



HAL
open science

pXRF measurements on soil samples in the vicinity of a W deposit and Nb-Ta prospect: example from the Echassières district (France)

Bruno Lemièrre, P Sarala, Anne-Sophie Serrand, Eric Gloaguen, Eric Fournier, Frédéric Lacquement

► To cite this version:

Bruno Lemièrre, P Sarala, Anne-Sophie Serrand, Eric Gloaguen, Eric Fournier, et al.. pXRF measurements on soil samples in the vicinity of a W deposit and Nb-Ta prospect: example from the Echassières district (France). 2020. hal-02479091

HAL Id: hal-02479091

<https://hal-brgm.archives-ouvertes.fr/hal-02479091>

Preprint submitted on 14 Feb 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

pXRF measurements on soil samples in the vicinity of a W deposit and Nb-Ta prospect: example from the Echassières district (France)

Lemiere, B.¹, Melleton, J.¹, Sarala, P.², Auger, P.¹, Derycke V.¹, Serrand, A., Gloaguen, E.¹, Fournier, E.¹, Lacquement, F.

¹French Geological Survey, BRGM, Orleans, France

²Geological Survey of Finland, GTK, Rovaniemi, Finland

b.lemiere@brgm.fr

Abstract: In order to face the challenges of mineral exploration in inhabited areas, portable XRF (pXRF) is gaining attention as a low-footprint exploration technique. To evaluate it, we revisited historic mining districts, simulating grassroots exploration with pXRF, within the UpDeep project under EIT-RM EU funding. A specific attention was given to strategic metals and mineral resources. A first study on a Sb district was presented at AIMS 2019 (Lemiere et al., 2019).

The second study was led around an historic W and kaolin district (Echassières, central France) where modern Nb-Ta-Li exploration is going on in an agricultural and forested area. We performed top soil sampling (Ah and B horizons) along profiles to understand better the endogenic geochemical anomaly signals.

The survey, limited to a fraction of the mining area, succeeded in recognising fault-controlled anomalies of several types (Cu-Sn-As, Fe-As) besides the cupola type W-Sn-As anomalies. Li and Be being beyond pXRF capabilities were not targeted.

Despite of an expected bias with laboratory analyses, pXRF measurements effectively located the various mineralised structures, thanks to their multi-element capabilities.

Composition data processing (CoDa) and horizon-selective sampling significantly improved the efficiency of the method. On-site measurements allow dynamic sampling and mapping, helping laboratory sample selection for further investigations.

The very high As background extending beyond mineralised areas is actually controlled by a NNE-SSW faults system. It can be used as a guide to possible fertile structures, but also to barren ones. The main Sn-W anomalies are located along a known structure, but much beyond previous mining works. Cu-Sn anomalies along another structure seem to confirm the location of ancient mining works.

Keywords: pXRF; tungsten; niobium; tantalum; arsenic; copper; mineral exploration; Echassières kaolin district