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Attribution of the radioxenon release sources, detected by SAUNA III and three SAUNA Q_B networks in Lithuania

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INTRODUCTION AND MAIN RESULTS

This presentation provides insights related to the possible sources attribution and the latest results of radioxenon measurements in Lithuania, obtained by recently (at the end of 2024) commissioned a network of three SAUNA Q_B and one SAUNA III atmospheric radioxenon measuring stations in Lithuania.

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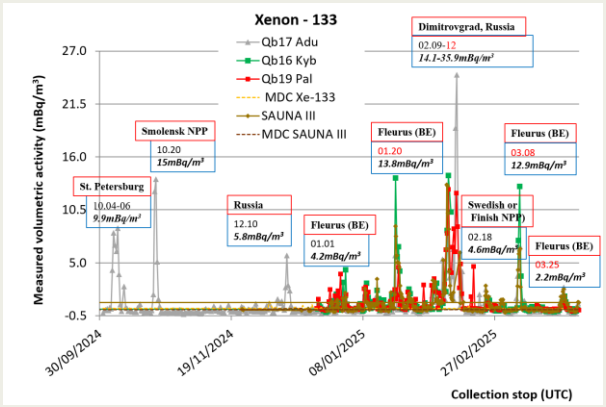
Introduction

- Radiation Protection Centre has launched a network of three SAUNA QB and one SAUNA III atmospheric radioxenon measuring stations in Lithuania.
- Measurements are performed regularly since the end of 2024 and the number of episodes with the elevated radioxenon (mostly Xe-133) concentrations were detected.

SAUNA III and SAUNA QB locations in Lithuania

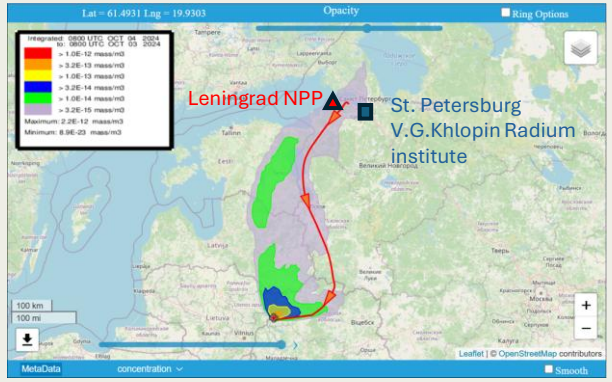
Methods/Data

SAUNA Lithuanian network measurements



HYSPLIT backward modelling

HYSPLIT backward trajectory and dispersion atmospheric transport modeling allowed us to identify the most probable radioxenon release source, attributable to each episode of contamination (see example).



Results

The analysis revealed:

- In the most of the cases detected radioxenon was transported from the direction of medical isotope production facilities in Belgium (IRE Fleurus).
- In some cases, possible radioxenon atmospheric releases from the medical isotope production facility in Poland (Maria reactor near Warsaw) were indicated.
- Potential release sources were also identified in neighboring nuclear power plants located in Belarus, Finland, southern Sweden, as well as in Ukraine and Russia.

Observation:

- In the case of distant source of release, all 4 measuring stations observed similar radioxenon activity approximately at the same time. However, the releases from the close source (e.g. potentially Belarusian NPP) triggered only the closest SAUNA stations.

Conclusions

The usage of the non-stop radioxenon measurements data obtained in the network of 4 different stations in Lithuania allows us to trace the detected possible sources of release with improved certainty.

The implementation of the PSR and FREAR methods for source attribution analysis is currently in progress.

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