

## Geochemistry of tin in the southern part of the Silesian Upland

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### Introduction

Majority of soils from the southern part of the Silesian Upland are highly degraded and contain elevated levels of the toxic heavy metals [1]. Therefore, the purpose of presented studies was evaluation of tin pollution and determination of its mobility and bioavailability in soils from the investigated area.

In this work the soil samples were taken from industrial area. The soils samples were collected from two depths: topsoil (0, 0-0, 3 m) and subsoil (0, 8-1, 0 m). Comparison of elements concentration between topsoil and subsoil allows identification of the source of pollution (natural or anthropogenic).

### Results

Considerably degree of chemical degradation was observed in both types of analyzed samples. The subsoil and topsoil samples were rich in tin (subsoil – 1265 mg/kg, topsoil – 37 mg/kg). Moreover, in both samples were noticed high concentration of copper, mercury, lead, arsenic and sulphur.

The sequential extraction experiments according to BCR method [2, 3] showed minimal tin mobility in the analyzed samples (almost 99% of tin was leached in the 4th step with aqua regia). The X-ray diffraction (XRD) analysis of selected samples showed the lack of tin minerals in the investigated soil. However, found the presence of quartz, clay minerals, calcite and gypsum.

[1] A. Pasieczna (2010) Detailed geochemical map of Upper Silesia 1:25000. [2] G. Rauret, J. F. López-Sánchez, A. Sahuquillo, R. Rubio, C. Davidson, A. Ure *et al.* (1999) *J. Environ. Monit.* **1**, 57–61. [3] J. M. Hernández-Moreno, J. I. Rodríguez-González, M. Espino-Mesa (2007) *Eur. J. Soil Sci.* **58**, 419–430.

## Mesoarchean gabbroanorthosite magmatism of the Kola Region (Russia)

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The Kola peninsula is the region marked with development of anorthosite magmatism in the NE Baltic Shield. The Archaean gabbroanorthosites intrusions - Tsaginsky, Achinsky and Medvezhe-Schuchezersky - have the age of 2.7-2.6 Ga. The Patchemvarek and Severny gabbroanorthosites intrusions are located in the junction zone of the Kolmozero-Voronja greenstone belt and the Murmansk domain. Age data for sedimentary-volcanogenic rocks of the Kolmozero-Voronja belt and Murmansk domain granitoids are 2.8-2.7 Ga.

The gabbroanorthosites intrusions have more calcic composition (70–85% An) of normative plagioclase, and low contents of TiO<sub>2</sub>, FeO, and Fe<sub>2</sub>O<sub>3</sub>. U–Pb zircon dating established Mesoarchean ages of 2925±7 and 2935±8 Ma for the gabbroanorthosites of the Patchemvarek and Severny massifs, respectively. The gabbroanorthosites of the studied massifs have fairly low REE contents (Ce<sub>n</sub> = 2.2–4.2, Yb<sub>n</sub> = 1.6–2.6) and distinct positive Eu anomaly. Comagmatic ultrabasic differentiates have practically unfractionated REE pattern, low total REE contents (Ce<sub>n</sub> = 1.2, Yb<sub>n</sub> = 1.1, La/Yb<sub>n</sub> = 1.32), and no Eu anomaly. The studied samples of the Archean gabbroanorthosites are characterized by positive εNd = +2.68 for the gabbroanorthosites of the Severny Massif and from +2.77 to +1.66 for the Patchemvarek Massif. The rocks of the Severny and Patchemvarek massifs has <sup>87</sup>Sr/<sup>86</sup>Sr<sub>i</sub> = 0.70204±8 and <sup>87</sup>Sr/<sup>86</sup>Sr<sub>i</sub> = 0.70258±8, respectively. The differences in the initial <sup>143</sup>Nd/<sup>144</sup>Nd ratios between the Neoproterozoic and the Mesoarchean gabbroanorthosites suggest the existence of two mantle sources. One of them produced intrusions with an age of 2.67–2.66 Ga, while other was responsible for the formation of massifs with an age of 2.93–2.92 Ga.

The gabbroanorthosites of the Patchemvarek and Severny massifs were presumably derived from MORB-type basalts of oceanic settings, while the Tsaginsky, Achinsky, and other anorthosite massifs of the Neoproterozoic age were generated from subalkaline magma formed in within plate anorogenic setting. The Sm–Nd isotope data suggest the existence of several mantle sources in the Kola region, which produced melts for different-age gabbroanorthosite massifs since Mesoarchean to the middle Paleoproterozoic.