCOPIE
La plateforme d'intelligence économique pour les géosciences

POLEAVENIA Geosciences Innovation Valley

Avec TKM TECKNOWMETRIX

BULLETIN DE VEILLE GEOSCOPIE n°45 – Octobre 2016

Edito

Bonjour à toutes et à tous,

Voici l'édition 45 du bulletin de veille Géoscopie dans laquelle vous découvrirez les actualités et une sélection de brevets et publications scientifiques des deux derniers mois sur les axes marchés et thématiques technologiques du POLE AVENIA.

Ce bulletin met un accent particulier sur la géothermie profonde, en raison d'une actualité plutôt riche ces derniers mois (Congrès de la géothermie 2016 AFPG&EGEC, mise en production industrielle de Soulz-sous-Forêt, mise en production de la centrale de Rittershoffen …).

Il s'agit cependant d'une tendance de fond observée au fil du temps dans la base Géoscopie : de plus en plus de publications et d'actualités concernent le monde de la géothermie profonde. Ainsi le nombre d'articles / brevets reliés à cette thématique est proche de 250 pour les deux derniers mois écoulés soit le double par rapport aux deux premiers mois de l'année. Sommes-nous (enfin) arrivés à maturation sur des projets initiés il y a quelques temps ou sommes-nous face à un réel bouleversement ?

L'avenir nous le dira !

Bonne lecture à toutes et à tous !

SOMMAIRE DU BULLETIN DE VEILLE GEOSCOPIE N°45

ACTUALITES

Les Géosciences en France

23/09/2016 - Développement de la filière Géothermie en Aquitaine : mise en place d'un animateur régional [source]
L'Aquitaine bénéficie de ressources géothermales importantes, qu'elles soient superficielles (de 10 à 200 m de profondeur), profondes (au-delà de 1000 m) ou intermédiaires (de 200 à 1000 m de profondeur). Actuellement, malgré ces atouts, l'utilisation de l'énergie géothermique en Aquitaine n'est pas à la hauteur de ses potentialités. La filière aquitaine est en effet insuffisamment structurée et représentée.

23/09/2016 – Le groupe ES Géothermie inaugure la mise en production du site géothermique de Soultz-sous-Forêts :[source]
Le Groupe ÉS (Electricité de Strasbourg), filiale d' EDF, a inauguré officiellement vendredi 23 septembre, la mise en production industrielle du site géothermique de Soultz-sous-Forêts, pionnier mondial de la géothermie profonde. Cette nouvelle installation dotée de la technologie EGS, offre une production de chaleur et d'électricité propre.

Marché de la géothermie

23/09/2016 - The new board of the European Geothermal Energy Council was elected at the European Geothermal : [source]
The new board of the European Geothermal Energy Council was elected at the European Geothermal Congress yesterday. The new board is comprised of: President: Ruggero Bertani (ENEL Green Power) Vice President: Miklos Antics (GPC IP) Vice president: Javier Urchueguia (Energesis) Treasurer: Attila Kujbus (Geothermal Express) Board Member: Marco Baresi (Turboden) Board Member: Robert Gavriliuc (Romanian [...]

23/09/2016 - The geothermal community meets in Strasbourg for the European Geothermal Congress 2016 to celebrate European excellency, calls for clear structural signals and tailored tools for further expansion. [source]
More than 800 participants are joining the European Geothermal Congress in Strasbourg this week. The event, organised every three years by the European Geothermal Energy Council, brings together stakeholders from the entire Geothermal community for sessions covering science, markets, and social issues, an exhibition, courses, and side events. Geothermal in Europe is growing and the [...]

23/09/2016 - Statoil and Icelandic partners drill the world's hottest geothermal well [source]
Statoil and partners in The Iceland Deep Drilling Project has just started to drill a geothermal research well on Iceland. The goal is to explore if high temperature water can be extracted from deep reservoirs for power production.

23/09/2016 - DOE Investing $11.5 Million to Advance Geologic Carbon Storage and Geothermal Exploration [source]
The The U.S. Department of Energy (DOE) has announced the selection of eight new research and development projects to receive a total of $11.5 million in federal funding under DOE's Subsurface Technology and Engineering Research, Development, and Demonstration Crosscut initiative.

23/09/2016 - More African Countries Embrace Geothermal Power, Receive $37M in Funding [source]
The tiny East African countries of Rwanda, Djibouti and the Union of Comoros have joined the African league of geothermal power producers, in a field still dominated by Kenya after applying and getting funding to commence surface studies and drilling operations from the US$ 115 Geothermal Risk Mitigation Facility fund, which is administered by the African Union.

23/09/2016 - Hot Springs and Tradition Stymie Japan's Geothermal Ambition [source]
With centuries of tradition on their side, Japan's horde of naked bathers remain unmoved by the island nation's bid to tap a rich reserve of power equivalent to about 20 nuclear reactors. The resource-poor country, which last year spent 18.2 trillion yen ($174 billion) importing fossil fuels, has the world's third-largest geothermal reserves, representing an estimated 23 GW of power, according to the International Energy Agency's...

Marché du stockage géologique

23/09/2016 - DOE Investing $11.5 Million to Advance Geologic Carbon Storage and Geothermal Exploration [source]
The U.S. Department of Energy (DOE) has announced the selection of eight new research and development projects to receive a total of $11.5 million in federal funding under DOE's Subsurface Technology and Engineering Research, Development, and Demonstration Crosscut initiative.

16/09/2016 – Stocamine : Avis de l'Autorité environnementale [source]
L'autorité environnementale a rendu son avis sur la prolongation pour une durée illimité du stockage souterrain de produits dangereux du site de Wittelsheim (68)

20/09/2016 – Slovakia may have a new underground gas storage [source]
Capacities for underground storage of natural gas in Slovakia may be extended. A new facility capable of storing up to 1.5 billion cubic metres of gas may be constructed near the village of Golianovo close to Nitra.

