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Transport Modelling for dispersion conditions after the DPRK 2017 nuclear test and the origin of regional xenon detections

For the definite proof of the nuclear origin of an explosion it is necessary that traces of radioactive fission products are released into the atmosphere and measured by radionuclide monitoring stations. The nuclear explosion conducted and announced by the DPRK on 3rd September 2017 was the strongest so far as the seismological analysis shows (see other presentations). The dispersion of potential releases emitted after the September 2017 explosion is investigated using the Lagrangian Particle Dispersion Model HYSPLIT operated in forward mode with GFS/GDAS meteorological data provided by NCEP. In the weeks after the DPRK test explosion occasionally the radioactive isotope xenon-133 was measured at various locations in the region by national means of South Korea. If measured without other isotopes xenon-133 is not specific for nuclear explosions as it is also produced by other nuclear facilities. Backward Atmospheric Transport Modelling is used to assess the potential source regions of those detections. Most of the xenon-133 occurrences in September 2017 seem to originate from background sources but some in October at the IMS station RN58 according to atmospheric backtracking may have emerged from the DPRK test cavity by a small delayed leakage.

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