ID: Type: **Poster**

Delayed Telltale Signature of an Underground Nuclear Explosion

Prompt release of gases at the ground surface resulting from existing or explosively propagated vents has typically been considered the only mode of transport of detonation gases from an underground nuclear explosion (UNE) capable of giving rise to measurable levels of radioxenon gases in downwind atmospheric samples. With a model for thermally and barometrically driven post-detonation transport across the permeable ground surface of a simulated UNE site, we show, using the results of simulations and an atmospheric tracer-release experiment, that even UNEs without significant prompt vents or leaks are potentially detectable many kilometers downwind with current technology. The bulk permeability of the UNE site and the depth of detonation appear to be primary source-term parameters controlling the distance of detection from the detonation point. Computer simulations of subsurface transport generally resulted in larger atmospheric signals for shallower, lower-yield explosions.

Primary author: CARRIGAN, Charles (Lawrence Livermore National Laboratory)

Presenter: CARRIGAN, Charles (Lawrence Livermore National Laboratory)

Track Classification: 2. Events and Nuclear Test Sites