Techniques et technologies pour les géosciences

23/09/2016 - National Lab Supports Development of High-Heat Geothermal Drilling Technology [source]
Sandia National Laboratories and Swedish firm Atlas Copco recently completed a three-year project to develop a new drilling tool that can handle the high temperatures associated with geothermal drilling.

Nouvelles des membres du pôle

23/09/2016 - Total Becomes 100% Owner of Chesapeake's Barnett Assets for $420 Million [source]
Total exercises its preemption rights for 100% ownership of Barnett Shale assets. French oil-major Total announced that it will exercise its preemption right to acquire the remaining 75% interest in its jointly held Barnett Shale operations in North Texas from Chesapeake Energy (ticker: CHK). Total E P USA, the company's U.S. branch, has held 25% interest in the assets.

23/09/2016 - SeaOwl set to expand oil and gas service coverage [source]
French contractor SeaOwl has agreed to buy Ogas Solutions, an oil and gas services group formed in 1999 and based in Bangkok.

23/09/2016 - CGG, GOSCO form joint venture for seismic services offshore Ghana [source]
CGG has signed an agreement with GNPC Operating Services Co. Ltd. to form a joint-venture company to conduct 2D, 3D, and 4D marine seismic acquisition and related services in the territorial waters of the Republic of Ghana.

23/09/2016 – Vermilion: 15 nouveaux forages dans les landes? [source]
Vermilion souhaite réaliser 15 nouveaux forages sur les dix prochaines années afin de produire davantage de pétrole dans les Landes. 70 puits sont toujours en activité sur le site landais.

23/09/2016 – Gallego & Fonroche Géothermie: Valence mise sur la géothermie [source]
De gros camions blancs sillonnent ces jours-ci les rues de l'agglomération de Valence en faisant vibrer le sol. Reportage vidéo.

LES PROJETS COLLABORATIFS

23/09/2016 - Une plateforme de tests et d'optimisation des échangeurs géothermiques superficiels [source]
C'est un outil unique en France. Créée en 2008 avec le soutien de la Région Centre et l Europe, la plateforme Géothermie du BRGM est destinée à tester les performances des échangeurs géothermiques et à développer des outils et méthodologies novateurs.

23/09/2016 - Le couplage réussi du stockage de CO2 et de la géothermie [source]
Stocker du CO2 sous forme dissoute dans des aquifères salins proches d installations industrielles émettrices, c est l idée développée avec CO2-Dissolved. Une solution très prometteuse, alternative aux stockages massifs.

23/09/2016 - Géothermie Caraïbe : vers une politique caribéenne de développement de la géothermie [source]
Géothermie Caraïbe 2 est un projet financé par les programmes européens Interreg III et IV et porté par la Région Guadeloupe en partenariat avec la Région Martinique, l'ADEME, le BRGM, le Commonwealth de La Dominique, l'Agence Française pour le développement (AFD) et la Caisse des Dépôts et Consignations et Électricité de Strasbourg (ES). Il a pour vocation d'initier une politique caribéenne de développement de la...

23/09/2016 - Recommandations pour l'acquisition de nouvelles données sur l'aquifère carbonaté du Lusitanien traversé à l'occasion des forages géothermiques au Dogger (bassin de Paris) [source]
L'objectif du projet RECOMFOR est d'élaborer un ou plusieurs programmes d'acquisition de données de forages ciblés sur les propriétés réservoirs de l'aquifère carbonaté du Lusitanien, spécifiques à la Géothermie Basse Énergie, et susceptibles d'être mis en place lorsqu'un nouveau forage géothermique au Dogger serait réalisé dans le bassin de Paris.

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AGENDA DU POLE AVENIA ET DE SES PARTENAIRES

Date	Événements	Lieu
12-14 octobre 2016	**JEMP2016** : **13èmes Journées d'étude des Milieux Poreux**, organisées par l'IPRA (UPPA) et le FIC (French Interpore Chapter)	Anglet (64)
24-28 octobre 2016	**RST2016** : 25ème édition des **Rencontres des Sciences de la Terre** organisées par la Société Géologique de France (SGF)et le laboratoire M2C de l'université de Caen/Rouen	Caen (14)
24 novembre 2016	**Geologia 2016** : Journée métiers dédiée aux rencontres avec les professionnelles du secteur de la géologie	Nancy (54) Centre Prouvé
29 novembre 2016	**POLE AVENIA** : **Assemblée générale + focus adhérents** : A l'issue de l'AG une quinzaine d'adhérents présenteront leurs activités, produits, projets …	Pau (64)
2-3 décembre 2016	2ème édition des **24H DE L'INNOVATION AU CENTRE DE LA TERRE**	Pau (64)

COMMUNICATION DU POLE AVENIA

Porteur de projet et créateur d'entreprise dans les géosciences et la valorisation du sous-sol, participez au concours **Géostart 2016** ! Créé par la techno-pole Hélioparc en partenariat avec le POLE AVENIA, Géostart 2016, c'est le concours national de la création d'entreprises innovantes dans les domaines des **géosciences et de la valorisation du sous-sol**. Le concours aura 4 lauréats qui seront choisis à l'issue d'un passage devant le jury. Les résultats des auditions seront communiqués au plus tard le 10 novembre 2016.

La dotation décernée aux 4 lauréats est fixée à 5000 euros chacun, sous condition d'intégration des projets dans l'incubateur et pépinière d'Hélioparc :

•2500€ représentant une année d'hébergement gratuit, comprenant le loyer et les charges inhérentes

•2500€ représentant l'accompagnement par des experts de la création et du développement d'entreprise, ainsi que des experts du domaine des géosciences et de la valorisation du sous-sol.

