Geophysical Research Abstracts
Vol. 21, EGU2019-16350, 2019
EGU General Assembly 2019

Source coincidence localization by atmospheric backtracking for radioxenon detections from repeating emitters

J. Ole Ross (1), Andreas Bollhöfer (2), Clemens Schlosser (2), and Lars Ceranna (1)
(1) BGR, B4.3, Hannover, Germany (ole.ross@bgr.de), (2) BfS, RN 6, Freiburg, Germany (abollhoefer@bfs.de)

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) prohibits all kinds of nuclear explosions. For the detection of treaty violations the International Monitoring System (IMS) operates stations observing seismic, hydroacoustic, and infrasound signals as well as radioisotopes in the atmosphere.
In the framework of CTBT monitoring the use of atmospheric Lagrangian Particle Dispersion Models is well established to confine source regions of radionuclide detections. For that Source Receptor Sensitivity (SRS) fields are regularly calculated in backward mode for air samples.
Various localization approaches for combining SRS fields for detections at multiple stations caused by an assumed single source were introduced over the last decade. Especially a simple additive coincidence approach overlapping SRS fields for multiple detections has shown to be quite promising in several test cases.
This method was expanded to evaluate source regions of repeating radioxenon detections at single stations. The simulated source regions of air samples with elevated xenon-133 activity concentrations are stacked in space in order to evaluate a region of potential common origin. Examples from recent years are shown for different IMS radionuclide stations and measurements in the national capacity of South Korea in the aftermath of the DPRK test explosion in September 2017.