## **EVALUATION OF MATRIX EFFECTS**

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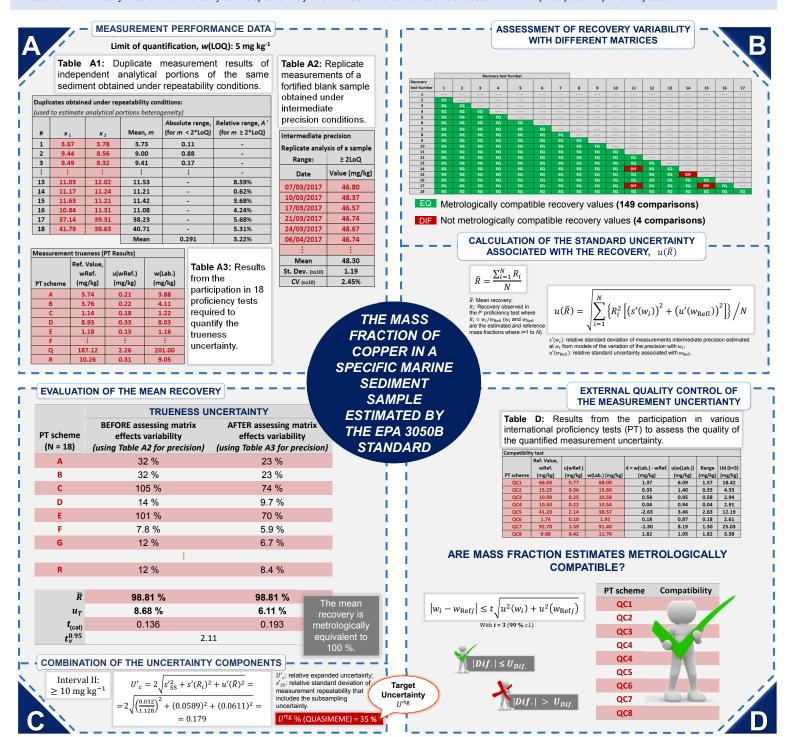


## **ABSTRACT**

The measurement of trace levels of analytes in complex matrices, such as the copper in marine sediments, is frequently affected by matrix effects that vary with the analysed item. In some cases, the determination of the analyte in items of the same class, such as marine sediments, are affected by different matrix effects due to the different parameters that characterize the sediments: mineralogy, grain size, metal characteristics, pH, organic matter, and oxidation-reduction potential.

Since the measurement precision uncertainty does not reflect the impact of uncertainty components constant in estimated precision conditions on the measurement result, these effects are, partially or fully, quantified in the trueness uncertainty component.

This work presents a methodology to separately quantify the variability of matrix effects in complex measurements in order to decide about the need to improve measurements robustness to these effects. This methodology is based on the comparison of the mean recovery estimated from the analysis of various reference materials<sup>[1]</sup> and was applied to measurements of heavy metals in sediments by atomic spectrometry where measurements trueness was assessed from the participation in proficiency tests.



## FINAL REMARKS

- The developed methodology allowed the reliable evaluation of the uncertainty of measurements affected by matrix effects;
- The developed methodology can be used to calculated the precision due to matrix effects ( $s'_M = \sqrt{s'_R^2 s'_I^2} = \sqrt{(0.0589)^2 (0.0322)^2} = 0.0493$ );
- Two models of the measurement uncertainty were developed for two mass fraction intervals (Interval I: < 2w(LOQ); Interval II: ≥ 2w(LOQ), presented in this poster).