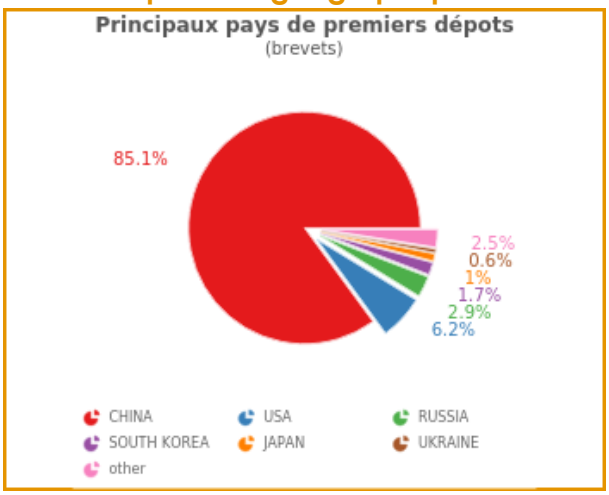
Les Dossier de candidature sont à demander à contact@helioparc.fr

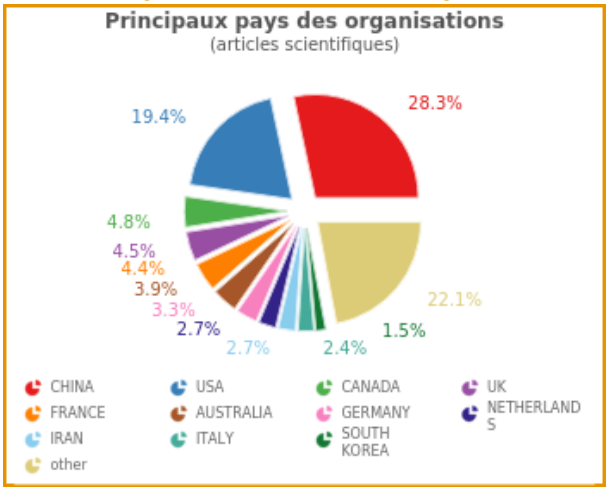
Le POLE AVENIA organise la deuxième édition des **24H de l'innovation au centre de la Terre** les 2 et 3 décembre 2016. Un aperçu de l'édition précédente ici :

Le concept est de faire phosphorer 24H non-stop des étudiants de tous domaines, sur des sujets d'entreprises partenaires à la recherche de créativité et d'innovation pour résoudre un problème ou investiguer un domaine. Elle peut aboutir pour les étudiants, à des opportunités professionnelles et pour les entreprises, à l'apport d'idées nouvelles sur des problématiques concrètes et au repérage de talents. Si, en tant qu'entreprise, vous souhaitez proposer un sujet : 24h@pole-avenia.com

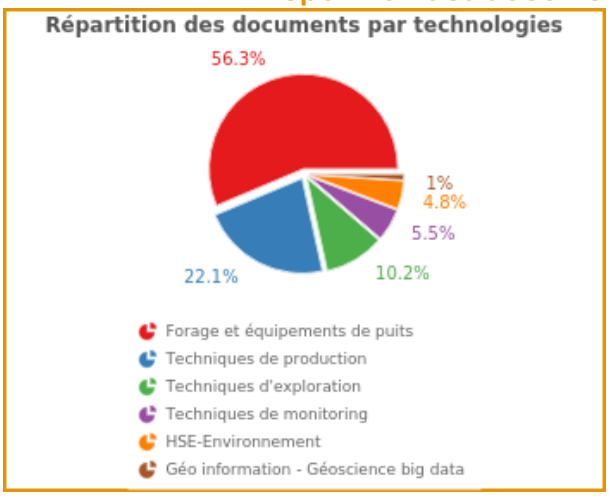
TABLEAUX DE BORD DE L'ACTIVITE SCIENTIFIQUE ET TECHNIQUE

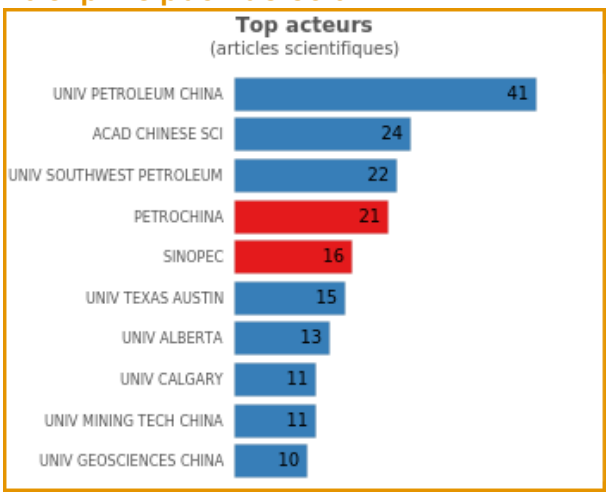
Répartition géographique des brevets et des publications scientifiques



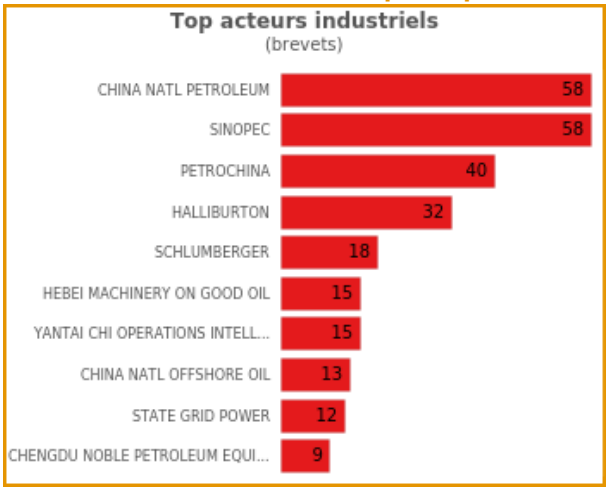


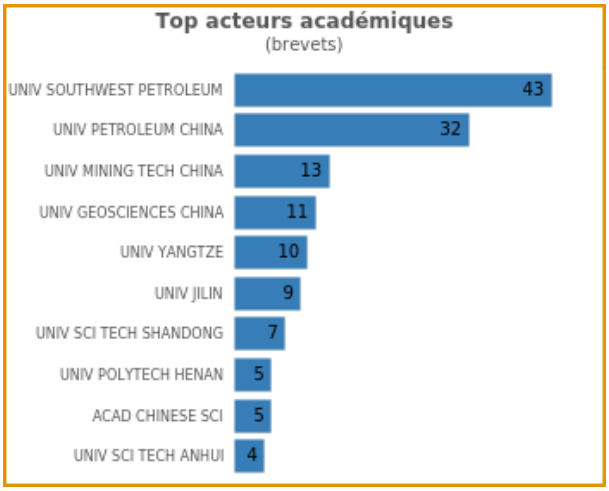
Répartition des documents et principaux acteurs





