

Analysis of Activity Concentrations to Effective Sample Position in International Data Centre Products Using the Monte Carlo Simulation

Wednesday, 21 June 2023 11:48 (1 minute)

The International Monitoring System radionuclide particulate systems of the CTBTO network are equipped with one of the following three system types: CINDERELLA, RASA and manual. Each system commonly involves sampling, decaying and acquisition processes. Whereas the entire processes are automatically conducted in both the CINDERELLA and the RASA systems, ensuring high reproducibility of the measurement geometry, manual systems require human interventions. During the acquisition process, specifically, the decayed sample is manually placed on the detector endcap by operators. Since a sample holder is not necessarily used at the stations, the repeatability of the measurement geometry can be compromised by the mispositioning of the sample, with the consequence of introducing bias in the calculated activity concentrations. This study aims at investigating the impact of variations in the sample positioning on the calculated activity concentrations of radionuclides in measured samples, using Virtual Gamma Spectroscopy Laboratory (VGSL), a Monte Carlo based simulation tool. Possible scenarios were simulated to investigate whether variability in sample positioning has a noticeable impact on the isotope quantification reported in International Data Centre products.

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Promotional text

Are sample holders a must for measurement repeatability? How much do they affect the isotope quantification in IDC products? This study performs the sensitivity analysis of activity concentrations to effective counting geometry in IDC products.

Oral preference format

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Session Classification: Lightning talks: P2.2, P3.2, P3.6

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.6
Analysis of Radionuclide Monitoring Data