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Design of an Atmospheric Radiotracer Experiment to Improve Local Scale Transport Modeling

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Understanding the impacts of near-field air flow on the long range transport of radionuclides in the atmosphere after a release from an underground nuclear explosion requires improved modeling at the local scale. In this work, we present the design of a radiotracer experiment in a complex terrain environment in support of modeling improvements. A remotely controlled release of Xe-127 gas, produced from neutron irradiation of isotopically enriched Xe-126, provides a radiotracer plume that can be detected by an array of real time NaI(Tl) sensors out to 5 km from the release point. Whole air sampler systems collect gas for later laboratory analysis. A simultaneous smoke release permits tracking of the plume using scanning lidar instruments. An array of meteorological towers provides high resolution wind field data to feed forward and backtracking atmospheric transport models. We will present the design of the experiment and the major elements thereof, including tracer sources, sensors, and samplers.

E-mail

carolyn.seifert@pnnl.gov

Promotional text

This work provides an opportunity to discuss improvements to nuclear-test-ban monitoring with the international community via improvements in near-field atmospheric transport modeling.

Oral preference format

in-person

Primary authors: Ms SEIFERT, Carolyn (Pacific Northwest National Laboratory (PNNL)); Ms JOHNSON, Christine (Pacific Northwest National Laboratory (PNNL)); Mr ELY, James (Pacific Northwest National Laboratory (PNNL)); Mr SHAH, Khiloni (The University of Texas at Austin); Dr WOOD, Lynn (Pacific Northwest National Laboratory (PNNL)); KEILLOR, Martin (Pacific Northwest National Laboratory (PNNL)); Mr FOXE, Michael (Pacific Northwest National Laboratory (PNNL)); Mr BODMER, Miles (Sandia National Laboratories (SNL)); Mr NEWSOM, Rob (Pacific Northwest National Laboratory (PNNL)); Mr STAVE, Sean (Pacific Northwest National Laboratory (PNNL)); WHARTON, Sonia (Lawrence Livermore National Laboratory (LLNL))

Co-authors: Mr GOWARDHAN, Akshay (Lawrence Livermore National Laboratory (LLNL)); Mr HUDSON, Clayton (The University of Texas at Austin); HAAS, Derek (The University of Texas at Austin); Ms DZENITIS, Elizabeth (Lawrence Livermore National Laboratory (LLNL)); Mr ALGER, Ethan (Lawrence Livermore National Laboratory (LLNL)); Mr MACLEOD, Gordon (Los Alamos National Laboratory (LANL)); Dr BROWN, Michael (Los Alamos National Laboratory (LANL)); MOORE, Michael (Pacific Northwest National Laboratory (PNNL)); Mr SCHALK, Walter (National Oceanic and Atmospheric Administration (NOAA))

Presenter: Ms SEIFERT, Carolyn (Pacific Northwest National Laboratory (PNNL))

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