Les principaux acteurs dans les brevets





LES BREVETS

Géo information - Géoscience big data

18/08/2016 - US2016239591 **METHOD AND SYSTEM TO ENHANCE COMPUTATIONS FOR A PHYSICAL SYSTEM** - EXXONMOBIL (USA) - A method and system for performing computations of physical systems are described. The method and system involve a hardware aware flexible layout for storing two dimensional (2-D) or three-dimensional (3-D) data in memory for stencil computations, which may be used for exploration, development and production of hydrocarbons. The stencil parameters are utilized to form macroblocks that lessen halo exchanges.

18/08/2016 - WO16130001 **COMPUTER SUPPORTED EXPLORATION AND PRODUCTION OF HETEROGENEOUS DISTRIBUTED HYDROCARBON SOURCES IN SUBSURFACE FORMATIONS BASED ON MICROBIAL PROSPECTING.** - BIODENTIFY (NETHERLANDS) - A computer supported method, computer system and computer program product for exploring and producing a subsurface heterogeneous hydrocarbon source and generating a predictive production map of an area under investigation, based on microbial prospecting. Microbial data representative of microbial activity attributable to hydrocarbon microseepage and hydrocarbon productivity data of a plurality of geographic locations are retrieved and...

Techniques d'exploration

30/06/2016 - EA201500194 **METHOD FOR DETERMINING THE RELIABILITY ESTIMATES OF PROBABILITY OF ANOMALOUS ZONES IN ROCKS** - SERGEY OSIPOV; SMYCHNIK EVGENIY - Invention relates to the field of research in the mining industry with the use of seismic methods of radiographic (SMEs) of rocks based on the use of passing waves to detect and study the geological objects, in particular, to methods for evaluating the reliability of the use of robust stochastic method of determining anomalous zones rocks and determine the required excess noise signal. The method is based on the use of radio wave, acoustic or...

25/08/2016 - US2016238722 **MULTISTAGE FULL WAVEFIELD INVERSION PROCESS THAT GENERATES A MULTIPLE FREE DATA SET** - EXXONMOBIL (USA) - A multi-stage FWI workflow uses multiple-contaminated FWI models to predict surface-related multiples. A method embodying the present technological advancement, can include: using data with free surface multiples as input into FWI; generating a subsurface model by performing FWI with the free-surface boundary condition imposed on top of the subsurface model; using inverted model from FWI to predict multiples; removing predicted multiples from...

14/07/2016 - WO16111685 **FUNCTIONAL EARTH MODEL PARAMETERIZATION FOR RESISTIVITY INVERSION** - HALLIBURTON (USA) - An example method for modeling a geological formation includes receiving a set of measurements from an electromagnetic logging tool and representing at least one characteristic of the geological formation as at least one continuous spatial function. At least one coefficient of the at least one continuous spatial function may be determined based, at least in part, on the set of measurements. At least one characteristic of the geological...

07/07/2016 - WO16108909 **FORMATION LOGGING USING MULTICOMPONENT SIGNAL-BASED MEASUREMENT OF ANISOTROPIC PERMITTIVITY AND RESISTIVITY** - HALLIBURTON (USA) - Certain logging method and system embodiments obtain multi-component signal measurements from an electromagnetic logging tool conveyed along a borehole through a formation, and invert the measurements for a single frequency using an anisotropic formation model having at least dip, horizontal and vertical resistivity, and horizontal and vertical permittivity, as parameters. A resulting log is provided to represent a position dependence of at...

Forage et équipements de puits

20/07/2016 - CN105781541 **ONE KIND OF SHALE BOREHOLE STABILITY LOG EVALUATION METHOD** - CHINA NATL PETROLEUM (CHINA) - The present invention discloses a method for shale stability of wellbore logging evaluation method comprising the steps of: (1) on the wellbore stability of rock mechanics analysis to determine the stress distribution of the surrounding rock wall; (2) after analyzing the drilling fluid contact with the formation, the rock wall around the change of water content and its distribution and its effect on the mechanical properties of the rock...

07/07/2016 - WO16108900 **MODIFYING MAGNETIC TILT ANGLE USING A MAGNETICALLY ANISOTROPIC MATERIAL** - HALLIBURTON (USA) - Methods and tools for modifying magnetic tilt angle using a magnetically anisotropic material

are disclosed. An electromagnetic logging tool includes an antenna coil oriented at a physical tilt angle relative to a longitudinal axis of the tool and a magnetically anisotropic material that modifies a magnetic tilt angle of the coil relative to the physical tilt angle a coil tilted at a physical tilt angle relative to an axis of the tool.

01/09/2016 - WO16137495 **ULTRASOUND COLOR FLOW IMAGING FOR DRILLING APPLICATIONS** - HALLIBURTON (USA) - A system and method for rheology measurement of a drilling fluid. The system may comprise an ultrasound transmitter positioned to direct ultrasound pulses into the drilling fluid; an ultrasound receiver positioned to receive sound waves reflected from the drilling fluid; and a computer system configured to determine a velocity profile of the drilling fluid based at least in part on the reflected sound waves. The method may comprise flowing at...

