

T3.2-P06. An EMP-based method for discriminating between nuclear and chemical explosions

The Comprehensive Nuclear Test Ban Treaty (CTBT) monitoring technologies such as infrasound and seismic waves are capable of detecting aggressive events, including earthquakes, chemical and nuclear explosions. Further analysis is required in order to characterize the nature of each event and its relevance to the treaty. Here we propose a rapid and automated method for discriminating nuclear explosions from other sources of infrasound signals. Gamma rays emitted by a nuclear explosion produce an electric current via emission of Compton electrons. This current is the source of a strong electromagnetic pulse (EMP) which can be detected large distances away. There are also natural sources of EMP, namely lightning. However, the spectrum of nuclear EMP has significantly different characteristics than that of lightning EMP, enabling reliable and simple discrimination between them. Non-nuclear sources of infrasound such as chemical explosions lack the unique signature of EMP. Thus, accompanying the infrasound monitoring by continuous measurements of electromagnetic signals may provide a powerful tool for highlighting the nuclear events among all infrasound events. Infrasound alerts which have no mutual nuclear EMP signal can be immediately classified as non-nuclear events, eliminating the need for further analysis.

Primary author: LIPSHTAT, Eliezer (Soreq Nuclear Research Center)

Presenter: LIPSHTAT, Eliezer (Soreq Nuclear Research Center)

Track Classification: 3. Advances in sensors, networks and processing