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Characterizing sources of emission of radioactive Xenon with the Canadian monitoring network and atmospheric transport modeling

R. D'Amours (1), M. Bean (2), K. Bock (2), I. Hoffman (2), E. Korpach (2), A. Malo (1), T.J. Stocki (2), R.K. Ungar (2)

(1) Canadian Meteorological Centre, Dorval, Canada, (2) Radiation Protection Bureau, Ottawa, Canada (real.d'amours@ec.gc.ca)

As part of its contribution to the Comprehensive Test Ban Treaty verification, Canada is operating highly sensitive noble gas monitoring stations in Ottawa, Yellowknife and St-John's. Occasionally the presence of radioactive Xenon gases is detected at levels significantly above background. With the help of long range atmospheric transport models executed in forward and inverse mode, those observations have been attributed mostly to emissions originating from the Chalk River medical isotope production facility located about 200km west of Ottawa and thousands of kilometers away from the other monitoring sites.

On October 21 and several days afterwards, Xe-133 was observed in Yellowknife at levels significantly above background. The use of atmospheric transport models and the use historical and real time monitoring data on the size and distribution of releases from Chalk River Laboratories allowed us to conclude with a fair degree of certainty that the Xe-133 detected on several of those days could be attributed to a release from the presumed October nuclear test in North Korea.

The presentation describes very briefly the atmospheric modeling tools used and demonstrate with a few examples, how they can be applied to the characterization the noble gas emission emissions from Chalk River. Then an analysis of the modeling for the Yellowknife possible detections of a plume from North Korea is presented.