



Subject offered for a contract starting october 2015

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**SUBJECT TITTLE: HVOC contamination of a multilayer system**

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Host lab/ Team :  
**ENS- Laboratoire de Géologie de l'ENS- UMR 8538**

Financing: Doctoral contract with or without assignment

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*For more information go to <http://ed560.ipgp.fr>, section: Offres de these ( PhD offer), You must apply on the Doctoral School website*

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Halogenated Volatile Organic Compounds (HVOC) are mainly organic carbon atoms of chemical compounds that can easily be in gaseous form in the atmosphere. This term covers a group of very large products (1,2-dichlorobenzene, chloroform, vinyl chloride, trichlorethylene ..) from natural and anthropogenic origin. Released into the environment, they will have a harmful effect on soil, groundwater and human health. Each compound has a specific behavior with respect to water. In 1993, the presence of these compounds in boreholes for drinking water was identified. Since then, the quality monitoring shows that the contamination plume is progressing towards the northeast.

The objective of this thesis is to understand the mechanisms of this contaminant migration within the multilayer aquifer system and to reproduce their past spatiotemporal evolution with the aim of predicting their future development. To this end, a multidisciplinary approach combining fieldwork data acquisition, exploitation of available data and hydrogeological modeling will be developed. The work will be organized around the following: i) literature review in particular to reconstruct the history of the dynamics of aquifers and the history of the sources of contamination, ii) characterization of the architecture and hydrodynamic properties of the aquifer/aquitard system, iii) characterization of the spatial and temporal evolution of the HVOC plume, iv) establishment of an appropriate monitoring network, v) characterization of biodegradation and / or retention of HVOC mechanisms and necessary conditions for their development, vi) modeling of flow and transfer of HVOC across the study area. For this study, additional data to those currently available will be required and may lead to implement innovative tools for characterizing the studied system.

**Skills required by candidate:** The candidate must have good skills in geology, hydrology, hydrogeology, geochemistry, geophysics and hydrodynamic modeling.

She/ He will be comfortable on both aspects required for this thesis, i.e.: naturalistic aspects for fieldwork and quantitative aspects for design and implement numerical models applied to the problem posed. Knowledge of programming language will be appreciated.

