The presence of metal ions such as Al and Fe increases the stability and accumulation of soil organic matter (SOM), which is particularly important due to the carbon sequestration issues and potential decrease of CO_2 in atmosphere. However, we do not know anything about the role heavy metal ions (Zn, Cu, Pb, Cd, Hg) in this process. Therefore, we hypothesized that metal pollutions may accumulate in topsoil and enhance stabilization and accumulation of SOM. We should also describe the potential this heavy metal pool to be released again to the environment, due to forest management. There is also a question if forest species composition may influence the relationships between ions in soil? The investigations will be carried out in the way allowing to show spatial and temporal variations of heavy metal pollutions. In each case the sampling procedure will cover an area of wide transect (50x100m) oriented perpendicularly to the roadway (pollution source). Samples will be subjected to the number of laboratory analysis, including basic soil analysis as well as SOM fractionation, extraction of heavy metals with 1M HCl, total elemental analysis and selected biological soil properties. Due to high costs of the heavy metal analysis we also planned several extra tasks addressed to development of simple test allowing to assess in fast and non-expensive way (near infra red or magnetometry) the content of heavy metals in soils.

The proposed project is aimed on the knowledge from several fields, particularly soil science, carbon sequestration, carbon balance, forestry and environmental protection. Recognition of the role of heavy metals as an element of soil cation exchange capacity and stabilization agents on the background of variable parent materials and forest types seem to be of particular importance. Simplified method of soil pollution assessment, particularly in the geostatistical approach, are also valuable.