

Postdoctoral position at IFP Energies nouvelles (IFPEN)

Geothermal potential assessment and recommendations for the positioning of doublets in the Albian silicoclastic sediments of the Paris basin

The objective of this post-doctoral work is to study the dynamic behaviour of the Albian aquifer as well as its impact on the future geothermal production. This will be based on a geological model of the Albian aquifer at the scale of the south of Ile de France, built by considering wells and populated with properties.

The main uncertainty for geothermal production in the Albian, not considering the problematic of clogging and progressive loss of injectivity, lies in the maximum flow rates expected taking into account drawdowns. An important interest is also the evaluation of the drained volumes and the evolution of the cold bubble. The maximum flow rates and the volumes drained depend on the trajectory of the well and the sandy levels produced, the facies encountered, the sedimentary heterogeneity and in particular the lateral continuity of the Albian clay levels, as well as the possible channelling of the bulk of the flow in sandy levels of reduced thickness.

A research and review of existing dynamic data, related to geothermal works as well as to water extraction, will be carried out. The Albian water table has been produced for more than a century to draw drinking water and its current piezometric surface is quite different from its equilibrium surface due to a fall in this surface centred on Paris. The first step will therefore be to initialise the pressure model on these disturbed conditions from the available piezometric maps. All the existing data will be considered to calibrate the flow model as well as possible.

The existing model is to be completed by porosities, permeabilities, conductivities and thermal capacities which will be integrated for each lithofacies, from mineralogical knowledge and mixing laws. For this point, contributions from existing basin models are also to be considered.

Finally, to generate recommendations on a regional scale, geographical zones will be established corresponding a priori to similar dynamic behaviours on which the recommendations will be the same. Simulations will be carried out on reservoir blocks at the scale of the doublet extracted from the regional block, in order to define in each case the recommended well architecture to obtain the maximum production flow. The lifetimes of the doublet before cold bubble breakthrough will be associated with this.

This work is part of the UPGeo ANR Project coordinated by Paris-Saclay University: UPscaling and heat simulations for improving the efficiency of deep GEOthermal energy (<https://hebergement.universite-paris-saclay.fr/upgeo>). The modelling will be carried out using a research reservoir simulation tool and interactions with IFPEN's applied mathematics teams may be necessary to develop the tool according to requirements.

Keywords: Geothermal energy, geology, sedimentology, reservoir modelling

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BRGM Co-supervisor	Dr. HAMM Virginie
Post-Doctoral location	IFP Energies nouvelles, Rueil-Malmaison, France
Closing date	05/04/2023
Duration and start date	1 year, 01/06/2023
Language requirements	French or English
Other requirements	Geology, hydrogeology, numerical modelling

To apply, please send your cover letter and CV to the IFPEN supervisor indicated here above.

About IFP Energies nouvelles

IFP Energies nouvelles is a French public-sector research, innovation and training centre. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see [our WEB site](#).