28/07/2016 - US2016215603 **SYSTEM AND METHOD FOR FLUID INJECTION** - CAMERON INTERNATL (USA) - A fluid injection system includes a water injection assembly having a choke valve configured to receive water from a water injection line and to provide the water to a main bore of a well head. The system also includes a polymer injection assembly having a dedicated polymer connection configured to receive a polymer from a polymer injection line and to direct the polymer toward the main bore of the well head to facilitate mixing of the water...

14/07/2016 - US2016194950 **PIPE TRACKING SYSTEM FOR DRILLING RIGS** - SCHLUMBERGER (FRANCE) - Pipes, drill strings including pipes, and methods for use on a drilling rig. The method includes obtaining pipe data for individual drill pipes of a drill string, obtaining a well trajectory for a well, obtaining one or more drilling measurements to be used when drilling the well, planning a first drill string based on the pipe data, the well trajectory, and the one or more drilling measurements, predicting an aging of the individual drill...

07/07/2016 - WO16108861 **THROUGH-CASING FIBER OPTIC MAGNETIC INDUCTION SYSTEM FOR FORMATION MONITORING** - HALLIBURTON (USA) - A through-casing formation monitoring system may include a casing string positioned within a wellbore, a power source electrically coupled to a first transmitter configured to produce a magnetic field, a magnetic induction sensor positioned within the casing string such that the magnetic induction sensor allows a continued operation of the wellbore, a fiber optic cable coupled to an electro-optical transducer within the magnetic induction...

Techniques de production

01/09/2016 - WO16134477 **ELECTROMAGNETIC WAVE CONCENTRATED HEATING AND HEAT-ACTIVATED CHEMICAL REACTIONS OF ENHANCED SENSITIZERS FOR ENHANCED OIL RECOVERY** - ESPARK ENERGY - Methods, systems and apparatus for enhanced oil recovery utilizing enhanced sensitizers with chemical blowing agents (CBAs) are described. The process includes irradiation of electromagnetic (EM) waves. The injected enhanced sensitizers absorb the energy from EM waves which increases the temperature. The elevated temperature then activates chemical blowing agents to aid in fluidity of heavy oil or bitumen extractions. The released gases from...

01/09/2016 - WO16137448 **SYSTEM AND METHOD FOR HYDRAULIC FRACTURING WITH NANOPARTICLES** - HALLIBURTON (USA) - A method for controlling fluid loss into the pores of an underground formation during fracturing operations is provided. Nanoparticles are added to the fracturing fluid to plug the pore throats of pores in the underground formation. As a result, the fracturing fluid is inhibited from entering the pores. By minimizing fluid loss, higher fracturing fluid pressures are maintained, thereby resulting in more extensive fracture networks....

11/08/2016 - US2016222772 **PSEUDOELASTIC MATERIALS AS ADDITIVES TO ENHANCE HYDRAULIC FRACTURING** - ARAMCO SERVICES (USA) - Systems and methods for enhancing hydraulic fracturing productivity for recovery of a reservoir fluid from a reservoir formation having an open fracture includes providing a shape memory filter that is pseudoelastically deformed and contained within a soluble container. The shape memory filter and soluble container are pumped into the open fracture so that the soluble container dissolves and the shape memory filter returns to an expanded filter...

Techniques de monitoring

17/08/2016 - CN105866474 **FLEXIBLE HINGE BEAM TWO-DIMENSIONAL ACCELERATION SENSOR FIBER BRAGG GRATING** - UNIV XI AN SHIYOU (CHINA) - A flexible hinge beam fiber Bragg grating-dimensional acceleration sensor, is provided on the base side of the abutment screw is connected to a cylindrical flexible hinges on a support beam, beam flexure hinge is formed with a circumferential groove measurement, groove depth measurement is smaller than the flexible hinge beam radius, flexible hinge axially outer surface of the beam is formed with two grooves fiber installations, the angle...

11/08/2016 - US2016230524 **PLANNING AND PERFORMING RE-FRACTURING OPERATIONS BASED ON MICROSEISMIC MONITORING** - MAGNITUDE MICROSEISMIC - An embodiment of a method of stimulating an earth formation includes: disposing a stimulation device at a borehole in an earth formation, the earth formation having been stimulated by an initial stimulation operation; subsequent to the stimulation operation, performing a probe operation configured to cause movement of existing fractures in the formation; and measuring microseismic events occurring in the formation by one or more seismic...

29/07/2016 - KR20160090073 **GROUND SUBSIDENCE SENSOR AND SYSTEM AND METHOD FOR MONITERING HYBRID TYPE GROUND SUBSIDENCE USING THEREOF** - THREE PEOPLE YIENSI; WEEK THREE PEOPLE YIENSI - More efficient by the present invention is to properly correspond to the same time of improving the measurement portion reliability and durability over a configuration in which a measurement with the light in the housing portion having the same modulus and the elastic modulus of the soil, ground deformation to provide a ground subsidence detection sensor and method, and a hybrid ground subsidence monitoring system using the same that can...

HSE-Environnement

24/08/2016 - CN105889761 **ONE KIND OF GAS PIPELINE EXPANSION COEFFICIENT DETECTOR** - ZHU DEZHONG - The present invention discloses a natural gas pipeline expansion coefficient detector, comprising a retaining collar, fixed at the bottom end of said collar is provided a data processor, are located at a first side of said data processor a tension knob and a second tension knob at the bottom end of the data processor is also provided a first port and a second wiring connection port. Said fixing collar can be scaled in diameter, said data...

06/07/2016 - CN205358231 **OIL SPILL PREVENTION ELECTRONIC SMOG GASIFIER** - SHENZHEN FIVE ELECTRONICS (CHINA) - The utility model discloses an anti-spill Electronic smoke digitizer, including anti-spill atomizing unit; the oil spill prevention atomizer assembly includes the intake pipe, the intake of the outer tube, spray chamber, nebulizer outdoor casing; intake outer tube arranged around the outer periphery of the intake pipe, and the first intake passage is formed between the inner wall and the outer wall of the intake pipe of the intake of the outer...

