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Impact of environmental backgrounds on atmospheric monitoring of nuclear explosions: selected results

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The International Monitoring System (IMS) was designed based on planned sensitivity estimates, such as radionuclide (RN) system minimum detectable concentration (MDC), but without knowledge of background levels. Recent background simulations and atmospheric transport modeling calculations show that for most of the Earth, using MDC values is still reasonable. However, for a number of locations, background xenon concentrations are frequently larger than the measurement equipment limitations and impose mild to severe limitations on the size of anomalous signal that can be discerned. The authors have calculated maps and statistical estimators of network capability for computed xenon background levels, using a threshold balanced between the MDC and background intensity and variability. Despite these limitations, xenon continues to be a very worthwhile monitoring method.

Promotional text

Xenon background is a key issue in the performance of the IMS. Understanding this will guide analysis from existing equipment and inform future deployment of next-generation capability.

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