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Enhanced Analysis of Elevated Radionuclide Detections Using HRATM: A Case Study for the Japanese Region

The Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) monitors radionuclide detections with the International Monitoring System (IMS) and uses atmospheric transport modelling (ATM) to establish a link between the location of detection and potential sources. ATM simulates the movement of released substances into the atmosphere, taking into account synoptic wind patterns and topography. However, global ATM simulations have limitations in estimating transport pathways and concentrations at monitoring and source locations in complex terrain areas, due to small-scale features like convective transport or land-sea breezes. Recently, high levels of radionuclides were detected at several IMS locations on and around the Japanese region, including the IMS NG systems at Takasaki (JPX38) and Wake Island (USX77), as well as the non-IMS system at Horonobe (JPX81). This unusual episode suggests a need for more detailed analysis. The dense network of stations in this area is ideal for using high-resolution ATM (HRATM), which can account for small-scale features. This presentation explores these unusual detection episodes using HRATM to investigate the potential gains in reducing the uncertainty about their origins.

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