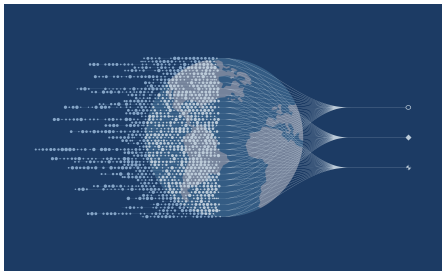

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variability of Xenon and Tritium following an Underground Explosively Driven Release

The measurement of radionuclides is continually performed by International Monitoring System (IMS) operated by the Comprehensive Nuclear-Test-Ban Treaty Organization Preparatory Commission (CTBTO PrepCom). The detection of radionuclides plays an important role in confirming if an explosion is nuclear or chemical. As radioactive gases are transported through the subsurface environment, there is potential for fractionation between the species. The fractionation between species is important for understanding the source term for isotope detectors. During a recent field experiment, radioactive tracers were released along with a high explosive source. The experiment was aimed at understanding the pressure driven transport of materials. Two tracers of interest for this study were 127Xe and tritium gas. The transport of these gases is expected to vary as a function of geologic media, gas sizes and gas chemistry. Real-time measurements were made for 127Xe in gas sampling boreholes and within the tunnel, while tritium real-time measurements were performed throughout the tunnel. In addition to the real-time measurements, grab sample measurements from select gas boreholes and tunnel locations were performed on 126Xe, tritium gas and HTO. In this presentation, we compare the transport of xenon with tritium through a series of measurements from both real-time field and laboratory systems.

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