PhD position

on prospective hydrogeological modeling

We are looking for candidates for a fully funded PhD position in Avignon, France (UMR EMMAH, Avignon University, Inrae, Hydro and Dream groups).

You are in the last year of a master's degree in geosciences (or related disciplines) or graduated, you have some skills in the the field of modeling, you are concerned about the future of groundwater resources, come and join the UMR Emmah in Avignon (France) in the framework of the PhD research project we propose for the period from Oct. 2023 to Sept. 2026.

For more details, see the description of the research project enclosed.

Period: 01/10/2023 – 30/06/2026

Location : UMR EMMAH (INRAE – Avignon Université), Avignon, France

Application procedure: on line via ADUM (link) platform **before May 5**.

Audition of the selected candidates: **June 8**.

Requirements: At the date of recruitment, the candidate must hold a master's degree in Earth Sciences or in related discipline and be proficient in hydrogeological modeling tools. Skills in common scripting languages (Matlab, R, Python) would be greatly appreciated. Knowledge of geochemical and isotopic tracing as well as agronomy would also be a plus. Candidates must be self-sufficient and must show a real capacity to work in a team in the framework of a multidisciplinary project.

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Remuneration / month :

- For the year 2023/2024: 2044,12 € (1642,85 € net)
- For the year 2024/2025 : 2100 € (1687,75 € net)
- For the year 2025/2026: 2200 € (1768,13€ net)

Project description :

Title: Global change and sustainability of groundwater resources: contribution of isotopes and distributed recharge to prospective hydrogeological modeling.

Abstract:
Groundwater is a key resource in most territories. In a context of climate change, it is essential to assess the sustainability of these water resources and to adapt accordingly the agricultural activities that solicit these resources. To do this, we must rely on models representing the dynamics of groundwater in interaction with surface flows. The calibration of most hydrogeological models is based solely on groundwater levels and relies on simplifying assumptions about aquifer recharge, geometry of the environment and boundary conditions.
Such models can therefore be inaccurate outside the calibration conditions. In fact, a current scientific issue lies in the evaluation of the quality of the simulations proposed by the models in the framework of prospective studies. In this context, we propose to develop a hydrogeological model that takes advantage of a detailed knowledge of the spatial and temporal distribution of recharge by using isotope tracing and surface modeling together. This model will be applied to an aquifer (Crau aquifer, South-East of France) where we already have a first hydrogeological model, long geochemical, isotopic and piezometric data records and a detailed description of the distributed recharge based on crop models. The challenge will then be to evaluate the added value of such an approach compared to the models already proposed and in particular to evaluate the gain obtained in terms of robustness in the framework of prospective simulations. The final goal of the proposed work will be to develop an optimal calibration method for hydrogeological models that can reliably simulate the consequences of expected changes in climate and land use on groundwater resources.