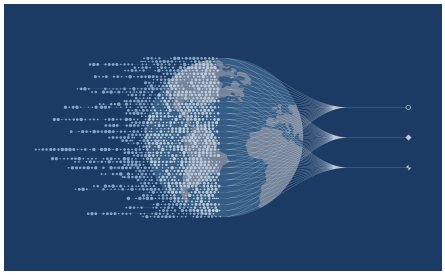

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of the influence of radioxenon releases from civil nuclear activities on measured air concentrations by CTBTO IMS stations using atmospheric transport modeling (ATM)

Monitoring atmospheric radioxenon concentration is crucial for verifying compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and may confirm the nuclear nature of an underground explosion. The International Monitoring System (IMS) collects and analyzes air samples to determine the activity concentrations of four radioxenon nuclides (131mXe, 133mXe, 133Xe, 135Xe). Multiple civil sources, such as nuclear power plants and medical isotope production facilities, contribute to the background levels of radioxenon. This can potentially mask signals from a nuclear explosion. The understanding of the influence of known emissions on the observed radioxenon level is of crucial importance for treaty verification. This study uses ten years of IMS observation data (AUX04, AUX09, NZX46 and BRX11) to infer radioxenon source strengths from the Australian Nuclear Science and Technology Organisation (ANSTO), Nuclear Technology Products (NTP) and National Atomic Energy Commission (CNEA) medical isotope production facilities. The results of case studies are used to demonstrate the method. The parameters of interest are maximum discharge rates, variability and uncertainty of inferred source strength and the estimate of total annual releases. The source strength of NTP is the least well known parameter so far, but it is thought to be the strongest source worldwide.

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