



Review of scientific publications on radioxenon signals at IMS stations possibly associated with announced DPRK nuclear tests

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For the purpose of monitoring for compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT), the International Monitoring System (IMS) is being established that includes 40 sensor systems for atmospheric xenon radioactivity, 31 of which were in operation by the end of 2019. Since the provisional operation of this system started, six announced underground nuclear tests were conducted by the Democratic People's Republic of Korea (DPRK) at the Punggye-ri Nuclear Test Site.

This presentation reviews the scientific publications that studied possible relationships of hypothetical emissions from the DPRK test site with detections at IMS stations. For the first test (9 October 2006) and the third one (12 February 2013), radioxenon observations were made that were immediately found being 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. Further investigation by various authors with in-depth scientific analysis, partly applying new methodologies, have revealed that potentially more IMS samples than initially thought may contain traces from the same emissions that were already identified or even additional potential emissions occurred and were captured at IMS stations. A summary of all detections of interest is provided and the level of confidence of possible matches between a hypothetical release and IMS observations as reported in various scientific papers is assessed. Conclusions are drawn about what future research and development can be recommended for radionuclide monitoring of nuclear tests.