SnT 2025
8 SEPTEMBER ONLINE DAY
9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

T2.3-416

Comparison of Xe-133 activity concentration background in the Northern and Southern Hemispheres

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CTBTO PREPARATORY COMMISSION | PUTTING AN END TO NUCLEAR EXPLOSIONS

INTRODUCTION AND MAIN RESULTS

This is a study of radioxenon Xe-133 background in the Southern and the Northern hemispheres.
Data of eight CTBTO stations in Northern and Southern hemispheres were analyzed since 2014 to 2024 with Toolkit software.
Data of different stations were separated by hemispheres, seasons and split depending on the level of activity concentration of Xe-133.

Results shows that the Xe-133 activity concentration in the Southern Hemisphere is lower than in the Northern one. After Covid-19 pandemic the background of Xe-133 in the Southern Hemisphere raised due to increase of radiopharmaceuticals production.

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Introduction

Radioxenon Xe-133 is present in the emissions of NPP and nuclear weapon explosion.
CTBTO stations monitoring Xe-133 activity concentration and provide data from different parts of the world.

Methods

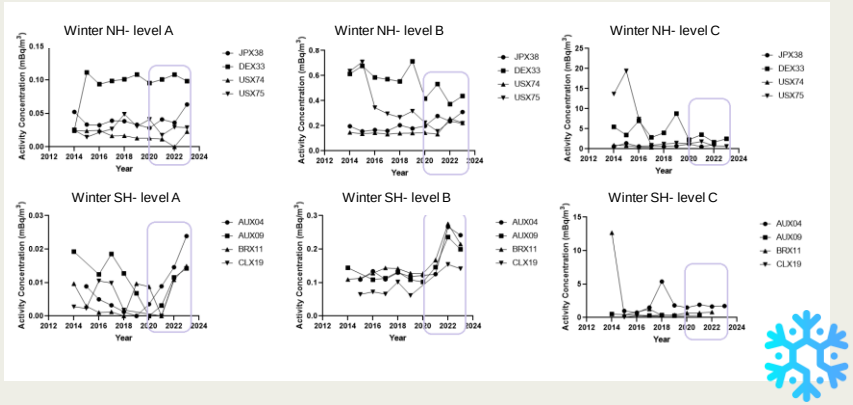
Data from different stations were separated by seasons and split depending on the level of activity concentration of Xe-133, as well they were differentiate in both hemispheres.

Eight stations data were analysed since 2014 to 2024 in order to study the background of Xe-133:

- **Northern Hemisphere**: DEX33 (Germany), JPX38 (Japan), USX74 (USA), and USX75 (USA); and
- **Southern Hemisphere**: AUX04 (Australia), AUX09 (Australia), BRX11 (Brazil), and CLX19 (Chile).

Results

Xe-133 activity concentration in the Northern Hemisphere is more than 2 times greater than in the Southern one.
In general, in the Northern Hemisphere, continuous quantity of radioxenon activity concentration were in all stations; DEX33 station shows the highest concentrations of activity, around 2-3 times greater than the other stations.
In the Southern Hemisphere, for levels A and B, Xe-133 concentration activity increased since 2020.



Conclusions

The production of the nuclear power plant reactors and research reactors in the Northern hemisphere is higher than in the Southern Hemisphere, so the Xe-133 activity concentration is also greater.

The Northern Hemisphere exhibits a continuous radioxenon activity concentration in the environment due to a continuous production.

In the Southern Hemisphere, since Covid-19 pandemic, radiopharmaceuticals production increased, and therefore the Xe-133 air activity concentration rose as well.

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