Géosciences pour une Terre durable

brgm

Annonce externe

Poste

Libellé du poste	**Post-doctoral position - Development of ComPASS-PhreeqC coupling**
No demande	2209

Rejoindre le Bureau de Recherche Géologique et Minière (BRGM), c'est intégrer l'établissement public de référence dans les sciences de la Terre rassemblant 1 000 personnes expertes et passionnées, réparties dans 29 entités implantées en France métropolitaine et d'outre-Mer. L'activité du BRGM a pour objectif la connaissance géologique et la compréhension des phénomènes liés au sol et au sous-sol, avec un enjeu: répondre aux défis des changements environnementaux à travers des projets innovants, à enjeux sociétaux.

Localisation du poste	Département : 45100 Ville : ORLEANS Pays : FRANCE
Affectation hiérarchique	DED/I2S
Date de début souhaitée	01/10/2025
Type de contrat	Post-Doctorant Durée (mm.jj) : 18.0
Formation	Doctorat
Expérience	1 - 5 ans
Contexte	Lithium is a critical chemical element that plays a key role in the energy transition. It is one of the main components of batteries for electric vehicles, for which global demand continues to grow. According to the French Ministry of Ecological Transition, the supply of critical metals, and lithium in particular, will be increasingly strategic for the French economy of tomorrow. Among the potential sources of lithium identified in France, those from geothermal brines circulating in the deep reservoirs of the Upper Rhine Graben (URG) appear particularly promising. BRGM, the French geological survey, and Lithium de France, France's leading independent operator of geothermal heat and lithium, are combining their expertise in a scientific study of geothermal lithium resources in Northern Alsace. Our research project focuses on gaining a better understanding of the mechanisms of natural lithium enrichment in geological reservoirs and in the thermal waters they contain, particularly in the URG area. The goal is to optimize prospecting methods and define the conditions for sustainable management of the geothermal lithium resource. Thanks to an experimental laboratory approach coupled with 0D to 3D numerical simulations, this project will contribute to a better understanding of the natural lithium cycle and assess how this resource could be developed in a sustainable way. By the end, this collaboration between BRGM and Lithium de France aims to preserve the natural environment of geothermal lithium, thereby securing a sovereign resource essential to the energy transition.
Missions	The exploitation of deep geothermal reservoirs induces hydrodynamic, thermal and chemical disturbances that need to be predicted to insure the long-term

	lifespan of these reservoirs. Numerical modelling is a powerful tool to assess these perturbations with non-linear effects. The 3D coupled thermo-hydrodynamic-geochemical simulations envisaged in the project will aim to account for the reciprocal effects of thermal, hydrodynamic and geochemical processes in the reservoir during its exploitation like, for instance, porosity/permeability changes due to dissolution/precipitation reactions whose kinetics are promoted by temperature. In the specific geological context of the URG, such simulations can be done by means of the development of a coupling between a thermo-hydrodynamic code adapted to fractured media, namely the ComPASS software, and a geochemical code, namely PhreeqC. ComPASS is based on recent developments to simulate multiphase and multicomponent hydrothermal transfers. Simulations can be carried out on unstructured meshes including complex fracture networks, in which the flow is two-dimensional, coupled to the three-dimensional flow in the porous matrix (hybrid model). For the geochemical code PhreeqC, modules (i.e., IPhreeqC and PhreeqC-RM) have been specifically developed to facilitate its coupling with hydraulic and transport codes. Both ComPASS and PhreeqC codes had been developed to enable parallel calculations. The post-doctoral work is planned to implement a sequential non-iterative approach (SNIA) coupling of ComPASS and PhreeqC relying on PhreeqC-RM. In addition to managing the balance of materials, charges and heat during information exchange, the coupling must consider that changes in fluid chemistry can induce dissolution/precipitation reactions affecting rock porosity and permeability, and consequently fluid circulation.
Compétences / Qualités	The applicant will mobilize the following skills and qualities: - teamwork, - writing skills, - good Python programming skills (knowledge of C++ will be a plus) - experience in modelling of coupled processes (experience in reactive transport modelling and/or hydrothermal modelling will be a plus)

Spécificités du poste

This position involves periodic travel in France and abroad. In an environment conducive to work/life balance, thanks to teleworking, in particular, BRGM stands out for its caring and friendly atmosphere. HRS4R certified in 2021, our aim is to support you throughout your professional life at BRGM. We offer a wide range of facilities to help you develop your skills and expertise, with opportunities for career development and geographical mobility.

Dans un environnement favorable à l'équilibre vie professionnelle/vie privée, notamment grâce au télétravail, le BRGM se distingue par son climat de bienveillance et de convivialité.

Labellisé HRS4R en 2021, notre souhait est de vous accompagner tout au long de votre vie professionnelle au sein du BRGM. Nous mettons à votre disposition de nombreux dispositifs pour développer vos compétences et votre expertise, avec des possibilités d'évolutions et de mobilités géographiques.

Au BRGM, vous bénéficierez de plusieurs avantages tels qu'une rémunération basée sur 13 mois, des JRTT, un restaurant d'entreprise, des infrastructures sportives, des prestations vacances et loisirs, …

Positionnement du poste dans les emplois BRGM

Filière	
Emploi	R1-INGENIEUR-CHERCHEUR
Métier	F08 GEOCHIMIE
Spécialité 1	Modélisation thermo et/ou hydro et/ou mécanique et/ou chimique
Spécialité 2	Modélisation géologique

Candidature

Date de fin de dépôt des candidatures	15/08/2025

Le BRGM vous garantit une procédure de recrutement transparente. Pour postuler envoyez-nous votre candidature (CV actualisé et lettre de motivation) jusqu'au 15/08/2025.

Sachez que tous nos postes sont ouverts à tous, au BRGM, nous sommes attachés à la diversité !

Nous étudierons votre dossier de recrutement dès la fin de diffusion prévue. Si votre candidature est retenue, nous vous contacterons pour des entretiens de recrutement pendant lesquels vous échangerez avec la direction recruteuse, la direction RH et une direction transverse.