Comparison of Calculation Methods for Analysis of Soil Samples

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The environmental impact of heavy metals in soil is well known. Knowing the concentrations of these elements with good accuracy is important in monitoring and remediation activities, and XRF is becoming an accepted technique for testing concentrations of heavy metals in soil. However, soil samples present difficulties in XRF measurement due to highly variable matrices, large variations in moisture content, heterogeneity, etc. Therefore, developing a general method to measure all soil samples is challenging. Fundamental Parameter (FP) methods, which normally can correct for the largest deviations in samples, may break down in the presence of mineralogical effects. Calculation methods ranging from pure FP to completely empirical were tested for soil samples. Tests were done on data quality within the range of calibration standards and outside the range, probing both accuracy and flexibility of the calculation methods. The matrix effect of varying light elements was also studied.