MURmap – Holistic geochemical tracking of elements and their sources in the Mur/Mura River Catchment

Moser, Ulrike[1]; Čeplak, Barbara[2]; Aldrian, Alexia[3]; Hočevar, Samo[4]; Kralj, Polona[2]; Prohaska, Thomas[1]; Šala, Martin[4]; Vollprecht, Daniel[3]; Žibret, Gorazd[2]; Irrgeher, Johanna[1]

1 Chair of General and Analytical Chemistry, Montanuniversität Leoben, Franz-Josef-Straße 18, A-8700 Leoben, Austria; 2 Geological Survey of Slovenia, SI-1000 Ljubljana, Slovenia; 3 Chair of Waste Processing Technology and Waste Management, Montanuniversität Leoben, A-8700 Leoben, Austria; 4 Department of Analytical Chemistry, National Institute of Chemistry, SI-1000 Ljubljana, Slovenia.

In the project MURmap, new scientific knowledge of the environmental geochemistry of conventional and modern inorganic pollutants is obtained on a European river catchment on the example of the Mur/Mura River. In the following, a holistic approach towards cross-border geochemical elemental and isotopic tracking of the fluvial system and its tributaries will be carried out. The project aims at the determination of (1) natural geochemical background of the catchment area, (2) historical and recent anthropogenic sources of chemical elements, (3) interaction of chemical elements between solid and liquid phases in different physical and chemical water conditions, (4) individual particles as carriers of specific pollutants, (5) differences in the elemental composition of water and sediments in high, medium and low water regime (6) the potential contamination and baseline levels of emerging modern high-technology pollutants, (7) chemical and isotopic composition (based on XRF and MC ICP-MS) of drainage systems, including drainage waters and drainage sediments and (8) at the establishment of sampling, analytical and data curation protocols for such a complex dataset. The obtained data and information will be (9) merged into an easily understandable set of ecological indicators and maps. In three campaigns (May 2022, August 2022 and February 2023) water samples, suspended particulate matter, and alluvial and stream sediment samples are taken and processed to geochemically and mineralogically characterize the Mur catchment area. First sample analyses taken in 2022 at selected sites show already a wide-ranging occurrence and variation in elements and are discussed along with geological background data and historical land use within the area.