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Nuclear Debris Characterization by Fission Isotope Assessment

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Radionuclide isotopic composition analysis is an important and reliable tool for determination of the artificial radionuclide source. As each anthropogenic emission could be characterized by its own unique radionuclide composition, these „fingerprints“ make it possible to determine the evidence of radionuclide contamination source. Gamma spectrometric measurements were performed with the state-of-the-art “Ortec” alpha spectrometer and gamma spectra were recorded by SILENA gamma-spectrometric system with an HPGe coaxial detector. Radionuclide isotopic ratios were measured by a high resolution sector field mass spectrometer combined with a high sensitivity APEX sample introduction system. Elevated $^{137}\text{Cs}/^{239,240}\text{Pu}$, $^{238}\text{Pu}/^{239,240}\text{Pu}$, $^{240}\text{Pu}/^{239}\text{Pu}$ isotopic “finger print” values reliably reveal a nuclear event and assess its source by fusing these values with atmospheric transport modelling. The report discusses the areas of uneven “hot” particle deposition and large, vast “hot” spots.

Promotional text

The report discusses the formation of uneven nuclear debris “hot” particle deposition areas and covers large, vast “hot” spots assessment accomplished during radionuclide monitoring.

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