02/08/2016 - BR102014024624 **BIDIRECTIONAL FILTER PARTICLE RETENTION AND HUMIDITY** - CENTRAIS ELETRICAS DO NORTE DO BRASIL ELETROBRAS ELETRONORTE (BRAZIL) - SUMMARY Patent Invention, BIDIRECTIONAL FILTER PARTICLE RETENTION AND HUMIDITY bidirectional filter for retention of particles and moisture, elimination of the source of dirt System breathing transformers, reactors and equipment requiring bi-directional filter for retention of particles and moisture. Through the extension of the breathing tube and the slots held, air and directed to the opposite of the tub holes, thus preventing the oil...

LES PUBLICATIONS SCIENTIFIQUES

Géo information - Géoscience big data

An overview of evolutionary computing for interpretation in the oil and gas industry **- 2016 - ACM International Conference Proceeding Series** - INST FOR SYSTEMS COMPUTER ENGINEERING (PORTUGAL); UNIV DO PORTO (PORTUGAL) - The Oil and Gas Exploration and Production (E and P) field deals with high-dimensional heterogeneous data, collected at different stages of the E and P activities from various sources. Over the years different soft-computing algorithms have been proposed for data-driven oil and gas applications. The most popular by far are Artificial Neural Networks, but there are applications of Fuzzy Logic systems, Support Vector Machines, and Evolutionary...

Quantitative Geoscience and Geological Big Data Development: A Review **- 2016 - Acta Geologica Sinica** - LAB BEIJING LANE RESOURCES INFORMATION RESEARCH DEVELOPMENT KEY (CHINA); UNIV GEOSCIENCES CHINA (CHINA) - After long-term development, mathematical geology has today become an independent discipline. Big Data science, which has become a new scientific paradigm in the 21st century, gives rise to the geological Big Data, i.e. mathematical geology and quantitative geoscience. Thanks to a robust macro strategy for big data, China's quantitative geoscience and geological big data's rapid development meets present requirements and has kept up with...

Techniques d'exploration

An inverse method for estimating thickness and volume with time of a thin CO2-filled layer at the Sleipner Field, North Sea **- 2016 - Journal of Geophysical Research: Solid Earth** - BRITISH GEOLOGICAL SURVEY (UK); UNIV CAMBRIDGE (UK) - Migration of CO2 through storage reservoirs can be monitored using time lapse seismic reflection surveys. At the Sleipner Field, injected CO2 is distributed throughout nine layers within the reservoir. These layers are too thin to be seismically resolvable by direct measurement of the separation between reflections from the top and bottom of each layer. Here we develop and apply an inverse method for measuring thickness changes of the...

Parallel-simulator framework for multipermeability modeling with discrete fractures for unconventional and tight gas reservoirs **- 2016 - SPE Journal** - CTR EXPEC ADVANCED RESEARCH (USA) - Economic gas rate from ultralow-permeability shale reservoirs requires the creation of a complex fracture network in a large volume known as the stimulated reservoir volume (SRV). The fracture network connects a large surface area of the reservoir to the well. It is created by injecting low-viscosity fracturing fluid (slickwater) at very high rates in multiple stages along the horizontal wellbore. Numerical simulation is used to evaluate the...

Pre- and post-stimulation characterization of geothermal well GRT-1, Rittershoffen, France: Insights from acoustic image logs of hard fractured rock **- 2016 - Geophysical Journal International** - ES GEOTHERMIE (FRANCE); UNIV STRASBOURG (FRANCE) - Geothermal well GRT-1 (Rittershoffen, Alsace) was drilled in 2012. Its open-hole section (extending down to a depth of 2.6 km) penetrated fractured sandstones and granite. In 2013, the well was subjected to Thermal, Chemical and Hydraulic (TCH) stimulation, which improved the injectivity index fivefold. The goal of the study was to assess the impact of the stimulation by comparing pre- and post-stimulation well-logging (acoustic and temperature...

Heterogeneous bedrock investigation for a closed-loop geothermal system: A case study **- 2016 - Geothermics** - FRIA (BELGIUM); UNIV LIEGE (BELGIUM) - This paper investigates bedrock heterogeneity by applying three different geophysical approaches, in order to study the long-term behaviour and the interaction between closed-loop geothermal systems. The investigated site consists of four boreholes equipped with geothermal pipes on the campus of University of Liege, Belgium. The first approach includes acoustic borehole imaging, gamma-ray logging and cuttings observation and results to a...

Innovative semielliptical seismic pattern improving line-change efficiency **- 2016 - Marine Geophysical Research** - UNIV MARITIME SZCZECIN (POLAND) - The paper presents a new method for conducting turns by vessels towing seismic cables. A comparison was made between the traditional way of turning to indicate the advantages of the proposed pattern. In order to improve the overview of the complete geometry of a towed streamer system, a model of marine seismic research quality coefficients was applied. The turning method was tested onboard a seismic vessel towing eight streamers of 6 km in...

Forage et équipements de puits

Study and application of reservoir protection drilling fluid treated with nano spheres **- 2016 - Drilling Fluid and Completion Fluid** - CHINA NATL OFFSHORE OIL (CHINA) - Tight sandstone gas reservoirs have special characteristics that make them quite prone to damage, which is very difficult to remove, during drilling. The dry gas reservoir in the Block Linxing, for example, is such kind of reservoirs, with low porosity, low permeability, low abundance, and no sulfur. To protect the reservoir from being damaged, two plugging agents, Micro-ball and CARB, have been used in the drill-in fluids to reduce the API...

