



ID: P2.3-058

Type: E-poster

research reactors as source of radioxenon from neutron activation of stable xenon?

Some strong indications were identified to confirm nuclear research reactors (NRRs) as a possible source of radioxenon emission generated by neutron activation from stable xenon. This source type is of high relevance to nuclear explosion monitoring for two reasons. First, the isotopic activity ratios may be confused with nuclear explosion signals. Second, neutron activation generates other radioxenon isotopes which would interfere with spectral analysis of IMS samples. Whether neutron activation may be a significant source is still not generally accepted in the expert's community. All relevant data found in the literature are gathered in multi-isotope activity ratio plots and compared with their own simulations. The plots involve emission data of five NRRs (HFIR, Texas TRIGA, Vienna TRIGA, FRM II and HANARO), as well as a typical light water reactor operational cycle, nuclear explosion scenarios and screening lines as context information. A confusing mismatch between the measured data and the results of simulations is found and discussed. This study finds evidence for at least one reactor being a strong source of radioxenon from activation. The purpose of this presentation is to inspire further discussion of these discrepancies and to advance the common understanding of radioxenon emissions resulting from neutron activation.

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Session Classification: P2.3 Atmospheric and Subsurface Radionuclide Background and Dispersion

Track Classification: Theme 2. Monitoring events and Nuclear Test Sites: T2.3 Atmospheric and Subsurface Radionuclide Background and Dispersion