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the background variability of radionuclides at International Monitoring System stations

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A variety of factors influence the atmospheric background of ubiquitous radionuclide signatures, like xenon-133, measured at International Monitoring System (IMS) stations. Variability in the radionuclide background obscures the categorization and discrimination of signals from nuclear weapons testing and civilian and industrial activities tied to medical radioisotope production and nuclear power reactors. The radionuclide background fluctuates due to synoptic weather events, temporal changes in background sources, and site-specific details related to the placement of IMS stations. To better characterize the radionuclide background, we have statistically analyzed a set of factors that may be associated with background variability. These factors include historical IMS measurements, weather reanalysis products, high-resolution spatial topographic and land-use data, and a large collection of atmospheric transport modeling simulations. We use this dataset to assess the relationships between potential background sources, site-specific characteristics, and signals at IMS stations, including an assessment of stations susceptible to large variations in background. This assessment may improve our understanding of the radionuclide background and may aid event characterization and analysis of data at the International Data Centre.

Promotional text

A statistical analysis of variability in background radioxenon reveals important factors associated with fluctuations in radioxenon at IMS stations. This analysis is useful for characterizing and understanding the radionuclide background.

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