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in nuclear explosion monitoring using predictive source models for radioxenon discharges from nuclear facilities

Radionuclide monitoring for nuclear explosions requires sufficient information and an adequate understanding of existing radioxenon sources which are frequently observed as background in atmospheric noble gas samples. In the absence of measured discharge data from nuclear installations, one can only revert to rough approximations of discharges based on publicly available information. In many cases, only generic estimates of annual total releases are available, and typically, a continuous discharge of the average amount is assumed. Using release data collected by the Source Term Analysis of Xenon (STAX) project offers a solid basis for the creation of source models for medical isotope production facilities (MIPFs) and nuclear power plants (NPPs). This presentation provides example source models for three model categories which include: patterns, distributions, and discharge characterizing parameters. The source models' usefulness in nuclear explosion monitoring is demonstrated through specific applications of event screening and through the use of expert technical analysis methods to identify a release event time, location, source strength, and source type. Some of the models facilitate disentangling different sources that influence the same samples.

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