Influence of electrolytes on the performance of a graft copolymer used as fluid loss additive in oil well cement **- 2016 - Journal of Petroleum Science and Engineering** - UNIV TECHNISCHE MUNCHEN (GERMANY) - The influence of electrolytes contained in sea water and 20 wt% NaCl solution on a high temperature fluid loss additive (FLA) for oil well cement was investigated. The FLA was comprised of a humic acid-{sodium 2-acrylamido-2-methylpropane sulfonate-co-N,N-dimethyl acrylamide-co-acrylic acid} graft copolymer which was tested at 27 °C and 150 °C. Its performance was compared with that of an industrial lignite-based copolymer. It was found that...

Steam blowouts in California Oil and Gas District 4: Comparison of the roles of initial defects versus well aging and implications for well blowouts in geologic carbon storage projects **- 2016 - International Journal of Greenhouse Gas Control** - LAB NATL LAWRENCE BERKELEY (USA); LAB NATL LOS ALAMOS (USA) - Unplugged, abandoned wells are the greatest concern for potential open leakage pathways to groundwater and the atmosphere from geologic reservoirs storing CO2. Such wells will blow out when encountered by a buoyant fluid. Historical data on well blowouts during steam-enhanced oil recovery in California's Oil and Gas District 4 provides perspective on blowout frequency during immiscible fluid injection. Well blowout rates are often characterized...

Techniques de production

Properties of the MCB series microcapsule gel breaker **- 2016 - Drilling Fluid and Completion Fluid** - CNPC BOHAI DRILLING ENGINEERING (CHINA); INST RESEARCH ENGINEERING (VIETNAM) - In segmented fracturing of horizontal wells, gels of the fracturing fluids are often broken too early for the fluids to function properly. To solve this problem, two micro capsule gel breakers, MCB-1 and MCB-2, with different capsule cloths have been synthesized through emulsion polymerization, using ammonium persulfate as the core. The active contents, percent of encapsulation, rates of release and gel breaking retardation have been measured...

Thermal recovery characteristics of a CO2 mixture gas circuit breaker **- 2016 - Journal of Electrical Engineering and Technology** - CTR POWER APPARATUS RESEARCH (SOUTH KOREA); INST KOREA ELECTROTECHNOLOGY RESEARCH (SOUTH KOREA); INST KOREA ELECTROTECHNOLOGY RESEARCH KERI (SOUTH KOREA); UNIV DONG A (SOUTH KOREA); UNIV PUSAN (SOUTH KOREA) - Interruption tests were conducted using the same circuit breaker for an initial pressure of SF6 0.5 MPa (gauge pressure) and CO2 mixture 1.0 MPa, 0.8 MPa, and 0.6 MPa. The pressure-rises in the compression and thermal expansion chambers were measured for verifying the computational results using a simplified synthetic test facility. Further, the possibility of the CO2 mixture substituting SF6 gas was confirmed. Moreover, in view of the thermal...

Investigation of the conditions required for improved oil recovery by an earthquake **- 2016 - SPE Production and Operations** - INPEX (JAPAN); UNIV KYOTO (JAPAN) - This study aims to clarify a phenomenological relationship between earthquakes and temporarily improved oil recovery for a small oil field located in a seismically active region of Japan. Our study concludes that the conditions required for an earthquake to temporarily improve oil recovery in this field are as follows: 1. An earthquake with a seismic intensity of at least 3 hits the well. 2. The well experiences a decline in productivity, with...

Fracture-matrix interactions during immiscible three-phase flow **- 2016 - Journal of Petroleum Science and Engineering** - PETROLEUM DEVELOPMENT OMAN (OMAN); SCHLUMBERGER (FRANCE); UNIV HERIOT WATT EDINBURGH (UK) - Naturally Fractured Reservoirs (NFR) contain a significant amount of remaining petroleum reserves and are now considered for Enhanced Oil Recovery (EOR) schemes that involve three-phase flow such as water-alternating-gas (WAG) injection. Reservoir simulation of three phase flow is challenging because a proper set of flow functions, i.e. relative permeability and capillary pressure functions, that describe the underlying physics of fluid...

Viability of Biopolymers for Enhanced Oil Recovery **- 2016 - Journal of Dispersion Science and Technology** - UNIV GRONINGEN (NETHERLANDS); UNIV NORWEGIAN SCIENCE TECH NTNU (NORWAY) - Xanthan gum and scleroglucan are assessed as environmentally friendly enhanced oil recovery (EOR) agents. Viscometric and interfacial tension measurements show that the polysaccharides exhibit favorable viscosifying performance, robust shear tolerance, electrolyte tolerance, and moderate interactions with surfactants. Non-ionic surfactants and anionic surfactants bind to xanthan gum and transform the backbone conformation from a strong helix to...

Experimental investigation of CO2 huff-n-puff process for enhancing oil recovery in tight reservoirs **- 2016 - Chemical Engineering Research and Design** - UNIV SOUTHWEST PETROLEUM (CHINA) - Due to the feature of tight formation, the primary oil recovery is usually very low and leaves substantial oil still in place. This fact results in a strong motivation of applying an enhancing oil recovery (EOR) method to further increase the oil recovery. In the present work, CO2 huff-n-puff process as a potential EOR method for tight oils was experimentally investigated in 0.3 md cores. The visual tests proved that the oil swelling factor and...

Techniques de monitoring

Rapid response, monitoring, and mitigation of induced seismicity near Greeley, Colorado **- 2016 - Seismological Research Letters** - CTR DENVER FED (USA); CTR NATL EARTHQUAKE INFORMATION (USA); UNIV COLORADO (USA); UNIV STANFORD (USA); US GEOLOGICAL SURVEY (USA) - On 1 June 2014 (03:35 UTC), an Mw 3.2 earthquake occurred in Weld County, Colorado, a historically aseismic area of the Denver-Julesburg basin. Weld County is a prominent area of oil and gas development, including many high-rate class II wastewater injection wells. In the days following the earthquake, the University of Colorado, with support from the U.S. Geological Survey and Incorporated Research Institutions for Seismology-Portable Array...

