

# Ratio Distributions of Radioxenon at International Monitoring System Radionuclide Stations Using Emissions from Nuclear Facilities with Decay Correction Based on the Atmospheric Transport Time Distributions Between These Facilities and Stations

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The isotopic ratios of radioxenon can be useful for discrimination between CTBT-relevant radioxenon detections and civil nuclear facilities. In this presentation, the isotopic ratio distributions of emissions from the civil nuclear facilities, are evaluated first in order to test and demonstrate this methodological approach. Second, the source-receptor sensitivity fields calculated operationally with atmospheric transport modelling are utilized to determine the atmospheric transport time distributions between these facilities and the International Monitoring System (IMS) radionuclide stations. Then, the isotopic ratio distributions that can be expected for measurements at IMS stations can be calculated by folding these two kinds of distributions (emission and atmospheric transport time) while applying the radioactive decay equations. Finally, we compare these calculated isotopic ratio distributions of measurements at IMS stations with the real isotopic ratio distributions of measurement at IMS stations. This investigation can help to develop methods for screening by distinguishing between normal (based on known sources) and anomalous isotopic ratios. It may also be useful for discrimination between CTBT-relevant radioxenon detections and estimated observations based on emissions from known nuclear facilities as part of the effort of developing a Xenon Background Estimation Tool (XeBET).

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## Promotional text

The typical radioxenon isotopic ratios as released from nuclear facilities are well known. However, due to the short half-life, the ratios have changed before reaching the IMS stations. This presentation shows what ratios to expect at the stations.

## Oral preference format

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