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detection of underground nuclear explosions by natural signatures

The detection of low-yield underground nuclear explosions (UNEs) is challenging due to containment measures undertaken to prevent escape of radioactive signatures. These signatures include fission and activation products generated from the explosion. Measures may also be undertaken to restrict generation of seismic and infrasound signatures. A new approach is proposed to detect such tests using natural signatures produced from the increased release of radon gas isotopes (222Rn and 220Rn) from the disturbance and pressurization of the sub-surface flow regime caused by a UNE. Whilst physical barriers can be constructed to ensure containment, measures are not typically implemented to restrict radon escaping from beyond the containment cage around the cavity. It is envisaged such soils, rock and pore waters are placed under significant stress and agitation by the explosion, and would be subject to increased radon release. The resulting anomalous radon concentrations (and associated progeny) could be useful for UNE detection.

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