

## *Master Thesis proposal*

### Investigating the mineralogy and the history of the black clays of the Hydrogeological Experimental Site of Poitiers

The **Poitiers Experimental Hydrogeological Site (SEH)** is a part of the Network of National Hydrogeological Sites (SNO H+). It is implanted 2 Km southeast from Poitiers – France ([http://hplus.ore.fr/index.php?lang=en&id\\_article=184&](http://hplus.ore.fr/index.php?lang=en&id_article=184&)). This site is managed by the Hydrogeology research group of the HydrASA team of the institute IC2MP of University of Poitiers.

HES water sampling campaigns (April 2007, June 2007 and June 2012) have been done to investigate the chemical properties of the groundwater. **Selenium concentrations above the threshold toxicity adopted in France (10 ppb)** were measured by ICP-MS in some wells marked by a star in the figure 1.

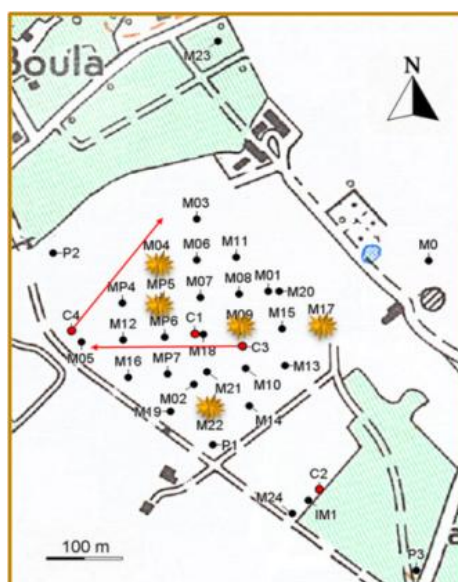


Fig 1: The Deffend Hydrogeological Experimental Site

Total rocks analyses performed on the samples representing all the geological facies from the oblique well dedicated fore core sampling C4 has shown that **selenium is concentrated in black clays that fill kart cavities. A complete mineralogical and petrographic study of the black clays was never done, and the origin and the evolution of these clays are not fully known.**

A new non-destructive called C<sub>5</sub> well was completed in December 2012 in order to extract fresh black clays. This new well C<sub>5</sub> has allowed us to extract successively a column of black clays from 65.9 m to 71.25m depth.



Fig 2: Extracted black clays – Well C<sub>5</sub>

## Objectives:

This master has the following objectives:

- 1- Complete the **mineralogical study** of the black clays by using many experimental methods and techniques (XRD, FTIR, EDX-SEM, TEM, laser granulometry ...).
- 2- Interpret the experimental results obtained using the **regional geological history**, the mineralogical characteristics of the hydrogeological system and bibliographic data in order to know the **origin and the history of the studied black clays**.
- 3- Use **particle size sorting** and **density sorting** in order to better understand the distribution of the selenium in the geological matrix (the size fraction and/or the density fraction in which selenium is the most concentrated).

## Skills Sought:

The suitable candidate must have these competencies:

- 1- He/she will **behave correctly and scientifically** in the laboratory.
- 2- He/she must have solid knowledge of **clays, soil science, petrology and geochemistry**.
- 3- He/she masters well **XRD** and at least one of these techniques: **FTIR, SEM, and TEM**.
- 4- He/she masters well his/her English.

**It is strongly recommended that interested candidates take contact with one of the supervisors before sending a CV and a motivation letter to [aude.naveau@univ-poitiers.fr](mailto:aude.naveau@univ-poitiers.fr).**

### Supervisors:

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