

Radioxenon's Local Sources by Studying the Seasonal Variability of Worldwide Atmospheric Background: Application to JPX38-Takasaki Detections

Radioxenon background can be locally complex, and may be due to the contribution of local and distant sources. This study also shows that seasonal variability of the global circulation can affect drastically the local nature of the background. By comparing IMS noble gas stations detections and calculated radioxenon background, it can be highlighted inconsistencies indicating that a local sources exist and must be taken into account. In this study, we focus on JPX38-Takasaki, Japan, IMS station carried out during 2012. Despite the shutdown of Japanese nuclear power plants after the Fukushima accident and the restart of two reactors in August 2012, the measured background is roughly equivalent to that observed before the Fukushima accident. However, the simulations show that during the summer period background levels should be very low, which was not observed. The detailed analysis shows that during summer period air masses came from the east of the station. On the contrary, during winter, air masses came mainly from west and the Asian continent. It is shown that summer radioxenon peaks are mainly due to releases from a medical radioxenon facility located near Tokyo, while peaks observed in winter can be mainly attributed to the releases of distant plants.

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