# Handheld ED-XRF spectrometers in geochemical investigation - the comparative studies for glacial deposits (Spitsbergen)

Lidia Kozak[1,1,1], Juliana Silva Souza[1,1,1], Adam Nawrot[2,2,2], Jedrzej Proch[1,1,1], Marcin Kazmierski[3,3,3], Agnieszka Zawieja[4,4,4], and Przemyslaw Niedzielski[5,5,5]

[1]Adam Mickiewicz University
[2]Institute of Geophysics Polish Academy of Sciences
[3]Adam Micvkiewicz Universsity
[4]MEWO
[5]Adam Mickiewicz University in Poznan Poland

November 30, 2022

**Abstract**

This study presents the determination of the content of selected metals: Ba, Ca, Fe, Nb, Rb, Sr, Y, Zn, Zr in postglacial deposits from two glacial valleys (Ebbadalen and Elsadalen) in the Petunia Bay (southern Spitsbergen). Deposits analyses were performed using X-ray fluorescence (XRF) in parallel with two portable spectrometers from different manufacturers to investigate the accuracy and reliability of the instruments. Statistical analysis of the results indicated that the measurements carried out with two spectrometers are statistically significantly different, which is probably due to the different calibration characteristics used by the manufacturers of XRF spectrometers. However, the analysis of the spatial distribution of element concentrations using Geographic Information System (GIS) tools showed that the distribution maps of element concentrations were similar regardless of the spectrometer used in the analyses.

# Handheld ED-XRF spectrometers in geochemical investigation – the comparative studies for glacial deposits (Spitsbergen)

Lidia Kozak[1], Juliana Silva Souza[1], Adam Nawrot[2]. Jędrzej Proch[1], Marcin Kaźmierski[3], Agnieszka Zawieja[4], Przemysław Niedzielski[1]*

[1]*Adam Mickiewicz University in Poznań, Faculty of Chemistry, Department of Analytical Chemistry, 8 Uniwersytetu Poznanskiego Street, 61-614 Poznań, Poland*
[2]*Institute of Geophysics Polish Academy of Sciences, 64 Księcia Janusza Street, 01-452 Warszawa, Poland*
[3]*Adam Mickiewicz University in Poznań, Faculty of Geographical and Geological Sciences, 10 Bogumiła Krygowskiego Street, 61-680 Poznań, Poland*
[4]*MEWO S.A., Starogardzka 16, 83-010 Straszyn, Poland*

* *correspondence: pnied@amu.edu.pl*

## Abstract

This study presents the determination of the content of selected metals: Ba, Ca, Fe, Nb, Rb, Sr, Y, Zn, Zr in postglacial deposits from two glacial valleys (Ebbadalen and Elsadalen) in the Petunia Bay (southern Spitsbergen). Deposits analyses were performed using X-ray fluorescence (XRF) in parallel with two portable spectrometers from different manufacturers to investigate the accuracy and reliability of the instruments. Statistical analysis of the results indicated that the measurements carried out with two spectrometers are statistically significantly different, which is probably due to the different calibration characteristics used by the manufacturers of XRF spectrometers. However, the analysis of the spatial distribution of element concentrations using Geographic Information System (GIS) tools showed that the distribution maps of element concentrations were similar regardless of the spectrometer used in the analyses.