Small-scale seismic monitoring of varying water levels in granular media **- 2016 - Vadose Zone Journal** - CNRS PARIS (FRANCE); CNRS TOULOUSE (FRANCE); UNIV LUNAM (FRANCE); UNIV MAINE (USA); UNIV PAUL SABATIER (FRANCE); UNIV QUEEN'S BELFAST (UK); UNIV SORBONNE (FRANCE); UNIV UPMC PARIS 06 (FRANCE); UNIV WYOMING (USA) - Physical properties of soils in the vadose zone, and especially their water content, are characterized by strong spatial and temporal variations mostly driven by weather and anthropogenic activities. To understand this variability and help water resource management, seismic methods have been recently suggested as a complement to electrical and electromagnetic techniques. The simultaneous in situ estimation of pressure (P) and shear (S) wave...

Identification method of high fractured body for overlying strata in goaf based on microseismic monitoring technology **- 2016 - Zhongguo Kuangye Daxue Xuebao/Journal of China University of Mining and Technology** - HUAINAN MINING GROUP (CHINA); UNIV XI AN SCIENCE TECH (CHINA) - To investigate the distribution state of mining-induced fractures and migration law of gas inside the overlying strata, a reasonable gas-rich region was determined. Further, the layout of the gas drainage drilling field was optimized. In this study, the real-time dynamic distribution state of mining-induced fractures in overlying strata was studied by applying the high-precision microseismic monitoring system to the industrial test at Huainan...

Field test study on leakage monitoring at a geological CO2 storage site using hydrogen as a tracer **- 2016 - International Journal of Greenhouse Gas Control** - FAC EARTH SCIENCE TECH (INDONESIA); UNIV KYUSHU (JAPAN) - In this study, a new monitoring approach for detecting CO2 leakage is proposed that utilizes hydrogen gas as a tracer for CO2 geological storage. The gas leakage from a shallow formation is studied using 20-100-m deep boreholes at the Ito Natural Analog Site field testing facility in Fukuoka, Japan. Direct measurements of CO2 concentrations may yield unreliable results, particularly in summer when high levels of CO2 flux are produced from soil...

Core-scale electrical resistivity tomography (ERT) monitoring of CO2-brine mixture in Fontainebleau sandstone **- 2016 - Journal of Applied Geophysics** - CNRS MONTPELLIER (FRANCE); CSIC (SPAIN); UNIV BARCELONA (SPAIN); UNIV MONTPELLIER (FRANCE) - The main goal of the monitoring stage of Carbon Capture and Storage (CCS) is to obtain an accurate estimation of the subsurface CO2 accumulation and to detect any possible leakage. Laboratory experiments are necessary to investigate the small scale processes governing the CO2-brine-rock interaction. They also provide a means to calibrate the results coming from field scale geophysical methods. In this work we set up an experimental system which...

A multirobot platform based on autonomous surface and underwater vehicles with bio-inspired neurocontrollers for long-term oil spills monitoring **- 2016 - Autonomous Robots** - UNIV POLYTECH CARTAGENA (SPAIN) - This paper describes the BUSCAMOS-Oil monitoring system, which is a robotic platform consisting of an autonomous surface vessel

combined with an underwater vehicle. The system has been designed for the long-term monitoring of oil spills, including the search for the spill, and transmitting information on its location, extent, direction and speed. Both vehicles are controlled by two different types of bio-inspired neural networks: a...

HSE-Environnement

GHGfrack: An Open-Source Model for Estimating Greenhouse Gas Emissions from Combustion of Fuel during Drilling and Hydraulic Fracturing **- 2016 - Environmental Science and Technology** - UNIV STANFORD (USA) - This paper introduces GHGfrack, an open-source engineering-based model that estimates energy consumption and associated GHG emissions from drilling and hydraulic fracturing operations. We describe verification and calibration of GHGfrack against field data for energy and fuel consumption. We run GHGfrack using data from 6927 wells in Eagle Ford and 4431 wells in Bakken oil fields. The average estimated energy consumption in Eagle Ford wells...

On the risk of hydraulic fracturing in CO2 geological storage **- 2016 - International Journal for Numerical and Analytical Methods in Geomechanics** - COLL IMPERIAL LONDON (UK); UNIV ARISTOTLE THESSALONIKI (GREECE); UNIV CYPRUS (CYPRUS) - We present a contribution on the risk of hydraulic fracturing in CO2 geological storage using an analytical model of hydraulic fracturing in weak formations. The work is based on a Mohr–Coulomb dislocation model that is extended to account for material with fracture toughness. The complete slip process that is distributed around the crack tip is replaced by superdislocations that are placed in the effective centers. The analytical model...

Geophysical Monitoring of Hydrocarbon-Contaminated Soils Remediated with a Bioelectrochemical System **- 2016 - Environmental Science and Technology** - CHEVRON ENERGY TECH (USA); CNRS LE BOURGET DU LAC (FRANCE); SCHOOL COLORADO MINES (USA); UNIV COLORADO (USA); UNIV SAVOIE (FRANCE) - Efficient noninvasive techniques are desired for monitoring the remediation process of contaminated soils. We applied the direct current resistivity technique to image conductivity changes in sandbox experiments where two sandy and clayey soils were initially contaminated with diesel hydrocarbon. The experiments were conducted over a 230 day period. The removal of hydrocarbon was enhanced by a bioelectrochemical system (BES) and the electrical...

How green is my oil? A detailed look at greenhouse gas accounting for CO2-enhanced oil recovery (CO2-EOR) sites **- 2016 - International Journal of Greenhouse Gas Control** - CETER GROUP (USA); MELZER CONSULTING (USA); UNIV NORTH DAKOTA (USA) - This study presents the results of a detailed life cycle analysis of greenhouse gas (GHG) emissions associated with carbon dioxide-enhanced oil recovery (CO2-EOR) where the CO2 is sourced from a coal-fired power plant. This work builds upon previous investigations and integrates new information to provide more plausible ranges for CO2 storage in the reservoir during CO2-EOR. The system model includes three segments: upstream, gate-to-gate, and...