POST-DOCTORAL RESEARCHER OPENING

Impacts of sedimentary heterogeneity on low-enthalpy geothermal use and underground thermal energy storage

RESEARCH TEAM

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The 'Fluvial, Eolian and Shallow-Marine Research Group' is seeking a talented and motivated researcher for a two-year project (initial one-year position, renewable) at the Department of Earth and Environmental Sciences of the University of Pavia, Italy.

PROJECT RATIONALE AND DESCRIPTION

Heterogeneous sedimentary aquifers hosted in clastic successions act as low-enthalpy geothermal resources that can be exploited for sustainable heating and cooling, and for the storage of excess energy from renewable sources or waste heat. However, the viability and efficiency of geothermal projects in clastic successions depend crucially on effects exerted by different forms of sedimentary heterogeneity on groundwater flow and heat transfer. For example, lithological compartmentalization and petrophysical heterogeneity are likely to determine the rate of heat loss by advection and diffusion in projects of aquifer thermal energy storage (ATES), or thermal feedback in groundwater heat pumps (GWHP) or geothermal doublets.

This research project aims to investigate the impact of sedimentary heterogeneities on the efficiency and longevity of projects of geothermal exploitation of clastic successions.

The research will consist of the following main activities:

- Characterization of heterogeneities of clastic strata using geological analogues that are representative of subsurface successions of interest for geothermal applications;
- Construction of a suite of geocellular models incorporating different styles of sedimentary heterogeneity, in part using bespoke modelling tools that are developed in-house;

- Application of static models to the simulation of heat transport (e.g., using MODFLOW/MT3D) for different scenarios of geothermal exploitation (e.g., doublet, GWHP, ATES).

One of the expected outcomes of the project will be the systematic categorization of heterogeneities in terms of their magnitude of influence on different geothermal applications. This will enable predictions of thermal behaviour that can be applied for development planning of low-enthalpy geothermal resources in clastic successions.

OFFER

Full-time fixed-term 'Type B' Research Fellowship, for an initial one year, renewable for a further year. The gross annual salary is €28,000.

The Research Fellow will join the 'Fluvial, Eolian and Shallow-Marine Research Group', and will be based at the Department of Earth and Environmental Sciences of the University of Pavia, Italy. There will be opportunity for research visits at the University of Leeds, UK.

https://web-en.unipv.it/research/

https://frg.leeds.ac.uk

The post holder will be supported in undertaking professional development and training.

JOB APPLICATION

Prior to application, interested applicants are invited to send their curriculum vitae and a letter of motivation to luca.colombera@unipv.it

Candidate selection is by public competition: applications inclusive of all requested documents should be submitted via https://pica.cineca.it/unipv (job opening code: **dista-2022-b16**). Selection of the successful candidate is based on qualifications and interview.

Applications must be submitted by 15th December 2022, 12.00 noon CET. Shortlisted candidates will be invited for an interview, to be held in early February 2023, in view of a project start in April 2023.

For more information or guidance on how to apply, please contact luca.colombera@unipv.it

QUALIFICATIONS

The ideal applicant will demonstrate excellent academic standing, a keen interest in applied sedimentary geology, ability to work independently and as part of a team, and willingness to learn new techniques and research tools.

- PhD in Earth Sciences or related discipline (desired)
- MSc in Earth Sciences or related discipline (required)
- Proficiency in English language