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1395 - Exploration geochemistry: comparison between classic trace elements geochemistry, soil partial leaches, portable XRF, on soils and biogeochemistry in Western Europe Environment. Example from Li-Ta-Sn and W deposits

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In Europe, exploration geochemistry is mainly restricted to classical soils geochemical analyses based on total or near total digestion of samples, despite the good results obtained in other areas with approaches related to selective and partial leaches, in particular to reveal anomalies linked to deeply buried deposits. Similarly, examples of biogeochemistry usage in continental Europe remain anecdotic. However, with the actual detection levels in analytical methods and the knowledge about metals accumulation reached in a large spectrum of plants, biogeochemistry has already been successfully tested in various environments and over distinct deposit types.

Within the UpDeep project (European Institute of Innovation and Technology - Raw Materials) framework which aims to develop the geochemical expertise on deep buried exploration in Europe, a comparison of some of these surface geochemical methods were performed in the vicinity of the Beauvoir rare-metals (Li-Ta-Sn-Be) granite and La Bosse stockwork (W), located in the Variscan French Massif Central.

One of the challenging questions of exploration geochemistry in Western Europe is the long-term anthropogenic contamination related to past mining activities but also agricultural and forestry activities, which can strongly affect the primary geochemical anomalies especially in soil horizons and plants. In the studied area, mining activities extended from Antiquity to the middle of the last century, and forestry has been conducted intensively.

Within the scope of testing different well documented approaches, around 160 samples of soils were collected, on which has been performed separately the following treatment: deionized water leach, sodium pyrophosphate leach, and Aqua Regia digestion on Ah horizon; and hot hydroxylamine leach, Ionic LeachTM (ALS) and Aqua Regia digestion on B horizon. Meanwhile, soil samples have also been analyzed by pXRF.

Moreover 84 samples of fern, 80 samples of bramble and 64 samples of Douglas fir were sampled in order to compare their respective geochemical signal. In this Western European context, selection of a homogeneously distributed vegetation media represents a complex issue.