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quality impact on the sampling possibilities of the International Monitoring System radionuclide particulate stations

The International Monitoring System particulate radionuclide station air sampler is a specialized device designed to detect and measure radioactive particles in the atmosphere. It forms part of a global network tasked with monitoring adherence to the Comprehensive Nuclear-Test-Ban Treaty. By continuously sampling the air, these stations play a crucial role in detecting unauthorized nuclear activities, thereby enhancing global security and safety. However, poor air quality can diminish sampling efficiency by affecting the airflow rate through the filter, consequently impacting the volume of the analysed air and detection sensitivity. Elevated levels of dust, smoke, or other particles accelerate filter clogging, reducing the samplers performance and potentially obscuring radionuclides. Additionally, weather conditions such as heavy rain, strong winds, and humidity can influence radionuclide dispersion and concentration, complicating detection efforts. This study examines the number of particulate station sampler's impacted by the reduced total sampling volume due to filter clogging. The data is analysed alongside variations in ^7Be concentrations and seasonal atmospheric transport models (where applicable).

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