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for radioxenon signals at IMS stations possibly associated with announced DPRK nuclear tests

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Since the provisional operation of the International Monitoring System (IMS) started, six announced underground nuclear tests were conducted by the Democratic People's Republic of Korea (DPRK) at the Punggye-ri Nuclear Test Site. For the first test (9 October 2006) and the third one (12 February 2013), radioxenon observations were made by IMS stations that were immediately reported to State Signatories as associated with the time and location of the relevant seismic events and, therefore, consistent with the assumption that the observations are reflecting a radioxenon emission from the DPRK test site. The isotopic ratios recorded in April 2013 are considered a strong evidence for the nuclear nature of the seismic event of 12 February 2013. Further investigation by various authors with in-depth scientific analysis, partly applying new methodologies in the domain of atmospheric transport modelling, have revealed that potentially more IMS samples than initially thought may contain traces from the same hypothetical emissions that were already identified or even additional potential emissions occurred and were captured at IMS stations. The applied algorithms are reviewed and the IMS observations are scrutinized. Conclusions are drawn about what future research and development can be recommended for radionuclide monitoring of nuclear tests.

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