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Investigation on Sample Association Using Decay Consistency Analysis for Consecutive Level C Samples and Prior/Post Level B Samples

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For the enhancement of International Data Centre products, specifically, the Standard Screened Radionuclide Event Bulletin (SSREB), an important step is to establish methods to associate the detections of CTBT-relevant nuclides in different samples with the same release to characterize its source for the purpose of nuclear explosion monitoring. Episodes of anomalous activity concentrations at the International Monitoring System (IMS) radionuclide stations are the first guess for being related to the same release. For multiple isotope observations, the consistency of their isotopic ratios in subsequent samples with radioactive decay is another plausible hint for one unique release. We show case studies of consecutive Level C samples and prior/post Level B samples used to demonstrate the effectiveness of sample association, whereas atmospheric transport modelling (ATM) is applied to identify the air masses that link the release to multiple samples. This approach forms the stepping stone to defining analysis procedures and criteria for automatic sample association for the SSREB, which is relevant for expert technical analysis.

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Promotional text

Sample association using decay consistency analysis is one of useful methods for characterization of the emission source.

Oral preference format

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