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

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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.