

Atmospheric Transport Modelling for the Radionuclides Detection of Northeast Asia in 2010

In May 2010, xenon and its daughter radionuclides were detected at four radionuclide stations in South Korea, Japan, and the Russian Federation. Some scientists estimated that the detected radionuclides had been originated from mountain Mantop where some underground nuclear tests were performed, or Yongbyon site where a small nuclear reactor operated in North Korea. In this study, source regions were estimated using the atmospheric dispersion model LADAS (Lagrangian Atmospheric Dose Assessment System), which has been developed in South Korea. At first, simulations were carried out to estimate the source area by using backward trajectory and atmospheric dispersion models based on measurements of four radionuclide stations. After that, the radionuclides were released from the possible source regions and the calculated concentrations of radionuclides were compared with measurements. From the simulations, possible source regions were estimated in the north east areas of North Korea. Even though there are some uncertainties in estimating unknown source areas due to the lack of measurement stations, the forward and backward atmospheric transport models can be used as good tools for detection of possible release regions from the covert nuclear activities near Northeast Asia.

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